Cambodian Developmental Milestones Assessment Tool (cDMAT): Physiotherapist Guide

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Claudie UNG Montaufray

MD MPH Piet De Mey

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Abbreviations

AHC	Angkor Hospital for Children
BMJ	British Medical Journal
cDMAT	Cambodian Developmental Milestone Assessment Tool
CB-DMAT	Community-Based Developmental Milestone Assessment Tool
DMAT	Developmental Milestone Assessment Tool
F	Fine Motor milestone
G	Gross Motor milestone
HC	Health Centre
L	Language / Cognitive milestone
OPD	Outpatient department (consultation in Health Centre or hospital)
PT	Physiotherapist
S	Social / Personal milestone

Acknowledgement

Many persons and organizations have contributed to the development of the Cambodian Developmental Milestone Assessment Tool. First of all there is Angkor Hospital for Children (AHC) where the tools have been designed, revised and used since 2008.

There are of course all those who participated in the observational study to develop the initial Cambodian DMAT (cDMAT) milestone manual, cDMAT reference charts, the inter-observer variability study, the development of the community-based DMAT (CB-DMAT) and the study on the "*Patient flow process at AHC for patients with developmental delay and disability and the use of the Cambodian Developmental Milestone Assessment Tool (cDMAT) and the Community-Based DMAT (CB-DMAT)"*. The results of all of this have contributed to the development this current Physiotherapist guide.

The cDMAT and CB-DMAT results have been shared in several technical fora, received with enthusiasm and were reviewed by multidisciplinary teams with local and expatriate pediatricians, doctors, department heads in the Ministry of Health, physiotherapists, ergotherapists, speech therapists and community social workers, working in private as well as public facilities in the country.

This led to the development of the **Family Stimulation Guide For Child Development** where besides improved milestone assessment methodology and performance definitions which are the key stone for cDMAT, the milestones became also linked with appropriate stimulation play games from the "Play Activities for Child Development Book" (also known as the Blue Book), which has been widely used in the Cambodian rehabilitation sector. The **Blue Book** as well as many other books and tools developed locally in the past are all the fruits of a collaborative work of the rehabilitation sector and its partners which development started in the early 1990s.

We want to thank and honor here all those in the medical sector, rehabilitation sector and social sector for contributing their time, expertise, resources, enthusiasm and encouragement to the creation of these set of tools which will be of a crucial importance to boost the attention in Cambodia for child development at an intersectorial level, ensuring that all children can achieve their optimal well-being.

We also want to special mention an acknowledgement to the GIZ Improving Maternal and Newborn Care Project that provided most of the financial resources and, together with AHC, the stewardship to push this initiative steadily forward.

1. Introduction to developmental milestone assessment

1.1 Developmental assessment

Child development refers to the process of how a child becomes able to do more complex tasks as getting older, evolving from dependable stage of infancy to an independent adulthood. Several factors contribute to a child's performance varying greatly between different population groups due to how they stimulate their children and how performance is assessed. There is also a marked difference between children in urban and in rural areas with urban children developing usually faster[1]. In a multicultural society it can be therefore challenging to find appropriate benchmarks for these standards when one does not take the child's history and environment into consideration.

Development milestones are set of functional skills or age specific tasks that most of the children manage to do at a certain age range. There are four types of development skills: gross motor, fine motor, languages/communication and social/personal. Child development is very important because it determines their quality of life as well as for the society.

Developmental assessment is the process of mapping a child's performance compared with its peers of a similar age[2]. Developmental assessment includes early identification of developmental delays through screening and surveillance. A more comprehensive, holistic assessment includes the integration of information obtained from the developmental, social, and family history, together with the medical history and a physical examination of the child.

1.2 Goal of Developmental Assessment

The goal of developmental assessment is not only to find out a delay in development but it is equally important to analyze the pattern of strengths and weaknesses in the child, family, and available developmental, educational, and social support systems, in order to direct beneficial interventions.

The steps for defining the needed early interventions for developmental delays:

- Identify whether there is a simple delay in development due to lack of stimulation to achieve certain skill(s) or whether it is caused by an impairment (the condition of being unable to perform a particular skill (set) as a consequence of physical, sensorial or mental unfitness);
- Make an underlying diagnosis which causes that delay, if possible;
- Seek to intervene positively to improve the functioning of the child and family;
- Reinforce acquired skills;
- Teach developmentally appropriate skills for the child's age;
- Identify missed stimulation experience and prescribe them through games;

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[1] Nirmala Rao, report on Technical Support for the validation, finalization and Adoption of the East Asia-Pacific Early Child Development Scales (EAP-ECDS), updated March, 11, 2015

[2] M Bellman, m.bellman@nhs.net; BMJ 2013; 346 doi: http://dx.doi.org/10.1136/bmj.e8687 (Published 15/01/2013)

- Make use of other skills to overcome challenges;
- Adopt the learning style of learning by playing and by repetition in order to promote acquiring new skills.

Developmental monitoring should be used by physiotherapists (PTs) or other professions for identifying children who are falling behind other children of their age in their skill development. Developmental monitoring should give a clear idea about developmental milestones and when on average children reach them. It should help to direct the focus of parents and caregivers in helping and promoting age-appropriate development activities that can further enhance the child's capacity.

To be able to assess the skills or capacities of a Cambodian child, the common international developmental milestone assessment tool "Denver II" (Denver Developmental Screening Test) has been adapted to the Khmer culture / customs. An observational study on healthy, well-nourished Khmer rural and semi-urban children has been conducted in 2015 in order to identify the age-range over which different Khmer children develop each specific skill / milestone. It provides a professional recognized methodology that will guide the PT and the parents to recognize if some delays are occurring for each child that is referred to you

Remember

1. Every child develops differently, also within the same family, depending on its own interests and the stimulation environment it receives and wants to respond to.
2. The PT should have a clear idea about the different age windows for children living in Cambodia to reach each developmental milestone (from birth to age of six years).
3. A child has a developmental delay in one or several specific milestones when it does not (yet) reach the(se) milestone(s) as compared to its peers of the same age and environment.
4. To be able to assess the skills or capacities of a Cambodian child, a Khmer developmental milestones tool has been developed. It helps to identify the common age-range for a number of developmental milestones, providing a professional recognized methodology that will guide the physiotherapist (PT) and the parents to recognize if delays are occurring in children.

1.3 This PT manual

This manual presents the general introduction to the Cambodian Development Milestones Assessment Tool (cDMAT), which are reference charts for Khmer rural and semi-urban children, organized by age-windows of achievement for each milestone.

This manual is not intended to cover all aspects of Physiotherapist intervention on child development and early stimulation intervention.

For understanding the cDMAT, the Family Guide for Developmental Stimulation (chapter 2.3) is an essential complement. For each developmental milestone, it describes the rationale and purpose for a given milestone, the Khmer performance age-range, the respective assessment methodology, the performance criteria for Pass and Fail, and easy and appropriate stimulation games that can be done by parents and other caretakers to stimulate a child's development and to grow up and learn in a playful way to develop each skill.

The manual is organized in the following chapters:

Chapter 2. Child development and cDMAT

Chapter 3. cDMAT reference charts

Chapter 4. How to use the development assessment chart

Chapter 5. Plan and implement the rehabilitation action plan

Chapter 6. Overview of the DMAT intervention cascade

Chapter 7. Cambodian institutions and programs where to learn more on child development

Annex 1 and 2 provide a copy of the cDMAT and the Community-based DMAT (CB-DMAT).

Annex 3 documents their respective reference tables.

Many practical manuals have been developed and field tested in Cambodia over the past two decades about specific aspects of child development. We have listed those essential resources which exist in Khmer language in annex 5 as well as other contacts of Cambodian expert in Child Development that you can obtain through the Cambodian Physiotherapist Association (annex 4).

A pediatric PT assessment form exists already in many formats (see one sample in annex 6). You can adapt it to your needs. The cDMAT should be an annex to it.

Annex 7 refers to other international resources on child development.

2. Child development and the Cambodian DMAT (cDMAT)

2.1. General overview and cDMAT history

Child development refers to how a child gradually becomes able to do more and more complex tasks as they grow older. Each child expands its skills by interacting with its environment. Through its developmental skills the child can fully participate in the community. Every child has the right to live in a society which guarantees its full participation. Barriers thereto should be addressed.

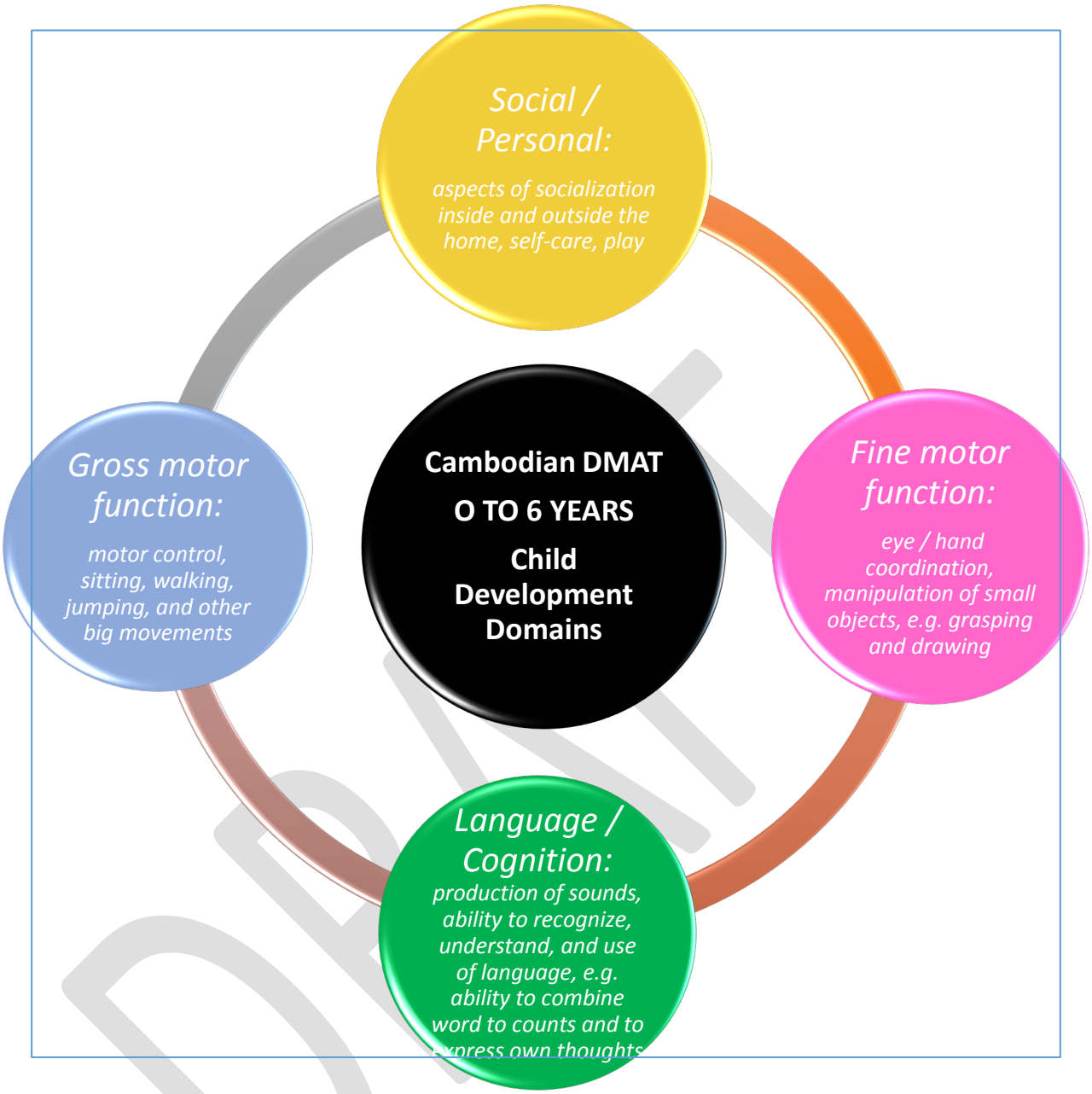
Developmental milestones are a set of functional skills or age-specific tasks that most children manage to do at a certain age range. A development milestone is an event that is much like a road with a sign or mark where the child passes throughout childhood (https://www.mottchildren.org/posts/your-child/developmental-milestones).

In the Cambodian DMAT (cDMAT) there are four types or categories of development skills, called skill domains [3]:

1. Social / personal skills (**S**): This category is about how children interact with others and their ability to express their emotion. Social and personal skills are related to thinking, learning, understanding, problem-solving, reasoning, remembering, caring for personal needs (self-care) like dressing, grooming, eating, drinking and sanitation needs, playing, interacting with others, having relationships with family, friends and teachers, cooperating and responding to the feelings of others.
2. Fine motor skills (**F**): This category refers to skills such as eye-hand coordination, using fingers to pick up small objects, or other small hand movements like for drawing.
3. Language communication / cognition skills (**L**): This category is about how children express their needs and share verbally what they are thinking, as well as whether they understand what is said to them. Language and communication skills refer to those using body language and gestures, speaking, hearing, listening, communicating and understanding what others say.
4. Gross motor skills (**G**): This domain is about how children use their bodies. It refers to skills where large groups of muscles are used to sit, stand, walk, run, jump, keep balance and changing positions.

[3] Some skills can in theory belong to several domains, and are sometimes arbitrarily allocated to one domain. Especially in the social / personal domain one also might need Fine motor, Language and Gross motor skills to perform them. This can be differently classified in different DMATs.

Fig. 1. Skill domains in cDMAT



The direct environment, the development stimuli the child receives and the individual aspiration of the child influences its development: e.g. by giving a child a pen, the child learns to scribble; by having a tree, a child is stimulated to climb; or by playing with older children, a child mimics certain skills. Thus, when interpreting the results of an application of cDMAT, findings related to fast or delayed development must take the environment of a child into account.

The cDMAT is particularly designed to be used by a trained health professional, a school teacher or a social worker, focusing on children up to the age six years. It helps to assess a child's development performance based on age-appropriate tasks.

The cDMAT consists of 129 milestones or skills/activities, which are arranged into the four milestone categories or domains as mentioned above.

The Family Stimulation Guide For Child Development describes each milestone by defining the exact assessment procedure and the performance criteria for Passing or Failing each milestone (chapter 2.3). This Family training manual also documents stimulation exercises to learn to develop each milestone which are used in the Cambodian physical rehabilitation services (Blue Book[4]). It is a reference for examination that will help the physiotherapist (PT) to identify developmental delays in order to, in collaboration with a pediatrician, come up with a targeted medical history and a physical examination, provide a diagnosis, and to identify appropriate medical interventions and stimulation exercises.

