Hong Kong Reference Framework for Preventive Care for Children in Primary Care Settings

Module on Development

2018
Acknowledgments

The Department of Health gratefully acknowledges
the invaluable support and contribution of
the Advisory Group on Hong Kong Reference Framework
for Preventive Care for Children in Primary Care Settings
in the development of this Module.
The on-going updating and development of new modules under this reference framework is supported by the **Advisory Group on Hong Kong Reference Framework for Preventive Care for Children in Primary Care Settings** since 2016. The Department of Health gratefully acknowledges the invaluable support and contribution of Members of this Advisory Group.

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Chapter 1. Developmental Surveillance

1.1 Introduction
A child undergoes development to evolve from a dependent infant to an independent youngster capable of basic ways of thinking, responding, and solving problems [1]. Genetic and environment factors are important in the developmental process.

Development is a continuous process. Skills are acquired sequentially, one goal after another. Furthermore, the development of later goals often depends on the achievement of earlier goals within the same field.

Early identification of children with developmental delays or disorders is important to the well-being of children and their families. It often requires orchestrated effort of health care professionals, care-givers and teachers. Early identification will lead to further evaluation, diagnosis and as a result early and timely intervention. Early intervention is available for a wide range of developmental disorders; their prompt identification can spur specific and appropriate therapeutic interventions [2].

1.2. Developmental milestones

1.2.1 What are the different areas of development? [1]
There are several areas in the developmental assessment. They overlap and interact with each other.

- Gross and fine motor
- Communication / Language
- Emotion, social behaviour
- Cognition
- Vision
- Hearing

The acquisition of a key performance skill is referred to as a milestone. Primary care doctors should be familiar with the normal milestones to ensure a proper assessment. Although development is generally predictable, timing to achieve a certain milestone varies. Hence, a child developing normally can be delayed in one or more milestones at a particular point in time but may subsequently catch up [3]. It is likely that a reliance on developmental checklists alone can result in over-identification of developmental delay. Therefore, checklists should be used as an adjunct to early detection. However, if there is significant delay on one area or when the delay is global (in two or more domains), then referral to specialist should be considered. A holistic approach is essential in the identification of developmental delays [4]. An early follow up of progress is also important and prompt referral to specialist is warranted if there is lack of improvement.
1.2.2 Developmental milestone checklists
There are different kinds of developmental milestones checklists readily available online, in medical textbooks or in many parenting books. They all show similar progression of skills acquired at different ages but in various length of item lists. Some simplified ones are designed according to different age groups and could be printed out for parents’ reference.

Examples of online developmental milestone checklists:
(i) Family Health Service, Child Health Information (http://s.fhs.gov.hk/s649c)
(iv) Ages & Stages Questionnaires. ASQ-3 (http://agesandstages.com/)
(v) ZERO TO THREE (https://www.zerotothree.org/resources/72-infant-and-toddler-development-screening-a nd-assessment)

(Please also refer to Annex on Developmental Milestones for information)

1.3 Developmental surveillance and screening

1.3.1 Definition
Developmental surveillance is defined as a flexible, continuous process whereby knowledgeable professionals perform skilled observations of children and identify parental concerns during the provision of health care [2], [5]. It is not a process of administering tests [6]. Indeed it ranges from specific inquiry into parent/guardian concerns, developmental history, risk factors for specific conditions such as autism, to surveillance for other contributing factors such as hearing or vision problems, and accurate observations of the child during the visit [7].

In addition, surveillance is useful for determining appropriate referrals, providing patient education and family-centered care in support of healthy development, and monitoring the effects of developmental health promotion through early intervention and therapy [1]. With all these benefits, it is recommended that developmental surveillance to be incorporated at every well-child preventive care visit. Any concerns raised during surveillance should also be promptly addressed [8].
Developmental screening, on the other hand, is the administration of a brief standardized tool aiding the identification of children at risk of a developmental disorder [8]. It is a cross sectional analysis, which tests are administered to whole population to identify those not meeting standard expectations of development. Screening tests are inherently imperfect assessments because they have to balance the risk of missing a child with delays (sensitivity) versus erroneously identifying children without true delays (specificity) [9]. Repeating the test after an appropriate time interval, or conducting a secondary screening with a more accurate and specific test, may improve test accuracy. Therefore developmental screening alone is controversial and not being promoted in most countries. Children’s development is dynamic in nature, regular and repeated screening combined with surveillance, parental reports and concerns are needed to detect developmental delays [8].

### 1.3.2 Developmental Screening Tools

There are two types of formal developmental screening tools: direct observation in conjunction with parent report (known as directly administered) and those based on parent report alone (known as parent completed) [10]. Directly administered screening tools, which provide more in-depth information and take longer to complete, are useful as second-stage screening tools. They are best used in a setting in which there is time given to work individually with patients. Parent-completed tools are an effective way to screen for developmental delay. They are feasible and easy to use in busy primary care offices and are more time efficient and practical in this setting than directly administered tools [11]. Parents can complete them while they wait for their appointment. Two of the most extensively evaluated parent-completed tools are the Parents’ Evaluation of Developmental Status (PEDS) and Ages and Stages Questionnaire (ASQ) [12]. For details, refer Section 1.3.4.1.

### 1.3.3 Timing of Developmental Surveillance

Developmental surveillance can be carried out in the following time:

- During well-child health visits e.g. regular developmental surveillance is provided by Maternal and Child Health Centres of the Family Health Service when children attend the scheduled visits (Schedule of the Integrated Child Health and Development Programme is available at their webpage) http://www.fhs.gov.hk/english/main_ser/child_health/child_health_schedule.html
- When the children attend health visits for immunisation
- As an opportunistic screening during episodic illness to family doctors
- When children with identified risk factors (such as prematurity) are followed by paediatricians / specialists
- When parents and carers express worries about their children’s development [1]
1.3.4 Components of Developmental Surveillance

There are five components of developmental surveillance: [2], [5], and [8]

- Eliciting and attending to parental concerns
- Obtaining a relevant developmental history
- Making accurate and informative observations of children
- Identifying risk and protective factors
- Maintaining an accurate record for documenting the process and findings

1.3.4.1 Eliciting and attending to parental concerns

Developmental concerns should be included as one of several health topics addressed at each preventive care visit throughout the first 5 years of life [8].

A lot of research data suggested that parents’ opinions and concerns together with doctors’ clinical impression increase the accuracy of identifying developmental problems [13]. Concerns about motor, language, global / cognitive and school performance were shown by studies to have high sensitivity (about 80%) [14]. Parents know their children best so they are most often the first ones to identify any problems or discrepancies. Hence, parents should be encouraged or educated on seeking professional advice once they suspect any developmental problems [12].

Despite the high sensitivity of parents’ observation, their specificities are less than desirable and have limited positive predictive value [13]. Parents are most likely to report behaviour that they regard as unusual, and knowledge of child development is basic to parents’ understanding of what is and is not normal behaviour for a child of a certain age [15]. This might distract physician’s decision-making due to inaccurate information.

On the other hand, the absence of concerns or concerns in other areas i.e. socialisation, self-help, or behaviour, has reasonable specificity [14]. It is recommended that doctors should listen carefully to parental concerns and observations about the child’s development during all encounters