The cDMAT is a tool for the PT at hospital level to be applied to children who have been positively screened for suspected development delays by the Health Center or OPD nurse for potential developmental delays. This first level screening can be done with a simplified developmental milestones assessment tool, which is the “Community-Based DMAT” (chapter 2.2 & annex 2).

The cDMAT, however, is not meant to be used as a screening tool but as a diagnostic tool as part of the PT clinical examination. It will draw attention to further detailed physical examinations needed using an appropriate assessment tool, for example the pediatric PT assessment form (annex 6).

It is part of the information that the physiotherapist will be able to provide to the hospital pediatrician. The pediatrician will need this information, together with the results of the PT physical examination, in order to identify further (referral) examination needs offered by other health service providers, e.g. hearing, vision tests or X-ray, medical examination, a diagnosis and the needed intervention and follow up.

The development status as documented by the Cambodian DMAT is only a snapshot in time, keeping on changing dynamically over the life of the child through acquiring gradually more new skills.

[4] See annex 5

2.2 Community-Based DMAT (CB-DMAT)

A quick and basic developmental milestone delay screening tool, the Community-based DMAT (CB-DMAT), has been developed to screen children at the Health Centre, pre-school, social service or at home. It can be used to screen children between 6 months and 6 years. For each age bracket, 4 skills have been defined (1 skills for each of the 4 domains[5]) that children should be able to perform, based on local research conducted in 2015.

A copy of the CB-DMAT with the age reference table can be found in annex 2.

These 4 age-specific milestone performance questions to document developmental delays can be answered by the caretaker of the child or checked by a community health volunteer or by a pre-school teacher.

Failing one of these milestones for their age group or lower warrants a complete cDMAT assessment by the PT in the Referral Hospital. Based on the results of that assessment, further advice may be given on exercises to stimulate child development or referral services that can provide specialist care.

[5] With 2 exceptions: at the age of 12 months (2 Gross Motor milestones and no Language/cognitive milestones) and at the age of 60 months (2 Language/cognitive and 0 Social milestones).

2.3 cDMAT milestone description in the Family Stimulation Guide

Every milestone is described in detail in the Family Stimulation Guide For Child Development following a standardized format.

Format of milestone description and stimulation exercises (family stimulation guide):

<table>
<tr><th colspan="2">P25</th><th>P75</th><th>P90</th><th>P99+</th><th>P100</th><th>Start cDMAT at</th></tr>
<tr><td colspan="2">Month cohort</td><td>Month cohort</td><td>Month cohort</td><td>Month cohort</td><td>(Month cohort)</td><td>month cohort</td></tr>
<tr><td colspan="4">Assessment:
1. X
2. y
3. Z</td><td colspan="3">Criteria:
Pass rules

Fail rules</td></tr>
<tr><td colspan="7">Stimulation games reference on the Blue Book / Box, used in the Cambodian rehabilitation sector)</td></tr>
<tr><td colspan="7">Description of the stimulation games (based on the Blue Book / Box, used in the Cambodian rehabilitation sector)</td></tr>
<tr><td>  </td><td colspan="6">How to adapt stimulation games for children with:
• Visual impairment
• Hearing impairment
• Mobility impairment
• Intellectual impairment</td></tr>
</table>

In the first row and second row the boxes tell at which age (in months) 25%, 75%, 90%, 99+% (virtually everybody) and 100% of the Khmer children manage this skill when they are well nourished and have no obvious disabilities.

The 'start DMAT at' box explains at which age a new cDMAT assessment should include assessing this skill because most probably every child can usually pass this milestone and all previous milestones as it is usually above P100. One expects 4 consecutive pass achievement.

In case there are no 4 consecutive passed milestones at the start of the assessment in each domain, lower ranked milestones in that domain need to be checked, until there is a clean 4 consecutive passed milestones. It is then agreed that lower ranked milestones (lower number) should be all passed, of course when there is no obvious functional limitation which can put this into question.

The third row explains the detailed steps on how the caretaker needs to prepare the games and activities. It defines the assessment methodology and the detailed Pass and Fail criteria for this milestone.

The fourth refers to where to find the stimulation exercises in the Blue Book or Blue Box, which has been copied in the fifth row

The sixth and consecutive rows, when they exist, describe specific adaptations or points of attention for the stimulation games remarks when an impairment is suspected or diagnosed.

	Adaptations for a child who obviously has some difficulties hearing		Adaptations for a child who obviously has some difficulties to control his body and movement
	Adaptations for a child who obviously has some difficulties seeing		Adaptations for a child who obviously has learning difficulties due to intellectual or mental limitations

2.4 General conditions for performing the milestone assessment

During the milestone assessment, the assessor's efforts should aim to obtain the best performance possible from the child and towards obtaining accurate information from the mother / caretaker. A good relationship between the child, the caretaker and the assessor is essential. Consider the following advice:

- The child's parents or primary caregiver should be present. Every effort should be made to make the caregiver and the child comfortable to elicit the most natural activities from the child.
- Perform the milestone assessments in a setting that is familiar to the child in order to decrease distractions and help the child to demonstrate its actual performance. It is therefore always advisable to ask the caretaker whether the child's performance is in line with their expectations. You should ask the caretaker whether they ever saw their child performing a given skill.
- The child's effort should be praised, even for milestones that he/she failed. This builds the child's confidence and may encourage him/her to attempt more difficult tasks.
- Shoes that restrict the child's performance of gross motor milestones should be removed before assessing the child.
- A young child may sit on the caregiver's lap. Infants are maybe evaluated on the floor. An older child may sit alone on a chair or cross-legged on the platform as long as it is comfortable and can reach the test materials easily.
- At a table, the child needs to sit so that his/her arms can rest upon the table. Its elbows need to be level with the table top. If a child is sitting on the lap, and it is too low for the table, one needs to add a pillow.
- The preference of the cDMAT is to see the child performing the skill, but some skills like asking to go toilet are difficult to witness during the assessment.
- When administering the milestone assessment, avoid asking 'leading questions' that may suggest an answer to the parents or other caretakers. Also pay attention to ask the required follow-up questions to supply the necessary information to pass as described in the protocol in the family stimulation guide for child development, asking for his/her detailed observations, rather than prompting the mother to give the desired response. For example, instead of asking "Your child can hold and drink from a cup without spilling, right?", rather ask "Does your child already drink from a cup?" or "He manages already to …?". It may help the caretaker feel comfortable in reporting failures.

- To encourage the child to get used to the DMAT assessment and to initially calm down, one starts with the social domain where there are a lot of questions to the caretaker. One then moves on to the small motor assessment. In this way there is a relationship build-up between the child and the assessor before one starts with the language and cognition assessment. As the last domain one checks the gross motor skills which usually cause the child not to want to sit down anymore.
- The DMAT usually starts with easy tasks that the child can easily perform in order to increase his confidence. The order of different milestone assessments should be flexible and the sequence can be adjusted according to the responsiveness of the child. The order set-up, the hierarchy of each milestone within each domain is influenced by the complexity of learning the different skills within a Khmer rural and semi-urban setting based on the observed performance amongst 1330 children.
    - Some skills need to be in place before a child is able to perform further task, e.g. managing to balance the body while sitting before starting to stand up.
    - Other skills are faster developed in a child due to the stimulations in the direct environment of the child, influenced by Khmer culture and the family conditions, in interaction with the personal interests and ambitions of the child.

Recap. 1. General conditions for milestone assessment

PTs as well as other concerned professionals should keep in mind[6]:

- Every consultation is an opportunity to ask flexible questions about the child's development as part of comprehensive medical assessment and care.
- Parents who voice concerns about their child's development are usually right. However, parents and caregivers are usually more aware of norms for gross motor milestones, such as walking independently, than for milestones and patterns of normal speech, language acquisition, and play skills. PTs should therefore consider targeted questioning in order to get a picture on the child's achievements in the 4 domains.
- PTs are well-positioned helping families to identify developmental milestones among their children. This is an ongoing process as children gradually learn new developmental milestones over time.
- It is important to act early if there are signs of potential development delay because early treatment through stimulation games and potentially other medical interventions are crucial for improving a child's skills and abilities.
- It is important for the PT to confirm his/her findings on failing a certain milestone with the parent's opinion and check with them whether the child is achieving / passing this milestone in other settings and/or whether the child was able to do this before. Due attention should be paid on letting the parents explain clearly so that due Pass or Fail definitions can be verified.
- When parents report a loss of previously acquired skills (regression), the physiotherapist should consider this as a red flag and should promptly refer the child to the hospital pediatrician for detailed assessment and investigation to identify underlying causes.

[6] **Martin Bellman,** BMJ 2013; 346 doi: http://dx.doi.org/10.1136/bmj.e8687 (Published 15/01/2013)

3. Cambodian reference charts for milestone performance

Milestone performance is usually assessed and documented as per skill domain.

In 2015 a study has been conducted to develop Cambodian performance reference charts. The charts presented below show each of the 4 developed reference charts, one for each domain, documenting in a bar-chart for each milestone the proportion (P = %) of children passing the milestones within each monthly age cohort amongst healthy, well-nourished Khmer rural and semi-urban children.

1. Left of the first mark (P25): less than 25% in the month cohort can Pass this milestone.
2. Between P25 and P75: between 25 to 75% in the month cohort can Pass.
3. Between P75 and P90: 75 to 90% in the month cohort can Pass.
4. Between P90 and P99+: 90 to almost 100% in the month cohort can Pass.
5. Between P99+ and P100: less than 1% in the total study cohort have failed this milestone within this age bracket.
6. Right of the bar 100% of the average children can perform the task. Failure to be able to do it by that age would mean a developmental delay which should warrant the need for further evaluation.

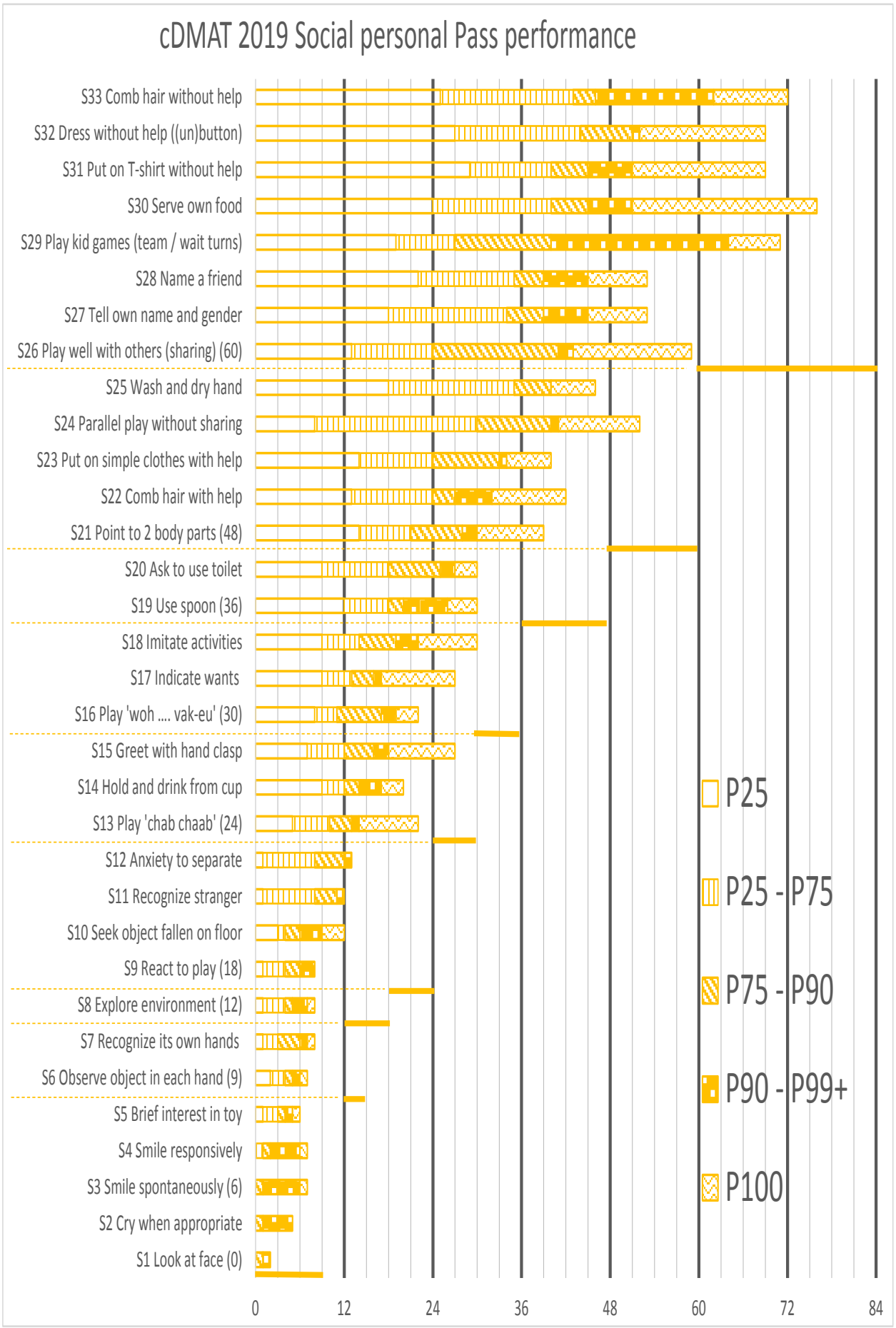
As milestone development depends on the stimulation in the child's environment, they are culturally and socially dependent. These reference charts are therefore different from those developed in other countries.

Moreover, children in urban areas and those who go to school develop usually faster as compared to the indicated age groups in the reference charts as they experience a stimulating environment, what helps to accelerate their development. Thus, the reference charts might not fully apply to other groups such as ethnic minorities, whose lifestyle leads to different development patterns.

3.1 Social / personal domain (Milestone S1-S33)

This domain is about how children interact with others and show emotion. Social and personal skills are related to thinking, learning, understanding, problem-solving, reasoning, remembering, caring for personal needs, interacting with others, having relationships with family, friends, and teachers, cooperating and responding to the feelings of others.

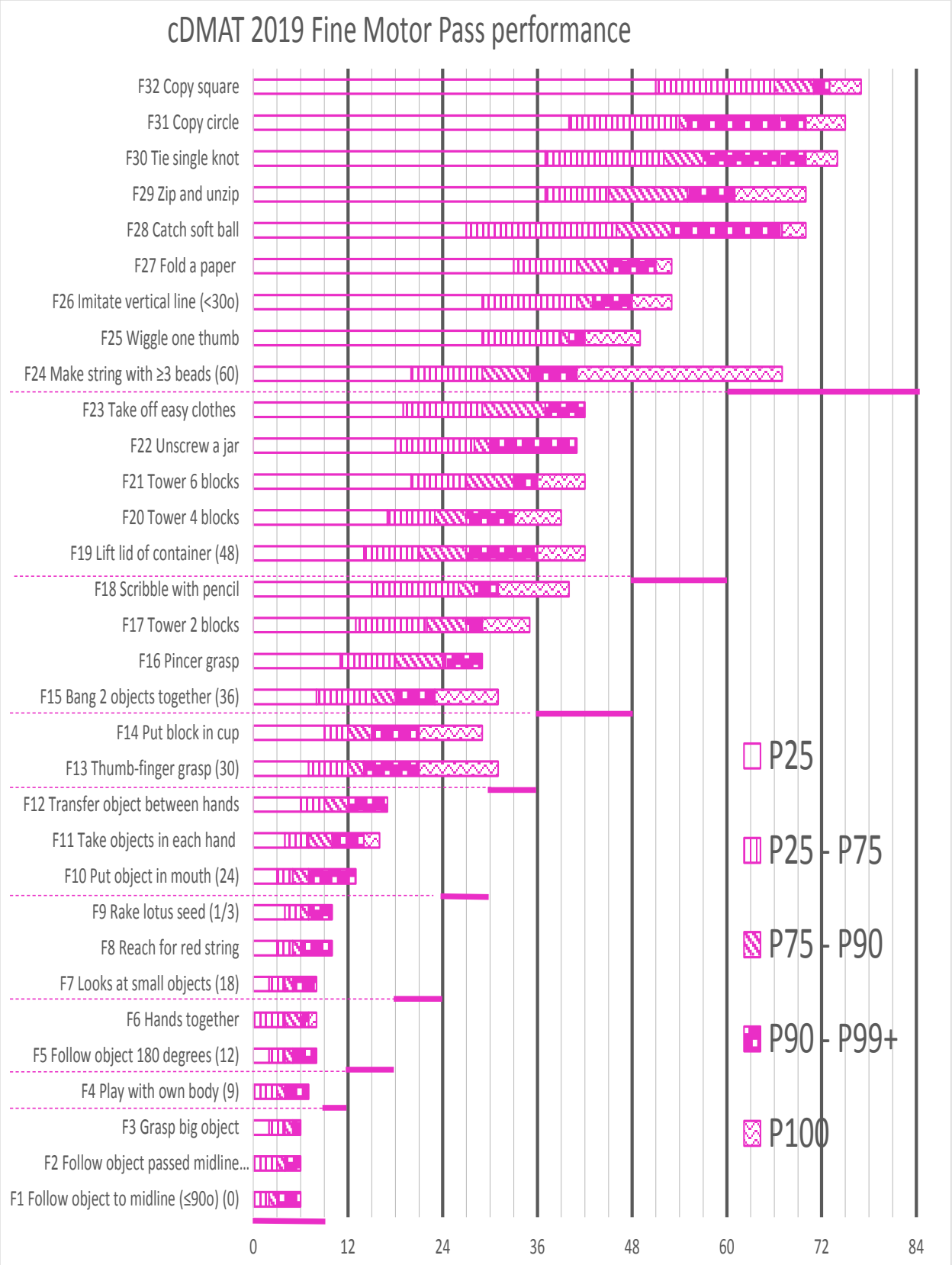
Fig. 2. **Social/personal domain Cambodian reference chart (Khmer)**



3.2 Fine motor domain (Milestone F1-F32)

The Fine Motor Domain refers to fine motor functions like eye/hand co-ordination, and manipulation of small objects, e.g. grasping and drawing.

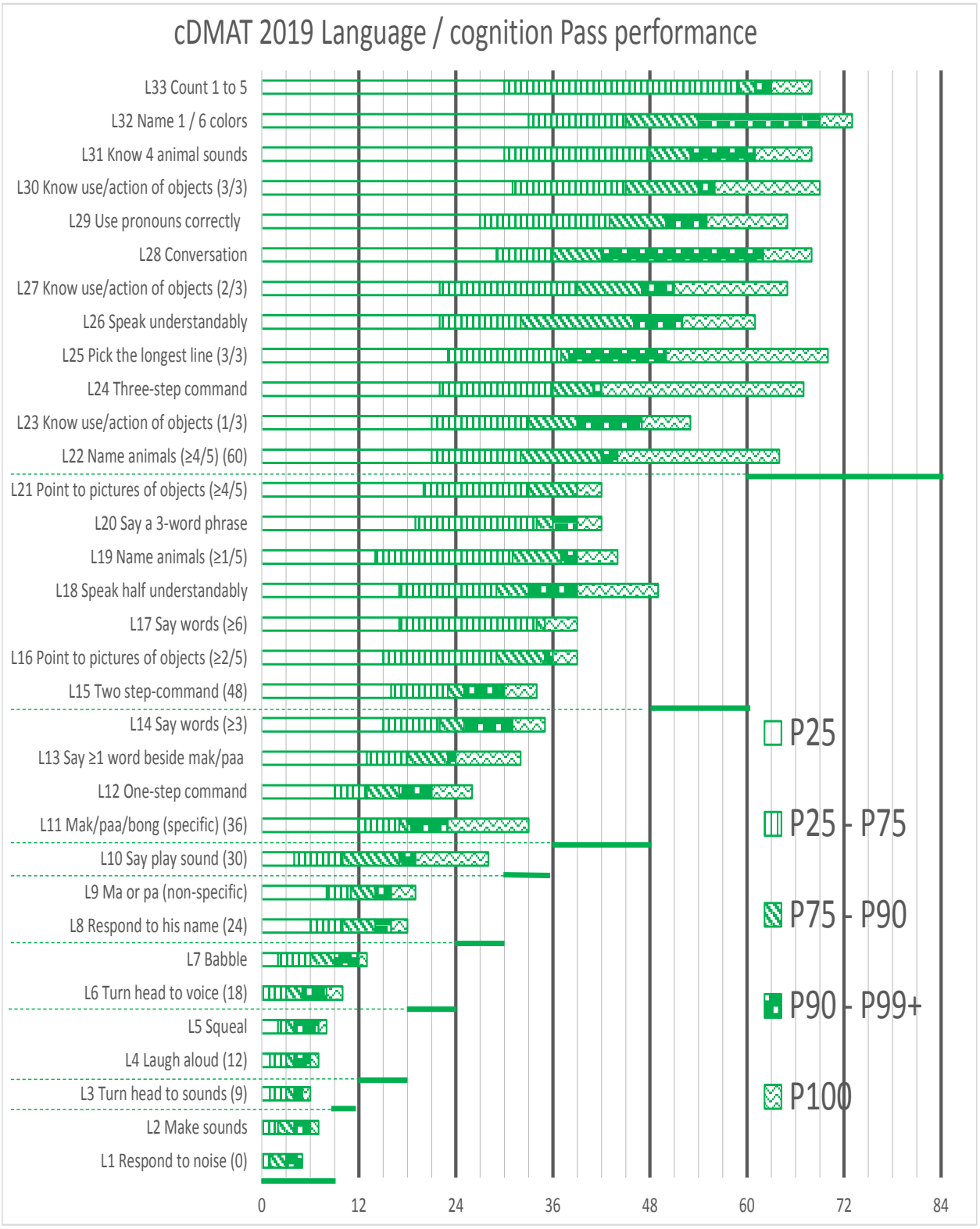
Fig. 3. **Fine motor domain Cambodian reference chart (Khmer)**



3.3. Language domain (Milestone L1-L33)

This domain is about how children express their needs and share what they are thinking, as well as understand what is said to them. Language and communication skills refer to those using body language and gestures, speaking, hearing, listening, communicating and understanding what others say.

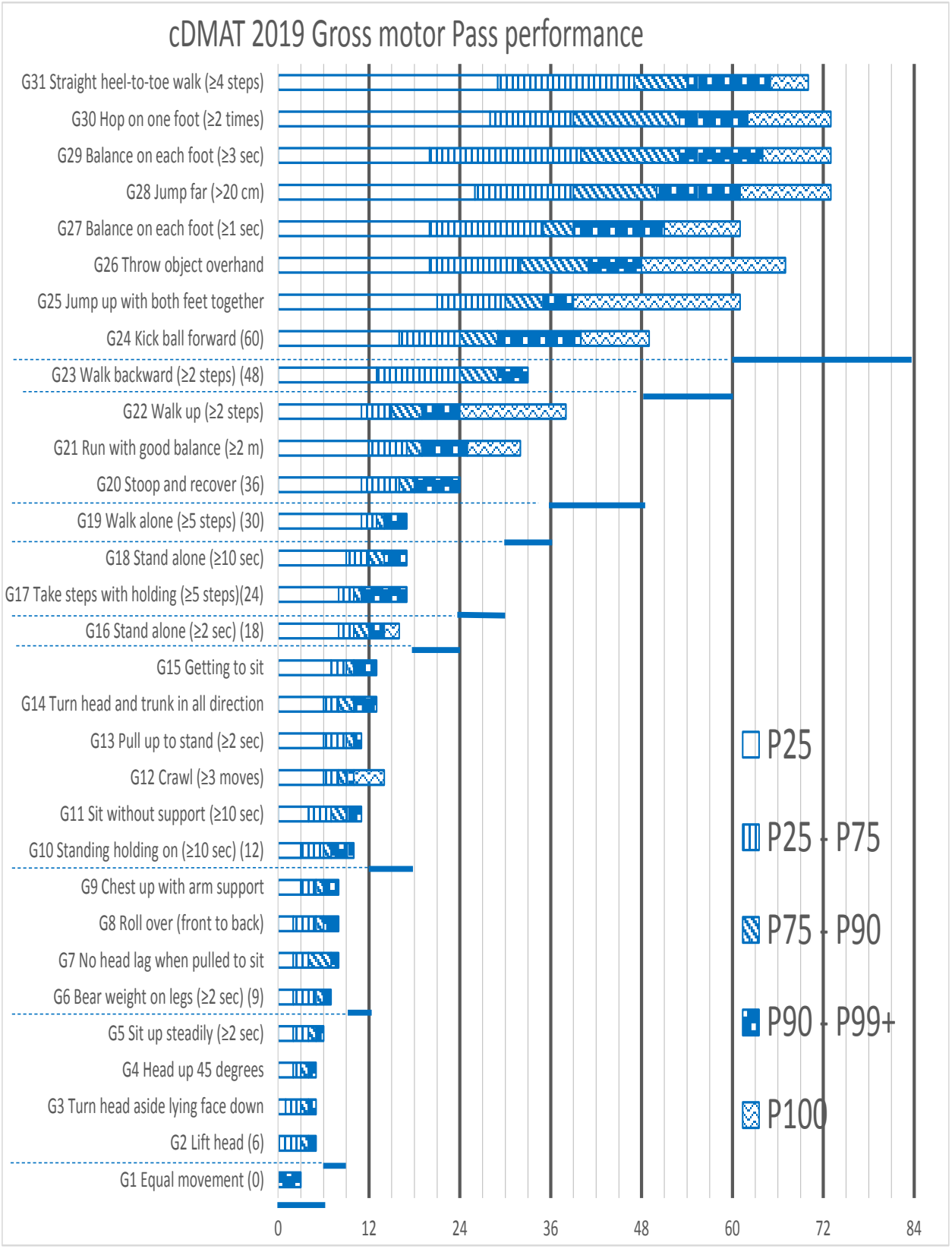
Fig. 4. **Language/cognitive domain Cambodian reference chart (Khmer)**



3.4. Gross motor domain (Milestone G1-G31)

The Gross Motor functions refer to movement control by big muscle groups like equilibrium / balance, sitting, walking, jumping, hopping, climbing stairs, and other movements like kicking a ball forward or throwing it overhand.

Fig. 5. **Gross motor domain Cambodian reference chart (Khmer)**



4. How to use the development assessment charts

Explain the parents or caretakers that the assessment chart will help to better understand what the child can or cannot do and to prepare, if needed, the most appropriate exercises/games, accordingly. Show Figure 1 (Skill domains in cDMAT) in this guide and briefly explain the four domains of child development.

Before using the chart with the child, fill in the general information place, date of assessment name of child, gender, birth date, address and telephone contact numbers.

The Cambodian DMAT usually starts with assessing the less complex milestones in the social domain, before continuing with the Fine Motor, then the Language / cognitive domain and to end up with the Gross Motor assessment. This allows to make all participants more relaxed and collaborative when needed.

In case parents consulting the PT or other professionals have a specific concern, it is important to get the child and the parent relaxed and confident before starting with the domain of child development that is of most concern to the parents, to the Health Center staff or to a medical doctor that has referred the child. It is necessary to explain this to the parents.

Prepare good conditions before beginning the assessment. Put the child in a comfortable position, alone with the mother-father or other caretaker in a quiet area where there are no distractions.

Set aside enough time:

- Any development milestone assessment can easily take more than 20 minutes for the first session.
- Each visit for monitoring the child progress and teaching new stimulation exercises may take up to approx. 1 hour.
- If the child with serious developmental delays would need later a complete PT Pediatric Assessment (i.e. ignoring the 4 Pass and 4 Fail rule (see 4.4)), you need to consider taking a first session of approx. 1.5 hour.

The assessment relies on the observations of what the child can or cannot do. Do not exclusively rely on what the parents give you as information. The child must be encouraged to have several trials to perform the skills / abilities you want him/her to do.

4.1. Material needed during Cambodian DMAT assessment

First, put out a few of the objects listed below to use as toys and for assessing the child's development.

Table 1. Khmer DMAT kit

Items (objects)	Quantity	Milestone
Box with lid (35x35x30 cm)	1	Contains all the items in the kit
Container for big blocks/objects	1	
A4 papers	50	F17, F25, F26, F30, F32, G28
Ball (soft, 10 cm diameter)	1	F29, G24, G26
Beads with holes	10	F7, F9, F13, F16, F27, L29
Blocks (cubes)	10	S5, S11, F3, F10, F11, F12, F14, F15, F18, F19, F20, L29
Chop sticks: short and long	2 sets	L31
Comb	1	S23, S32
Container with press lid	1	F21
Crayon or pencil (sharpened)	2	F17, F25, F26, F30, F32
Cup (small)	1	S14, F15,
Jar with screw lid	1	F23
Light or bright colored object	1	F1, F2, F5
Lotus seeds (dry)	15	F7, F9, F13, F16, F27, L29
Marbles	30	S33, F7, F9, F13, F16
Nylon string (30 cm, red)	1	F1, F2, F5, F8, F27, F31
Picture of 5 household objects	1	L17, L19
Picture of animals: cow, dog, cat, hen, duck	1	L20, L22, L28
Picture of circle and square	1	F30, F32
Picture of cup, spoon and pencil	1	L23, L25, L30
Picture of primary & secondary colors	1	L33
Rattle (container with small items, beads, plastic houses)	1	S3, L1, L2
Sharpener for pencil	1	F17, F25, F26, F30, F32
Shirt with button (gender neutral color, size 2-6 years old)	1	S30, F22
Spoon (kids size)	1	S19
String 1-meter	2	F27, G30
Tennis ball	1	G24, G26
T-shirt (gender neutral color, size 2-6 years old)	2	S29
Towel or cloth (small)	1	S25
Pant or skirt with Zip	1	F28

4.2. How to use the reference charts

Use the age ruler at the bottom of the chart as a guide to draw the actual age line for the child. See example in Fig. 6 for Social milestone reference chart of Pass for a 19 month old child.

a. With a black pencil put a dot around the age of the child on each chart (below at the axis). In this example at 19 months.

b. Draw a vertical line through the 4 domain charts at the child's age.

This **actual age line** (full line) is very important to remind you of the age of the child during the assessment and detect relative or absolute delays in skill development as compared to his age-peers.

If the infant was born before the expected date of delivery (40 weeks after last menstruation), the child is expected initially to develop slower because (s)he did not have the time to mature during the pregnancy.

When the expected delivery date was unknown, you ask for the birth weight of the child. If the birth weight was below 2.5 kg, a second doted indicating the "corrected age line" (interrupted line) should be drawn with a 1, 2 or-3 month reduction in the chronological age to compensate for prematurity until the age of 2 years.

- 2,251-2,500 gram = 1 month early = 8 months pregnancy period
- 2,001-2,250 gram = 1.5 month early = 7.5 months pregnancy period
- 1,751-2,000 gram = 2 months early = 7 months pregnancy period
- ≤1,750 gram = 3 months early = 6 months pregnancy period

c. Because the child in the example of Fig. 6 (next page) was born 2 months early with a weight of 1,900 gram, we need to adjust the age at which we assess the child to 17 months (19-2).

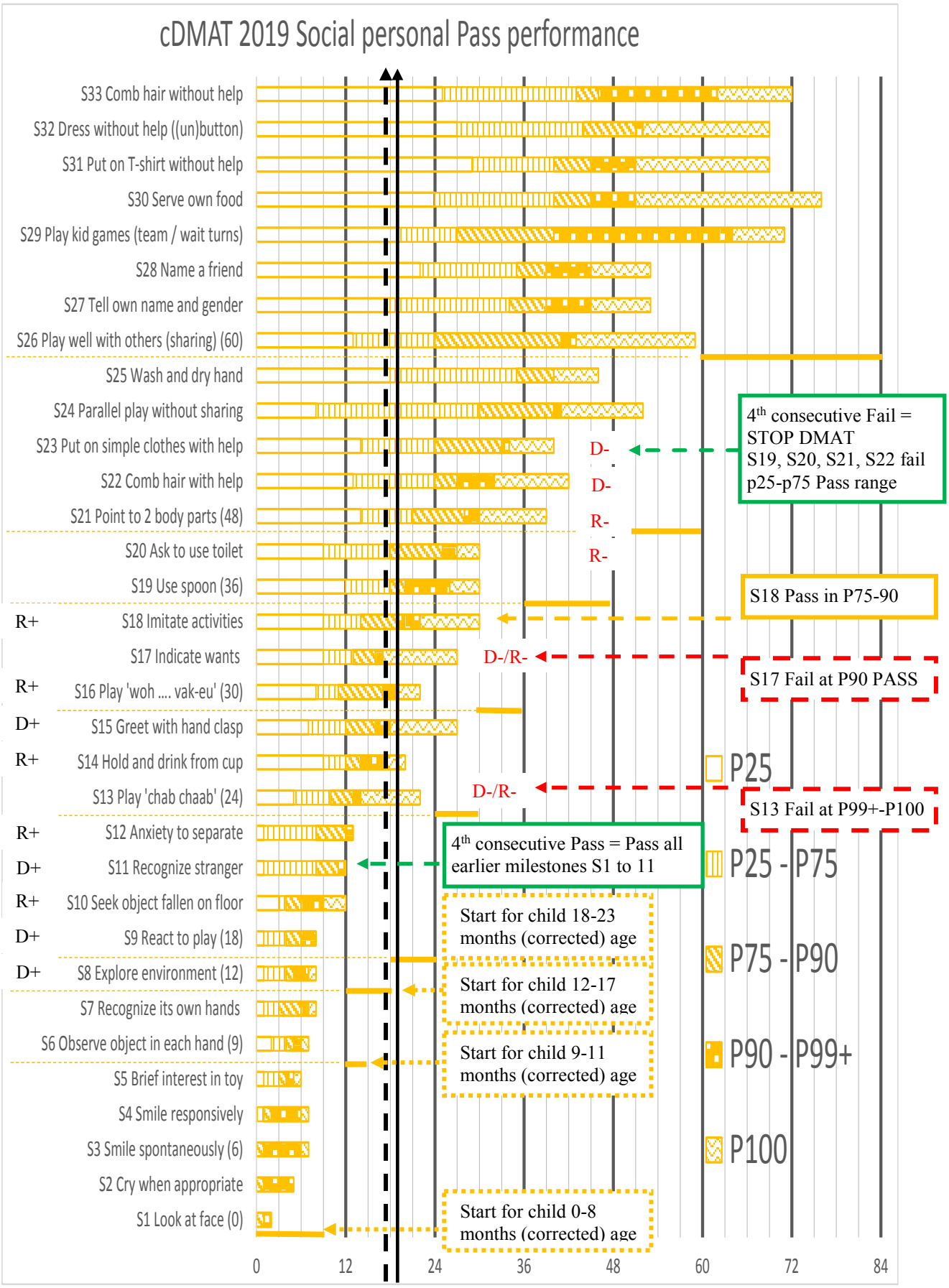
   With a black pencil therefore put a second dot around **the corrected age** of the child on each chart (below at the axis). In this example 17 months.

d. Draw a DOTTED vertical line through the 4 domain charts at the corrected child's age.

The graph indicates horizontal age lines where to start the assessment at the different ages. Where the (corrected) age line crosses one of these horizontal lines is where the cDMAT should start for the child.

Fig. 6. Social domain DMAT sample with actual age line and corrected age line (interrupted) for a child of 19 months (1.9 kg birth weight / 7 months pregnancy)

See p. 24 for drawing the age line and correcting the age for prematurely born children and on p. 25-28 for its detailed explanation.



Corrected age 17 months Real age 19 months

4.3. Recording assessment results for each milestone performance

When possible, the assessor should classify each milestone as “passed” or “failed” by telling the children to demonstrate the relevant milestone activity, following the assessment instructions in the Family Stimulation Guide for Child Development, potentially after physical demonstration by the assessor on what the child is expected to try to do.

Follow the described procedures in the Family Stimulation Guide meticulously for every milestone describing how to perform each activity/skill assessment. Also, carefully check each “Pass” and “Fail” criteria before deciding on passing or failing. It is important to have a relaxed and playful atmosphere where the child is encouraged to perform at its best.

If the child refuses to demonstrate, it is acceptable to ask the opinion of the parent or caregiver whether the child has performed a given milestone previously already or not.

Each milestone can be potentially passed by report of the parent, but also in this case the passing and failing criteria should be carefully explained, requiring the caretaker to fully understand the meaning of the milestone and confirm the child’s performance based on their own observations.

Always check the observed performance with the parents to confirm that this is normal performance of the child.

There are only two possible outcomes for each milestone assessment: Pass or Fail, either by the child performing the skill during the assessment or by the parent reporting whether (s)he can do it.

Therefore, the possible results for each milestone can be usually divided in 4 categories and should be marked as such on the reference chart:

- **Child demonstration**

D+: passed by demonstration;

D-: failed by inability to demonstrate the milestone after 3 trials.

- **Parent / caretaker report**

R+: passed by parent reporting (no as reliable as demonstration);

R- : failed by parent reporting (not as preferable as failing to demonstrate it).

It is possible though that the child refuses to demonstrate and that the caretaker does not know whether their child can perform this skill. Then mark **R?** (not sure), meaning refusal to attempt the milestone by the child, and the parent / caretaker is not aware whether the child can perform this milestone.

It is easier to mark all Passed milestones (D+ or R+) on one side of the chart and all the Failed milestones (D- or R-) on the other side for easy reference, as demonstrated in previous page.

4.4. Assessment order of milestones and cDMAT rules

Based on the Cambodian performance reference tables, some milestones mark in brackets after its description at which age to start the assessment with that milestone (start 0, 6, 9, 12, 18, 24, 36, 48, 60 months). It is expected the child will initially Pass the 4 first milestones assessed and gain confidence to collaborate fully. For easy reference the chart also indicates where to start with horizontal lines for the age bracket.

Children will be assessed, starting with milestones that are assumingly easy to reach for their age. The reference chart shows that all children without developmental delays are able to perform it because P100 is left of the individual age line. From there, more and more complex milestones will be assessed as shown in the sample DMAT in figure 6 (p. 24).

Some rules though apply in general:

The hierarchy or complexity ranking is based on the Khmer learning pattern but it has no implications on the order to make a DMAT assessment. One has all interest to make the child interested rather than to follow the hierarchical order rigidly.

4 consecutive Pass and 4 consecutive Fail rule

1. **The child has to pass at least 4 milestones consecutively at the start.** If a child fails one of the 4 first assessed milestones, the assessor needs to consider whether the child has a serious challenge to participate in the assessment, e.g. not being collaborative or being sleepy, tired or sick and, therefore, the assessment should be rescheduled when the parent confirms that the child does not act as usual. In case this is not the case, less complex milestones need to be assessed until there are 4 consecutives Passed milestones. Only then the assessment will start to record Failure and Passing of more complex milestones.
2. **To stop the assessment the child has to fail at least 4 milestones consecutively.**
3. It is **good to assess all the milestones in-between with their Khmer performance references** in order to compare the child with its age peers.

The rule to pass or fail 4 times consecutively relies on the assumption that once the child passes 4 times consecutively, it will be able to pass all milestone activities less advanced than the level where he passed 4 times consecutively.

Similarly, once the child fails 4 times consecutively, it will most probably fail all milestone activities that are more advanced than the level where they failed 4 times so one stops the assessment for convenience also for the child.

In this way, the consecutive passing and failing method allows to know the results for all the milestone activities for a specific child without requiring to assess all the milestones.

In any case, the assessor needs to identify 4 consecutives passed milestones and 4 consecutively failed milestones per domain. The number of milestones to be assessed will therefore vary with the age of the child as well as with the different performance of each child, even of the same age.

The 4 consecutive pass rule does not necessarily apply for children with a specific disability as the functional limitation of the child might hinder it from performing certain skills, even when stimulated repeatedly. For example, a child with a profound vision impairment will fail to perform certain social domain-related developmental skills requiring

vision capabilities. For example, such as child miss developmental skills such as: S1: look at face, S4: observe object in each hand and S9: explore environment. However, with adapted stimulation exercises this child can overcome certain challenges and learn to perform many more complex social milestones at a later age like drinking from a cup or dressing skills where the inability to see does not exclusive interfere with the performance or where proper adjustments can be made.

For children with an obvious disability or with a multitude of developmental delays, begin the chart with the lowest milestone (number one) and check them all out. Even when there is no crossing yet of the age line with the milestone performance chart, the child can Pass or Fail for different reasons. Every milestone needs therefore to be assessed.

Explanation of Fig. 6 social milestone performance assessment (p. 24)

The chart reflects the assessment in the social domain for a 19 month old child born 2 months prematurely, therefore being compared to a child of 17 months corrected age (dashed vertical line). The vertical line of corrected age crosses the dotted line written under the S8 milestone, indicated by a horizontal bold start bar in the applicable age interval for where to start (12-17 months). If the child would have not born prematurely and therefore considered as 19 months of age, the milestone to start with would have been S12. The assessment therefore starts with S8, S9, S10 and S11.

In our child with corrected age of 17 months, the first 4 milestones assessed (S8-S11) are all passed, 3 by demonstration (D+) (on the left of the respective milestone) and S10 by the mother's report (R+) (on the right of the milestone bar).

The 4 consecutive Pass rule at the start of the assessment is respected and we therefore assume that S1 to S7 are also all passed.

The assessment then steadily works upwards until his/her actual age line (and for premature children the corrected age line) start to cross the bar graphs.

When the applicable age-line has not yet crossed the bar chart for a milestone, it means that the child is expected to be able to perform that skill. In this example in Fig. 6 these are the milestones till S12. Gradually, the applicable line starts to cross the segments in the reference chart, starting from S13:

- P99+-P100 Pass segment: less than 1% of the children in these month cohorts fail to perform this milestone in the observational study and belong clearly to the outliers. The age at which virtually 100 percent of the reference children Pass (P99+) is an important mark for developmental delays for those children who fail to demonstrate milestones at and above this age (see chapter 6 for intervention summary).

  The child in this example is one of them for S13 as it failed to play "chab … chaab". This has been marked by (D-/R-) on the right of the milestone performance bar graph. S14 and S16 are exactly on the p99+ mark but were both passed by demonstration or reporting (marked left of the milestone).

- P90-P99+ segment: less than 10% of the children in these month cohorts fail to perform this milestone in the observational study.

The child in this example is NOT one of them for S15 as the child passed. For S17 Play “ou…. vak-eu” the child is exactly in the P90 month cohort at 17 months corrected age but failed to demonstrate and by mother’s reporting.

- P75-P90 Pass segment: between 10-25% of the children fail while 75-90% pass this milestone in these month cohorts.

  The child in this example passes S18 imitating activities within this segment.

- P25-P75 Pass segment: this is the age-window where the majority of the children learn this milestone according to the observational study. For a child of 17 months corrected age this would be to be able to perform all milestones from S19 until S24.

  The child in this example fails to perform 4 consecutive milestones (S19-S22) and therefore the assessment has been stopped, supposing that also from S23 to S33 the child is expected to fail to perform.

- When the applicable age line is left of P25 segment, the child who passes is amongst the first 25% of the children with the fastest performance for that milestone amongst its age peers (month).

  For a child of 17 months corrected age this would be to be able to perform S25 till S33, except for S28 playing sharing tools with others.

As a performance summary in the social domain, the child has relatively a slow development as compared to its age-peers, especially considering that only for the next 5 months (till 24 months) there will be an age-adjustment due to prematurity:

- The 5 consecutive Passed milestones were all expected for its age.
- Only S18: imitating activities has been performed in the P75-P90 segment.
- One could be preoccupied with not being able to S13 play “chab … chaab” (P99+-P100) and S17 play “ou…. vak-eu” (P90) which might indicate a lack of these interactions in the child’s environment or an absence of interest of the child to interact in this playful way which potentially could be an indication for an impairment.
- This child deserves to have a full medical assessment by a pediatrician (see chapter 6) and a **close follow up** for the next 3 to 6 months to assess the child’s progress expected at the age of 24 months: the gaining of, besides playing chab chaab and “ou…. vak-eu” (older then P100), also S19 to use a spoon (P90-P99+), S20 ask to use the toilet (P75-P90), S21 indicate 2 body parts (P75-P90) and P22 comb hair with help (P75).

This would need to be discussed with the caretakers when developing a rehabilitation / child stimulation plan, besides addressing the findings and recommendations of the pediatrician.

Recap. 2. Review of cDMAT main points

• The DMAT consists of 129 milestones, divided into four domains.

• Ages covered by the 4 DMAT reference charts range from birth to just below 7 years (83 months completed).

• Draw a vertical line at the child's chronological age on these 4 reference charts. Check where it crosses the age-bracket to start the assessment. The assessment should start with the 4 easiest milestones (below) where the age line does not intercept yet with the P100% age-window of achievement. This should result in 4 consecutive Passes.

• Children who are born preterm or have a birth weight below 2.5 kg might have a 1, 2 or 3 months development delay as compared to babies born at term until the age of 2 years. Their age line should therefore take this potential delay in their development into account by documenting a corrected age line.

• The assessment should happen in a relaxed setting, free of distraction. Enough time should be dedicated to directly interact with the child and gain its interest to cooperate. The atmosphere should be play-like and fun as you need the collaboration of the child to demonstrate the skill.

• There may be some variation in the duration of the assessment, depending on both the age, the cooperation of the child and its acquired skill sets: from 4 consecutive pass at the start to 4 consecutive failed milestones allowing to stop assessing. Assessment of children below 1 year is usually faster because they rapidly fail 4 milestones consecutively. The same applies to children above 5 years because only 39 milestones need to be assessed when they have a consecutive 4 Pass at the start in each domain.

• The milestones are preferably recorded through direct observations of the child. If this is not possible, the parent or caretaker can report whether the child is usually capable of performing a given task, but attention needs to be paid to also check the specific performance criteria of Passing and Failing mentioned in the Family Stimulation Guide for Child Development.

• Any milestone performance result should be discussed and confirmed by the caretaker whether the observation mirrors the child's usual or expected performance level. Otherwise a reassessment at a later stage might be required.

• The data of the observational study amongst average Khmer rural and semi-urban children are presented, similar to a growth curve, as monthly-age windows (the respective month-age-cohort where 25%, 25%-75%, 75%-90%, 90%-99+ and outliers (99+-100%) PASS in their respective month-age-cohort).

• All children and adults alike learn from the thrive to succeed, repeated stimulation, lessons learned from failure and from occasional success, in an enabling atmosphere of encouragement, acceptance of needing to practice more to be able to perform consistently and to imagine how to remove, overcome or bypass hurdles which are part of the facts in one's life

• The younger children start to develop skills, the better they will become. The more anyone practices the more expert the child will become.

5. Plan and realize the rehabilitation action plan

- When you have finished the assessment in all domains (4 charts), look and see which skill set the child can do.
- Then look and see the first milestone that the child cannot do in each domain.
- Based on your observation of the child, the family, and your knowledge of the stimulation games that are decribed in the Family Stimulation Guide For Child Development, you can start to develop your rehabilitation plan with the family, agreeing with them on long- and short-term rehabilitation goals.
- Next, look in the Family Stimulation Guide For Child Development for child stimulation games to acquire that skill. These could be your proposal to the parents as the initial short-term goals.
- Review with parents a minimum of 3 games to do at home as 3 short-term goals that would also fit the minimum expectations of the parents for their child's performance.

5.1. Long-Terms Goals

Must

1. Must give an answer to the main complaints / challenges.
2. Must correspond to the main expectations of the family and/or the child.

Why

- There is evidence that clear goals enhance the motivation of the parents and lead to more positive outcomes.
- Using the main expectations of family as the long-term goals creates opportunities for the family and services providers to form a partnership.
- Involving the family in goal setting positively influences a family's satisfaction with the PT treatments.
- Keep the formulation of the goal with the wording of the parents so that they have a clear understanding of what will be aimed for to achieve in the future.
- If the long term-goal is too far, break it down into more manageable short-term Goals.

5.2 Short-Term Goals

Must

1. Must give practical answers to achieve the long-term goals.
2. Must correspond to milestones that will help to achieve the main expectations of the family and/or the child.

Why

- Addressing each underlying cause of failing to reach a specific milestone should correspond to one short term goal, e.g. a simpler skill-set needed to pass the more complex milestone: for example, having a good balance and trunk control while sitting is needed before the child can learn to stand-up.
- Each short-term goal set is needed to achieve the long-term goal. If one short-term goal is missed, the long term goal will not be achievable. When each short-term goal will be achieved, the long-term goal should be achieved too.

5.3. Example of a Rehabilitation Action Plan template

Parents Expectations	**Main Finding**			
	Social			
	Fine Motor			
	Language			
	Gross Motor			
Long-Term Goals	**Time Frame**	**Short-Term Goals**	**Time Frame**	**Description**
1. X		1) A 2) B 3) C		
2. Y		4) D 5) E 6) F		

Recap. 3. Rehabilitation plan

- Families who experience challenges concerning their child's development might come to the PT unit having particular problems or expectations for their child in mind already. Take them seriously and take them into account when developing the rehabilitation plan.
- Plan long-term and short-term goals to address a child's development in areas where you found development delays.
- When the PT is making a Rehabilitation Action Plan with a child's family, (s)he will often need to encourage the family to express their point of view, taking their expectations seriously, and to also give some suggestions to the parents on how they can solve what they consider as the major challenges of the child.

5.4 Steps to start the Rehabilitation Action Plan

5.4.1. How to start

- When the PT and the parents agree to at least 3 short-term goals (3 new milestone games that the parents will do at home with their child), go back to the Family Stimulation Guide for Child Development and try to get or create the materials / toys as suggested in the guide to support the stimulation game(s).
- Ask the parents or caregivers if they have or can prepare the same material at home. If they cannot, think of alternative materials to use that you can help to create or the family is able to obtain.
- Prepare the materials you need before you begin to do the play activities with the child.
- Try yourself first the activity with the child, and then ask the parents or caregivers to try by themselves. Allows them to become familiar with the stimulation game. Do not overcorrect them and make sure to praise any effort of the parents or caregivers. You can always find a positive element to praise, for example:
    - "*It is very good how you noticed the child was looking for the toy*", or
    - "*I like how you looked at your child directly in the eyes*".
- Always ensure the parents or caregivers will go back home only after having performed the games-activities as agreed with them as short-term goals in the Rehabilitation Action Plan. If they are not the daily caregiver of the child, make sure they are able to teach others, who can perform the stimulation game(s) regulary.
- Discuss with the parents how to engage other people in the household (siblings, grandparents), so they all participate in the stimulation games of the child.
- Discuss with them how many times a day they will do the activity, and in which moments. Help them to think realistically and set targets as specifially as possible for the given activity. This will help parents or caregivers to specifially understand how they can support their child's development.
- If possible, provide a copy of the stimulation game(s) from the Family Stimulation Guide For Child Development, which you have agreed upon as short-term goal(s). This will serve as a practical reminder of what parents or caregivers are expected to do.
- Some families or caregivers may not be able to read or understand all the information on the game sheet. It is therefore important that you give this information to them orally and show them the stimulation game in a way that they can easily understand.

5.4.2. How to set up a time for a next appointment.

- Discuss with the parents about the need for follow-up to review with them the progress of the child.
- When they think they could come back to you, set an appointment with them, fine-tuned with the medical follow-up needs as defined by the pediatirician.

- During next visits, explain then again to the parents the level of their child milestone achievement compared to average children so that you all can agree again on new stimulation games (next set of short term goals).

5.4.3. Advice to give to parents about the stimulation games

Advice to the parents and also apply this in your daily practice:

- To encourage a child to do an activity, you first need to know how the child understands you. (S)he may understand by watching the movements of your hands and body, or he may understand and learn by doing an activity with you. To help the child learn, you need to speak and explain the activities in a way that (s)he understands easily. For a child with impaired vision you might need to guide their hands. For deaf children you might demonstrate a skill repeatedly and draw the attention of the child to something important by making gestures.
- The child will learn best if you teach only one activity at a time. Start with an activity that you think the child will like doing. If the child likes an activity, (s)he will learn it more easily.
- Encourage the child during the game. Show the child that you are pleased through the words you use, by the tone of your voice and by smiling. You can also show this by touching and holding the child close to you, and by spending more time with him/her.
- To show the child that (s)he has done well, you can reward him/her. Give him/her something (s)he likes or let him/her do something special. Just showing the child that you are pleased can also be a reward in itself.
- Do not frighten the child with loud words or punishment. A frightened child cannot learn. If the child does something that (s)he should not do, speak firmly but gently and explain to him/her why it is not a good thing to do.
- Play with the child as often as possible. Choose certain times each day so that it can become a routine.
- When you play with the child, you should have the child's full attention. Make sure that (s)he is not hungry or wet. If the child is hungry or wet, (s)he will not listen or learn.
- Choose a quiet place where the child will concentration playing with you. If there are people and noise where you are playing, (s)he will want to look at what is happening and will not be able to learn.
- Most children like to play alone sometimes. Give him/her as much time as (s)he wants to play alone with objects he likes. If (s)he is tired of one activity, find out what other activity (s)he wants to do and do this with him/her. Or, you can let him/her play alone for a while and then start playing again together.
- Children should also be encouraged to play with other children. Sometimes an older brother or sister can play with him/her by doing the activities in the Family Stimulation Guide for Child Development. When the child plays with another child of the same age, at first they may just sit beside each other, but each will play parallel, on their own, not yet together. Later, as the child grows, they will play with

each other more and more. Encourage him/her to play with other children. This will help him/her to learn how to behave with other people.

- As soon as (s)he learns to do a new activity or does something well, show the child that you are extremely pleased. Let the child know that (s)he has done it without help. Then (s)he will be happy and will continue to try to do well.
- After the child has learned to do an activity, (s)he needs to continue doing it. The more often the child does an activity, the better (s)he will do it next time. Sometimes, let the child do activities (s)he has mastered previously. This will encourage him/her and help to learn new activities more easily.

Recap. 4. Starting the rehabilitation plan

- Practice 3 stimulation games agreed as short-term goals with the caretaker during the PT demonstration
- Give them a printout with the game instructions.
- Remind to parents or caregiver before they leave the PT unit to:

1. Do the activities with the child milestone by milestone. If there are several activities, do them one at a time.
2. Advice the caretaker to wait until the child can do one activity repeatedly and consistently, before moving to the next activity / short-term goal for that step if there are more stimulation games.
3. When the child can do all the activities for one milestone, go to the next milestone, which the child cannot do yet in the same developmental domain or start stimulating the development of other delayed milestones in another domain.

Remember — it is good practice to monitor periodically the skill development in a child while it is growing up. If developmental delay(s) are discovered, acting early can make all the difference for both the child and the family in the short and the long term. Children who do not reach milestones in time may need extra support and services to reach their full potential.

Note that if you, after conducting the Cambodian DMAT, find out that there is:

1. A single late milestone development above P90[7] but below P99+, which does not raise a suspicion during the PT assessment that there is an underlying medical issue, it can be treated only by stimulation exercises, without passing the full medical examination.

[7] P90 indicates the age in months where 90% of the children of that monthly age-cohort can perform that milestone. P99+ indicates that every child of that age and older should be able to perform that skill with few exception in well-nourished kids. P100 means no child of that monthly age cohort and older failed that milestone.

2. One or more P99+ or several P90 milestone delay(s): we encourage the PT to perform a complete developmental milestone assessment of the child (cDMAT) as part of the pediatric PT assessment form and to refer the child to a pediatrician for a complete physical assessment in order to eventually clarify his / her diagnosis and more comprehensive treatment.

7. Overview of the DMAT intervention cascade

<table>
<tr><td colspan="4">Assess periodically the performance for age-appropriate milestones according to its age</td></tr>
<tr><td colspan="4">Compare the child's PASS and FAIL performance with the reference charts of each domain:</td></tr>
<tr><td colspan="4">• Identify skills where the child is relatively late as compared to other children (>P90)</td></tr>
<tr><td colspan="4">• Identify skills where the child is definitely delayed (>P99+)</td></tr>
<tr><td>One failed skill > P90</td><td>Several failed skills > P90</td><td>One failed skill > P99+</td><td>Several failed skills > P99+</td></tr>
<tr><td rowspan="10"><u>When the PT does not identify health concerns</u>, demonstrate the caretaker the appropriate stimulation game(s) to develop that skill, explain the reason why and provide a printout of the stimulation games from the Family Stimulation Guide for Child Development.</td><td colspan="3">• Take medical history (incl. milestone development history)</td></tr>
<tr><td colspan="3">• Make a complete physiotherapy examination and fill out the pediatric PT form</td></tr>
<tr><td colspan="3">• Refer to the pediatrician with the pediatric PT form</td></tr>
<tr><td colspan="2">Pediatrician formulates:</td><td>PT makes a further detailed assessment:</td></tr>
<tr><td colspan="2" rowspan="2">1. The potential (historical) physical, sensorial or mental cause(s)</td><td>• Take information about the physical and social environment in which the child grows up.</td></tr>
<tr><td>• Identify potential barrier and facilitators in the child's environment, including the needs for assistive devices.</td></tr>
<tr><td colspan="2">2. A diagnosis if possible</td><td>• Find out priorities from the parent's perspective.</td></tr>
<tr><td colspan="2">3. A medical, surgical, sensorial or mental intervention plan when indicated, including a schedule for follow-up visits if needed (fine-tuned with the PT follow up schedule)</td><td>• Come up with long-term and short-term rehabilitation plan, including follow-up visits, referral for assistive devices when beneficial and the advice for parents to inform village chief about the disability of their child in order to be able to benefit from social support and safety networks</td></tr>
<tr><td colspan="2">4. Start medical intervention if indicated</td><td>• Demonstrate the caretaker the appropriate stimulation game(s) to develop that skill, explain the reason why and provide a printout of the stimulation games</td></tr>
<tr><td colspan="4">PERIODIC FOLLOW-UP by PT and pediatrician</td></tr>
</table>

7. Cambodian institutions and programs where to learn more on child development

7.1. Cambodian Physiotherapy Association (CPTA)

The Association can help you:

- To answer where, when and how to find any training for continuous professional development for PTs, also those on child development milestones and stimulation exercises;
- To make an appointment to visit some PT services working with children with developmental delays and using this kind of stimulation games (annex 5);
- To provide you with examples of Pediatric PT Assessment Form;
- To provide you with links to other Khmer manuals for parents and trainers that can answer some of your needs if they are not yet addressed by the Khmer Family Guide for Developmental Stimulation.

7.2. TSMC Physio school three-year Diploma curriculum

During the first three years of study at TSMC, the students have already received some training on child developmental milestone tools that exist in Cambodia.

The Child Development Milestone Assessment tool that they teach at school was developed in Cambodia around 2000 by Handicap International (in the Blue Book[8]). It was based on an existing Khmer assessment tool created in 1989 (called the yellow book[9]). It was used since then already in child development activities with parents and children at community and rehabilitation center.

You can contact your teacher to receive more background information.

7.3. TSMC Physio Bridging Course

Starting in 2017 at TSMC a bridging course has been organized for PTs with a total duration of two years aiming at reaching an equivalent of a bachelor degree in physiotherapy. The Pediatrics and Women's Health Course covers the topic of child development milestone assessment and stimulation interventions. It is a 150-hour course with 30 hours of theory, 30 hours of practical exercises and 90 hours of clinical practice.

[8] See Annex 5

[9] See Annex 5

ANNEXES

Annex 1. cDMAT form 2019

giz **Cambodian Developmental Milestone Assessment Tool (cDMAT 2019)**

Name: _____ Child enrolled in (pre-)school? __No __Yes __ Unknown

Birthdate: __ __ /__ __ / 2 0 __ __ Highest educational level of the principal caretaker:

Gender: ___Female ___Male ___None ___Primary ___Secondary ___Academic

Assessment date: __ __ /__ __ / 2 0 __ __ **Age at time of assessment: __ __ month(s)**

P99+ (mo)	Social/personal	Pass	Fail	NA
2	S1 Look at face (start 0)			
5	S2 Cry when appropriate			
6	S3 Smile spontaneously (start 6)			
6	S4 Smile responsively			
5	S5 Brief interest in toy			
6	S6 Observe object in each hand (start 9)			
7	S7 Recognize its own hands			
7	S8 Explore environment (start 12)			
8	S9 React to play (start 18)			
9	S10 Seek object fallen on floor			
12	S11 Recognize stranger			
13	S12 Anxiety to separate			
14	S13 Play 'chab chaab' (start 24)			
17	S14 Hold and drink from cup			
18	S15 Greet with hand clasp			
19	S16 Play 'woh .... vak-eu' (start 30)			
17	S17 Indicate wants			
22	S18 Imitate activities			
26	S19 Use spoon (start 36)			
27	S20 Ask to use toilet			
30	S21 Point to 2 body parts (start 48)			
32	S22 Comb hair with help			
34	S23 Put on simple clothes with help			
41	S24 Parallel play without sharing			
40	S25 Wash and dry hand			
43	S26 Play well with others (sharing)(start 60)			
45	S27 Tell own name and gender			
45	S28 Name a friend			
64	S29 Play kid games (team / wait turns)			
51	S30 Serve own food			
51	S31 Put on T-shirt without help			
52	S32 Dress without help ((un)button)			
62	S33 Comb hair without help			

P99+ (mo)	Fine motor	Pass	Fail	NA
6	F1 Follow object to midline (≤90°) (start 0)			
6	F2 Follow object passed midline (>90°)			
6	F3 Grasp big object			
7	F4 Play with own body (start 9)			
8	F5 Follow object 180 degrees (start 12)			
7	F6 Hands together			
8	F7 Looks at small objects (start 18)			
10	F8 Reach for red string			
10	F9 Rake lotus seed (1/3)			
13	F10 Put object in mouth (start 24)			
14	F11 Take objects in each hand			
17	F12 Transfer object between hands			
21	F13 Thumb-finger grasp (start 30)			
21	F14 Put block in cup			
23	F15 Bang 2 objects together (start 36)			
29	F16 Pincer grasp			
29	F17 Tower 2 blocks			
31	F18 Scribble with pencil			
36	F19 Lift lid of container (start 48)			
33	F20 Tower 4 blocks			
36	F21 Tower 6 blocks			
41	F22 Unscrew a jar			
42	F23 Take off easy clothes			
41	F24 Make string with ≥3 beads (start 60)			
42	F25 Wiggle one thumb			
48	F26 Imitate vertical line (<30°)			
51	F27 Fold a paper			
67	F28 Catch soft ball			
61	F29 Zip and unzip			
70	F30 Tie single knot			
70	F31 Copy circle			
73	F32 Copy square			

P99+ (mo)	Language/cognition	Pass	Fail	NA
5	L1 Respond to noise (@ 0 m)			
6	L2 Make sounds			
5	L3 Turn head to sounds (@ 9 m)			
6	L4 Laugh aloud (@ 12 m)			
7	L5 Squeal			
8	L6 Turn head to voice (@ 18 m)			
12	L7 Babble			
16	L8 Respond to his name (@ 24 m)			
16	L9 Ma or pa (start non-specific)			
19	L10 Say play sound (@ 30 m)			
23	L11 Mak/paa/bong (specific) (@ 36 m)			
21	L12 One-step command			
24	L13 Say ≥1 word beside mak/paa			
31	L14 Say words (≥3)			
30	L15 Two step-command (@ 48 m)			
36	L16 Point to pictures of objects (≥2/5)			
35	L17 Say words (≥6)			
39	L18 Speak half understandably			
39	L19 Name animals (≥1/5)			
39	L20 Say a 3-word phrase			
39	L21 Point to pictures of objects (≥4/5)			
44	L22 Name animals (≥4/5) (@ 60 m)			
47	L23 Know use/action of objects (1/3)			
42	L24 Three-step command			
50	L25 Pick the longest line (3/3)			
52	L26 Speak understandably			
51	L27 Know use/action of objects (2/3)			
62	L28 Conversation			
55	L29 Use pronouns correctly			
56	L30 Know use/action of objects (3/3)			
61	L31 Know 4 animal sounds			
69	L32 Name 1 / 6 colors			
63	L33 Count 1 to 5			

P99+ (mo)	Gross motor	Pass	Fail	NA
3	G1 Equal movement (@ 0 m)			
5	G2 Lift head (@ 6 m)			
5	G3 Turn head aside laying face down			
5	G4 Head up 45 degrees			
6	G5 Sit up steadily (≥2 sec)			
7	G6 Bear weight on legs (≥2 sec) (@ 9 m)			
8	G7 No head lag when pulled to sit			
8	G8 Roll over (start front to back)			
8	G9 Chest up with arm support			
10	G10 Standing holding on (≥10 sec) (@ 12 m)			
11	G11 Sit without support (≥10 sec)			
10	G12 Crawl (≥3 moves)			
11	G13 Pull up to stand (≥2 sec)			
13	G14 Turn head and trunk in all direction			
13	G15 Getting to sit			
14	G16 Stand alone (≥2 sec) (@ 18 m)			
17	G17 Take steps with holding (≥5 steps) (@ 24 m)			
17	G18 Stand alone (≥10 sec)			
17	G19 Walk alone (≥5 steps) (@ 30 m)			
24	G20 Stoop and recover (@ 36 m)			
25	G21 Run with good balance (≥2 m)			
24	G22 Walk up (≥2 steps)			
33	G23 Walk backward (≥2 steps) (@ 48 m)			
40	G24 Kick ball forward (@ 60 m)			
39	G25 Jump up with both feet together			
48	G26 Throw object overhand			
51	G27 Balance on each foot (≥1 sec)			
61	G28 Jump far (>20 cm)			
64	G29 Balance on each foot (≥3 sec)			
62	G30 Hop on one foot (≥2 times)			
65	G31 Straight heel-to-toe walk (≥4 steps)			

Comments / specific observations during the assessment

Instructions

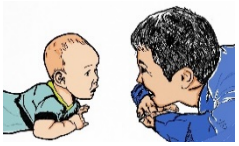
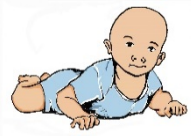
Step 1	Collect demographic information on the child and determine the child's **age in months**
Step 2	Start assessing the child in **this order** of the 4 domains: social/personal, fine motor, language/cognitive, and gross motor.
Step 3	The milestone from **where to start in each domain** at a specific age in months is indicated in (@ xx m) behind specific milestones.
Step 4	Check '**PASS**' if the child passes the skill by demonstration or caregiver report. Check '**FAIL**' if the child fails the skill. Check '**NA**' when the skill is not assessed (e.g. child is unable to perform and the caregiver does not know whether (s)he can do it).
Step 5	REMEMBER to apply the **4 consecutive Pass rule at the start**. In case not, also assess previous milestones till the rule is met.
Step 6	The **4 consecutive Failed rule allows to stop** the assessment for more advanced skills as they are expected to Fail all.
Step 7	**Compare the performance of the child with the P99+ column** which indicates the age in months when virtually all Khmer children are able to do.

Annex 2. Community based DMAT form (CB-DMAT)

Child name:	**Sex:** **F M**	**Birthday: .. / .. / 20... (D/M/Y)**					**HC** **Village**
milestone 2018	**Perfor-mance (months)**	**P25**	**P75**	**P90**	**P99+**	**P100**	CB-DMAT for referral to physiotherapist for full DMAT assessment
S1 Look at face		0	0	1	2	2	Every child from the age of 6 months should be able to perform these 4 milestones
F2 Follow object passed midline (> 90°)		0	3	4	6	6	
L3 Turn head to sounds		1	3	4	5	6	
G4 Head up 45 degrees		2	3	4	5	5	
S8 Explore environment		1	4	5	7	8	9 months = 0.75 years
F5 Follow object 180 degrees		2	4	5	8	8	
L5 Squeal		2	3	4	7	8	
G9 Chest up with arm support		3	5	6	8	8	
S11 Recognize stranger		1	8	11	12	12	12 months = 1 year
F9 Rake lotus seed (1 /3)		4	6	7	10	10	
G11 Sit without support (≥10 sec)		4	7	9	11	11	
G13 Pull up to stand (≥2 sec)		6	9	10	11	11	
S14 Hold and drink from cup		9	12	14	17	20	18 months = 1.5 year
F11 Take objects in each hand		4	7	10	14	16	
L7 Babble		2	6	9	12	13	
G19 Walk alone (≥5 steps)		11	13	14	17	17	
S16 Play 'woh …. vak-eu'		8	11	17	19	22	24 months = 2 years
F12 Transfer object between hands		6	9	12	17	17	
L9 Ma or pa (non-specific)		8	11	14	16	19	
G20 Stoop and recover		11	16	18	24	24	
S19 Use spoon		12	18	20	26	30	30 months = 2.5 year
F14 Put block in cup		9	12	15	21	29	
L11 Makmak/paa/bong (specific)		12	17	18	23	33	
G21 Run with good balance (≥2 m)		12	17	19	25	32	
S23 Put on simple clothes with help		14	24	33	34	40	36 months = 3 years
F15 Bang 2 objects together		8	15	18	23	31	
L14 Say words (≥3)		15	22	25	31	35	
G23 Walk backward (≥2 steps)		13	24	29	33	33	
S26 Play well with others (sharing)		13	24	41	43	59	48 months = 4 years
F22 Unscrew a jar		18	28	30	41	41	
L17 Say words (≥6)		17	34	35	35	41	
G24 Kick ball forward		16	24	29	40	49	
F25 Wiggle one thumb		29	39	40	42	49	60 months = 5 years
L26 Speak understandably		22	32	46	52	61	
L29 Use pronouns correctly		27	43	50	55	65	
G26 Throw object overhand		20	32	41	48	67	
S29 Play team games (waiting turns)		19	27	40	64	71	72 months = 6 years
F28 Catch soft ball		27	46	53	67	70	
L33 Count 1 to 5		30	59	61	63	68	
G31 Straight heel-to-toe walk (≥4 steps)		29	47	54	65	70	

Community based-DMAT (CB-DMAT)

Age 6 months–2 years

			yes	no	
6 months		**By age 6 months, your child can:** ▪ Look at face? ▪ Follow object passed midline? ▪ Turn head to sounds?	☐ ☐ ☐	☐ ☐ ☐	If one or more 'no', refer to specialist
9 months		**By age 9 months, your child can:** ▪ Explore environment? ▪ Flow object 180 degrees? ▪ Squeal? ▪ Chest up with arm	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
1 year		**By age 12 months, your child can:** ▪ Recognize stranger? ▪ Rake lotus seed (≥1 /3 atter ;)? ▪ Sit without support (≥10 se ▪ Pull up to stand (≥2 sec)	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
1.5 years		**By age 18 months, your child can:** ▪ Hold and drink from cup? ▪ Take objects in each hand? ▪ Babble? ▪ Walk alone (≥5 steps)?	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
2 years		**By age 24 months, your child can:** ▪ Play 'woh…. vak-eu'? ▪ Transfer object between ha ? ▪ Ma or pa (non-specific)? ▪ Stoop and recover	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist

Community based-DMAT (CB-DMAT)

Age 2.5 years–6 years

			yes	no	
2.5 years		**By age 30 months, your child can:** ▪ Use spoon ▪ Put block in cup ▪ Mak/paa/bong (specific) ▪ Run with good balance (≥2 m)	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
3 years		**By age 36 months, your child can:** ▪ Put on simple clothes with help? ▪ Bang 2 objects together? ▪ Say words (≥3) ▪ Walk backward (≥2 steps)	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
4 years		**By age 48 months, your child can:** ▪ Play well with others (sharing)? ▪ Unscrew a jar? ▪ Say words (≥6)? ▪ Kick ball forward?	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
5 years		**By age 60 months, your child can:** ▪ Wiggle one thumb? ▪ Speak understandably? ▪ Use pronouns correctly? ▪ Throw object overhand?	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist
6 years		**By age 72 months, your child can:** ▪ Play kid games waiting turns? ▪ Catch soft ball? ▪ Count 1 to 5? ▪ Straight heel-to-toe walk (≥4 steps)?	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	If one or more 'no', refer to specialist

Version: 1.0 (2019)

The CB-DMAT is created by the cDMAT Core Group in affiliation with AHC and GIZ. For usage of the CB-DMAT, please contact Dr Ngoun Pheaktra (pheaktra@angkorhospital.org) or Lina Saem Stoey (linasaem@gmail.com).

Annex 3. Reference tables of cDMAT 2019

Social personal domain cDMAT 2019	P25	P75	P90	P99+	P100	START DMAT
S1 Look at face	0	0	1	2	2	0
S2 Cry when appropriate	0	0	1	5	5	
S3 Smile spontaneously	0	0	1	6	7	6
S4 Smile responsively	0	1	2	6	7	
S5 Brief interest in toy	1	3	4	5	6	
S6 Observe object in each hand	2	4	5	6	7	9
S7 Recognize its own hands	1	3	6	7	8	
S8 Explore environment	1	4	5	7	8	12
S9 React to play	1	4	6	8	8	18
S10 Seek object fallen on floor	3	4	6	9	12	
S11 Recognize stranger	1	8	11	12	12	
S12 Anxiety to separate	1	8	12	13	13	
S13 Play 'chab chaab'	5	10	13	14	22	24
S14 Hold and drink from cup	9	12	14	17	20	
S15 Greet with hand clasp	7	12	16	18	27	
S16 Play 'woh …. vak-eu'	8	11	17	19	22	30
S17 Indicate wants	9	13	16	17	27	
S18 Imitate activities	9	14	19	22	30	
S19 Use spoon	12	18	20	26	30	36
S20 Ask to use toilet	9	18	25	27	30	
S21 Point to 2 body parts	14	21	28	30	39	48
S22 Comb hair with help	13	24	27	32	42	
S23 Put on simple clothes with help	14	24	33	34	40	
S24 Parallel play without sharing	8	30	40	41	52	
S25 Wash and dry hand	18	35	40	40	46	
S26 Play well with others (sharing)	13	24	41	43	59	60
S27 Tell own name and gender	18	34	39	45	53	
S28 Name a friend	22	35	39	45	53	
S29 Play kid games (team / wait turns)	19	27	40	64	71	
S30 Serve own food	24	40	45	51	76	
S31 Put on T-shirt without help	29	40	45	51	69	
S32 Dress without help ((un)button)	27	44	51	52	69	
S33 Comb hair without help	25	43	46	62	72	

Fine motor domain cDMAT 2019	P25	P75	P90	P99+	P100	START DMAT
F1 Follow object to midline (≤90º)	0	2	3	6	6	0
F2 Follow object passed midline (>90º)	0	3	4	6	6	
F3 Grasp big object	2	4	5	6	6	
F4 Play with own body	0	3	4	7	7	9
F5 Follow object 180 degrees	2	4	5	8	8	12
F6 Hands together	0	4	6	7	8	
F7 Looks at small objects	2	4	5	8	8	18
F8 Reach for red string	3	5	6	10	10	
F9 Rake lotus seed (1/3)	4	6	7	10	10	
F10 Put object in mouth	3	5	7	13	13	24
F11 Take objects in each hand	4	7	10	14	16	
F12 Transfer object between hands	6	9	12	17	17	
F13 Thumb-finger grasp	7	12	14	21	31	30
F14 Put block in cup	9	12	15	21	29	
F15 Bang 2 objects together	8	15	18	23	31	36
F16 Pincer grasp	11	18	24	29	29	
F17 Tower 2 blocks	13	22	27	29	35	
F18 Scribble with pencil	15	26	28	31	40	
F19 Lift lid of container	14	21	27	36	42	48
F20 Tower 4 blocks	17	23	27	33	39	
F21 Tower 6 blocks	20	27	33	36	42	
F22 Unscrew a jar	18	28	30	41	41	
F23 Take off easy clothes	19	29	37	42	42	
F24 Make string with ≥3 beads	20	29	35	41	67	60
F25 Wiggle one thumb	29	39	40	42	49	
F26 Imitate vertical line (<30º)	29	41	43	48	53	
F27 Fold a paper	33	41	45	51	53	
F28 Catch soft ball	27	46	53	67	70	
F29 Zip and unzip	37	45	55	61	70	
F30 Tie single knot	37	52	57	70	74	
F31 Copy circle	40	54	55	70	75	
F32 Copy square	51	66	71	73	77	

Language cognition domain cDMAT 2019	P25	P75	P90	P99+	P100	START DMAT
L1 Respond to noise	0	1	3	5	5	0
L2 Make sounds	0	2	4	6	7	
L3 Turn head to sounds	1	3	4	5	6	9
L4 Laugh aloud	1	3	4	6	7	12
L5 Squeal	2	3	4	7	8	
L6 Turn head to voice	0	3	5	8	10	18
L7 Babble	2	6	9	12	13	
L8 Respond to his name	6	10	14	16	18	24
L9 Ma or pa (non-specific)	8	11	14	16	19	
L10 Say play sound	4	10	17	19	28	30
L11 Mak/paa/bong (specific)	12	17	18	23	33	36
L12 One-step command	9	13	17	21	26	
L13 Say ≥1 word beside mak/paa	13	18	23	24	32	
L14 Say words (≥3)	15	22	25	31	35	
L15 Two step-command	16	23	25	30	34	48
L16 Point to pictures of objects (≥2/5)	15	29	35	36	39	
L17 Say words (≥6)	17	34	35	35	39	
L18 Speak half understandably	17	29	33	39	49	
L19 Name animals (≥1/5)	14	31	37	39	44	
L20 Say a 3-word phrase	19	34	36	39	42	
L21 Point to pictures of objects (≥4/5)	20	33	39	39	42	
L22 Name animals (≥4/5)	21	32	42	44	64	60
L23 Know use/action of objects (1/3)	21	33	39	47	53	
L24 Three-step command	22	36	41	42	67	
L25 Pick the longest line (3/3)	23	37	38	50	70	
L26 Speak understandably	22	32	46	52	61	
L27 Know use/action of objects (2/3)	22	39	47	51	65	
L28 Conversation	29	36	42	62	68	
L29 Use pronouns correctly	27	43	50	55	65	
L30 Know use/action of objects (3/3)	31	45	54	56	69	
L31 Know 4 animal sounds	30	48	53	61	68	
L32 Name 1 / 6 colors	33	45	54	69	73	
L33 Count 1 to 5	30	59	61	63	68	

Gross Motor domain cDMAT 2019	P25	P75	P90	P99+	P100	START DMAT
G1 Equal movement	0	0	0	3	3	0
G2 Lift head	0	3	4	5	5	6
G3 Turn head aside lying face down	1	3	4	5	5	
G4 Head up 45 degrees	2	3	4	5	5	
G5 Sit up steadily (≥2 sec)	2	4	5	6	6	
G6 Bear weight on legs (≥2 sec)	2	5	6	7	7	9
G7 No head lag when pulled to sit	2	4	7	8	8	
G8 Roll over (front to back)	2	5	6	8	8	
G9 Chest up with arm support	3	5	6	8	8	
G10 Standing holding on (≥10 sec)	3	6	7	10	10	12
G11 Sit without support (≥10 sec)	4	7	9	11	11	
G12 Crawl (≥3 moves)	6	8	9	10	14	
G13 Pull up to stand (≥2 sec)	6	9	10	11	11	
G14 Turn head & trunk in all direction	6	8	10	13	13	
G15 Getting to sit	7	9	10	13	13	
G16 Stand alone (≥2 sec)	8	10	12	14	16	18
G17 Take steps with holding (≥5 steps)	8	10	11	17	17	24
G18 Stand alone (≥10 sec)	9	12	14	17	17	
G19 Walk alone (≥5 steps)	11	13	14	17	17	30
G20 Stoop and recover	11	16	18	24	24	36
G21 Run with good balance (≥2 m)	12	17	19	25	32	
G22 Walk up (≥2 steps)	11	15	19	24	38	
G23 Walk backward (≥2 steps)	13	24	29	33	33	48
G24 Kick ball forward	16	24	29	40	49	60
G25 Jump up with both feet together	21	30	35	39	61	
G26 Throw object overhand	20	32	41	48	67	
G27 Balance on each foot (≥1 sec)	20	35	39	51	61	
G28 Jump far (>20 cm)	26	39	50	61	73	
G29 Balance on each foot (≥3 sec)	20	40	53	64	73	
G30 Hop on one foot (≥2 times)	28	39	53	62	73	
G31 Straight heel-to-toe walk (≥4steps)	29	47	54	65	70	

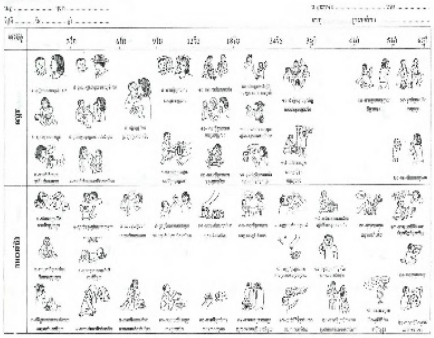
Annex 4: Cambodian projects on child development assessment and rehab

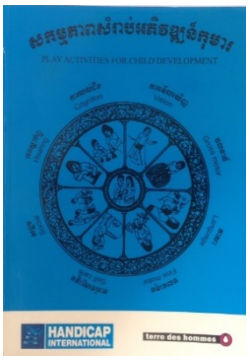
1. Rehabilitation at Community level: CABDICO

cabdico@cabdico.org

CABDICO is the NGO with the most experience in using the Blue Book and its assessment at community level with families as part of home-based rehabilitation. The organization has also been involved in the development of the Blue Book.

A booklet is used as a child file and contains more inquiries about the child development. They use these resources to define short- and long-term goals. It is very practical when you need to get idea and implementing it with parents and child so they can also practice at home as agreed with them as short- and long-term goals.





2. Center for Child and Adolescent Mental Health, Chey Chumneas Hospital, Takmao

caritas-ccmh@forum.org.kh

The Center for Child and Adolescent Mental Health (CCAMH) has been using the Blue Book kit since more than ten years. They are working at center and community level in different provinces. They have developed trainers and parent's manual connected to the main milestone sector.

3. Angkor Hospital for Children (AHC), Siem Reap

Angkor Hospital for Children is the leading institution involved into the development of the Cambodian DMAT (cDMAT). They have qualified pediatricians specialized in child development who are qualified trainers for child development and cDMAT. They implement cDMAT on a daily basis in their Outpatient Department on children internally or externally referred for suspected developmental delays.

In 2017 they conducted a study on *"Patient flow process at a referral hospital in Siem Reap Cambodia for patients with developmental delay and disability and the use of the Cambodian Developmental Milestone Assessment Tool (cDMAT) and the Community-Based DMAT (CB-DMAT)"*.

They use a different entry form which also states the P99+ in front of each milestone: the age in months from where onwards virtually every child is expected to be able to perform this milestone. They can be found in annex 1 to 3 of this PT guide.

Annex 5. Development Milestone Manuals used in Cambodia

This manual is not intended to cover all the aspects of Physiotherapist intervention on child development and early stimulation intervention. Many other culturally appropriate manuals have been developed and field tested in Cambodia over the past 2 decades about specific aspects of child development.

We list here resources which are available in Khmer in Child Development that you can obtain by contacting the Cambodian Physiotherapist Association (www.cambodiapt.org).

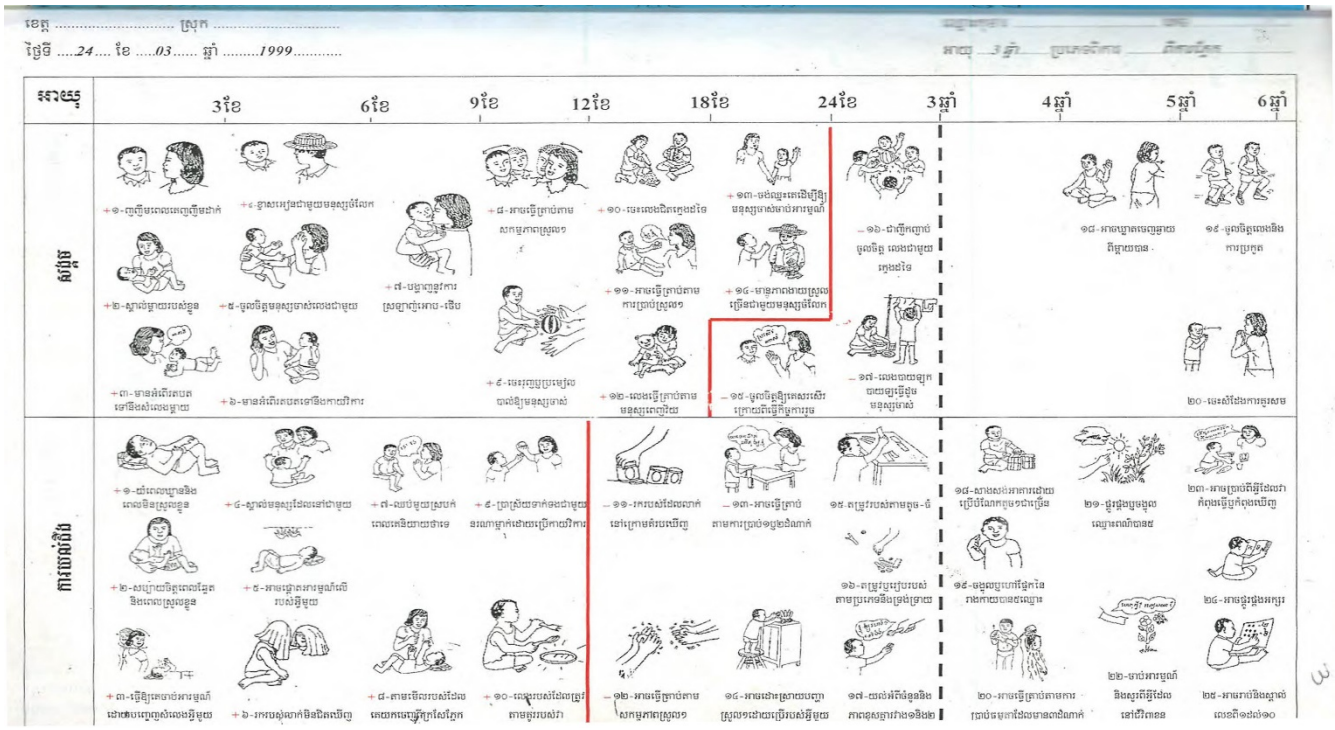
1. Family Stimulation Guide For Child Development

For understanding the cDMAT the Family Guide for Developmental Stimulation (chapter 2.3) is an essential complement. It describes for each developmental milestone what is the purpose of the milestone, the Khmer performance age-range, the assessment methodology, the performance criteria for Pass and Fail, and to find easy and appropriate stimulation games to be done by the parents with their child in order for the child to grow up and learn in a playful way to develop each skill.

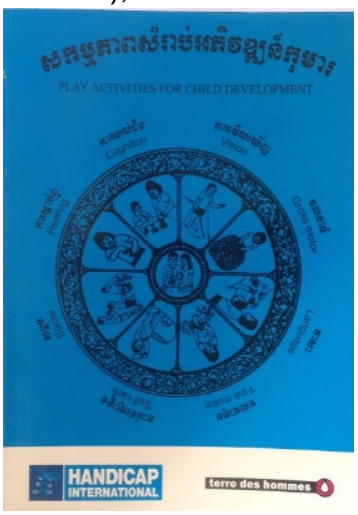
2. Blue and the Yellow Book

The most commonly used developmental milestones assessment tool in Cambodia is part of the Blue Book. It is part of the regular Khmer PT curriculum and is taught in TSMC School. It has 137 milestones, ordered by age based upon Western / international agreed average age-windows of achievement which are different from the Khmer ones.

This assessment tool is divided into clusters of milestones classified in 8 different developmental domains, hierarchically ordered by international recognized age windows. It is derived from different international tools, one of them called “Denver”. It can be compared to the cDMAT with its 129 steps as some 90 milestones are in common.



The “Blue Book” has been developed in early 2000 and was based on the experience on milestone assessment and stimulation games at the Khmer Border refugee Camps (International Rescue Commission), which has been documented in the Yellow Book.



The eight Development domains in the Blue Book are:

1. Social 2. Cognition 3. Language 4. Hearing	5. Vision 6. Gross Motor 7. Fine Motor 8. Self-Care

3. Nine series of manual for trainers and parents at Center for Child and Adolescent Mental Health

These are sets of training books on 9 different topics. Each set contains one trainer manual, one booklet for PT and one for the parents (see sample above).

Series 1: Enhancing Gross Motor Skills
Series 2: Enhancing Fine Motor Skills
Series 3: Toilet Training
Series 4: Teaching brushing skills
Series 5: Train your child to bath
Series 6: We can dress ourselves
Series 7: Teaching grooming skills
Series 8: Train your child to feed himself
Series 9: Teaching basic social skills

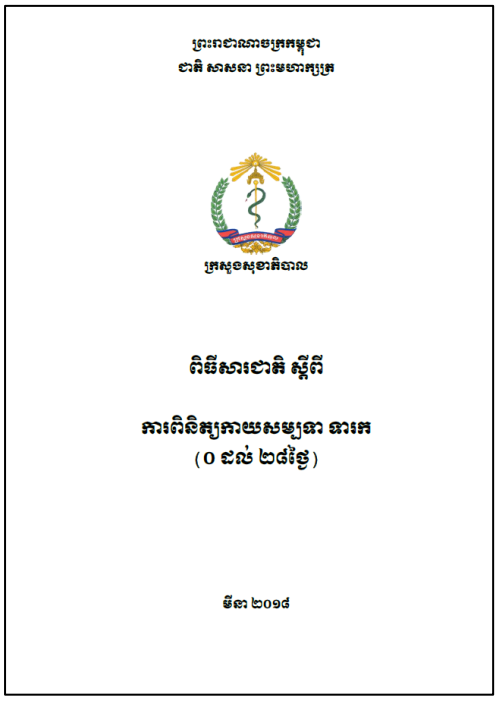
4. **Power Point presentation on "Exercises for Child Development Milestone stimulation" made by PWDF Kheang Kleang Rehabilitation Center**

5. **Screening and referral toolkit for early detection and early intervention of children with aged 0-5 years, Ministry of Health, GIZ, HI**

A set of screening and referral tools for children with disabilities has been developed by the Ministry of Health, GIZ and HI since 2013. Screening checklists for newborns and young children up to 5 years were integrated into national health guidelines in 2016 and 2018. They should assist health staff at health center and referral hospital level to detect suspected impairments in children and refer them to specialist care as needed.

As of 2018, preparations have been made to obtain an approval of the Ministry of Health for the respective training manuals.

Following materials are part of the screening and referral toolkit:

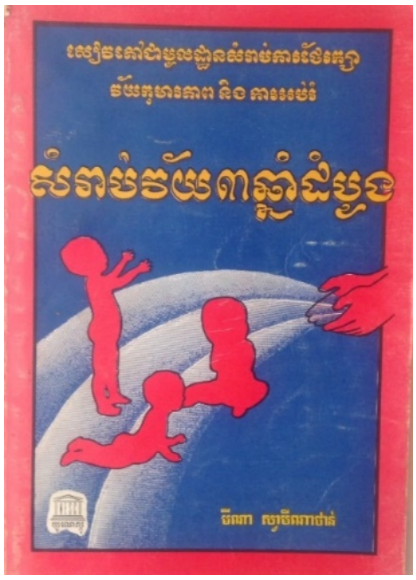


- ToT manual for physical screening of newborns and young children
- Newborn (0-28 days) screening checklist, protocol, and screening demonstration video

- Young child (1 month – 5 years) screening checklist, protocol, and screening demonstration video
- Referral pathways manual for children with confirmed impairments
- Online disability service directory (http://dac.org.kh/directory/)

While mostly focusing on a physical examination of the child, the toolkit, particularly the screening protocols, make a brief reference to child development when assessing the medical history.

6. The first five years (UNESCO)

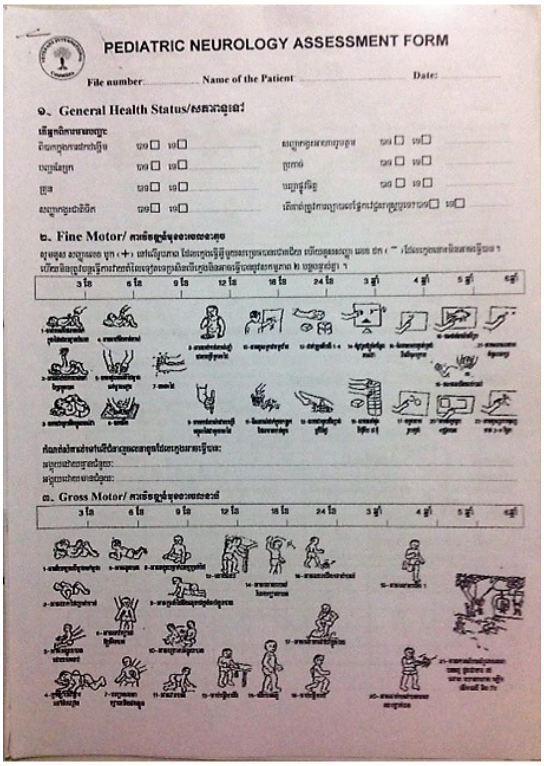


This book in Khmer (English version exist) have game dedicated for group age children to do at pre-school Can be useful to train the physiotherapist.

7. Physical Therapy for Special Children

A Training book for Health workers with information for parents (May 1980), explains in easy Khmer child anatomy. It provides very basic knowledge on child development, delays and impairment.

Annex 6. Local sample of Pediatric PT Assessment Form

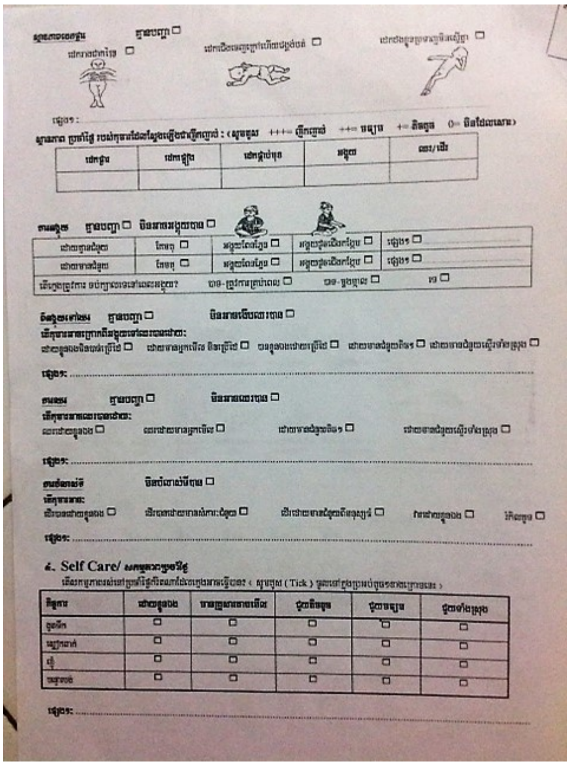

PEDIATRIC NEUROLOGY ASSESSMENT FORM

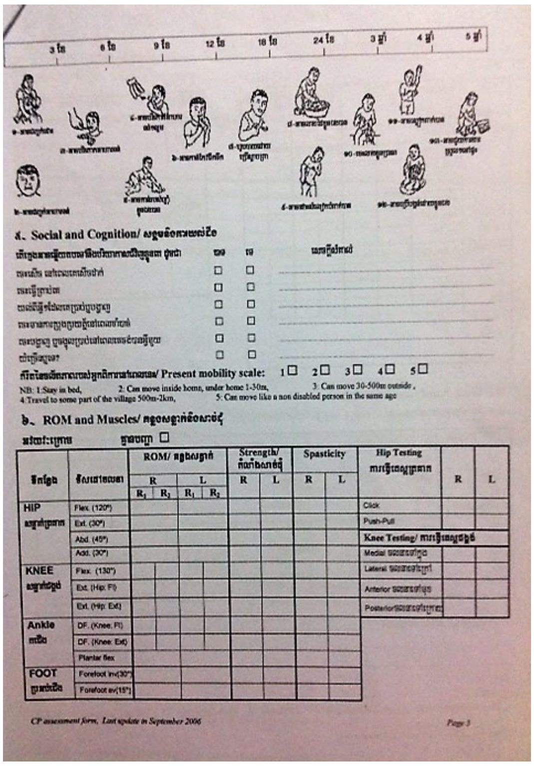
File number Name of the Patient Date:

1. General Health Status/

2. Fine Motor/

3. Gross Motor/


4. Self Care/

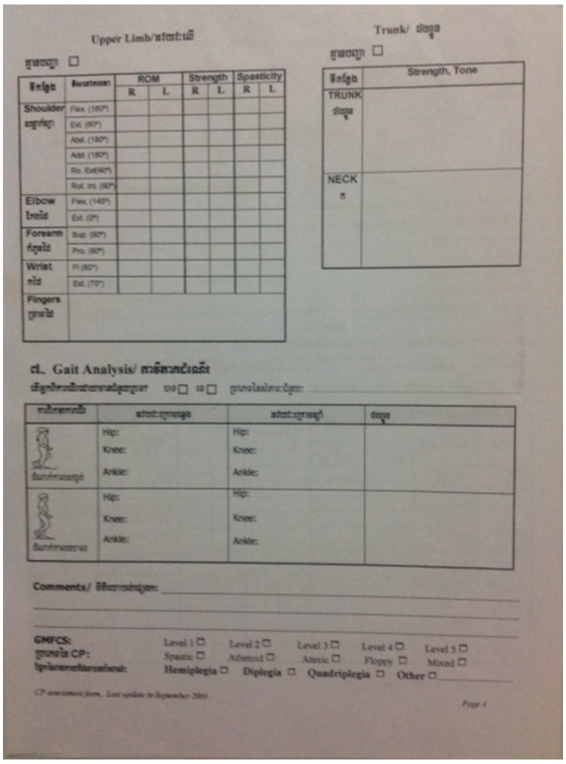

5. Social and Cognition/

Present mobility scale: 1☐ 2☐ 3☐ 4☐ 5☐

6. ROM and Muscles/

		ROM/				Strength/		Spasticity		Hip Testing	R	L
		R		L		R	L	R	L			
		R_1	R_2	R_1	R_2							
HIP	Flex (120°)									Click		
	Ext (30°)									Push-Pull		
	Abd (45°)									Knee Testing/		
	Add (30°)									Medial		
KNEE	Flex (130°)									Lateral		
	Ext (Hip Fl)									Anterior		
	Ext (Hip Ext)									Posterior		
Ankle	DF (Knee Fl)											
	DF (Knee Ext)											
	Plantar flex											
FOOT	Forefoot inv(30°)											
	Forefoot ev(15°)											

CP assessment form, Last update in September 2006 Page 3


Upper Limb/

Trunk/

		ROM		Strength		Spasticity	
		R	L	R	L	R	L
Shoulder	Flex (180°)						
	Ext (60°)						
	Abd (180°)						
	Add (180°)						
	Ro. Ext(90°)						
	Rot. Int (90°)						
Elbow	Flex (145°)						
	Ext (0°)						
Forearm	Sup (90°)						
	Pro (90°)						
Wrist	Fl (80°)						
	Ext (70°)						
Fingers							

	Strength, Tone
TRUNK	
NECK	

7. Gait Analysis/

	Hip: Knee: Ankle:	Hip: Knee: Ankle:	
	Hip: Knee: Ankle:	Hip: Knee: Ankle:	

Comments/

GMFCS: Level 1☐ Level 2☐ Level 3☐ Level 4☐ Level 5☐

Spastic ☐ Athetoid ☐ Ataxic ☐ Floppy ☐ Mixed ☐

Hemiplegia ☐ Diplegia ☐ Quadriplegia ☐ Other ☐

CP assessment form, Last update in September 2006 Page 4

Annex 7. International resources[10]

ABOUT CHILD DEVELOPMENT

Pathways

http://pathways.org/images/random_pdfs/Early_Infant_Assessment_Redefined_Handout1.pdf

Stimulation play

- Early child development kit: a treasure box of activities, UNICEF (Games and activities for children from 0 to 6).

  http://www.unicef.org/earlychildhood/files/Activity_Guide.pdf

CHILDREN WITH DISABILITIES

These documents also exist in Khmer. Please contact the Physiotherapy Association to get electronic access to the Khmer versions.

- Training in the community for people with disabilities, WHO, 1989

  We recommend the section of play activities, which can be downloaded as "General Training Packages": English and French version

  http://www.who.int/disabilities/publications/cbr/training/en/

- Disabled Village Children, Women with Disabilities, Blind Child, Deaf child and where there is no doctor, … can be downloaded in many different languages from Hesperian.org, including Khmer

  http://hesperian.org/books-and-resources/language-list/

[10] Source Blue Box from Handicap International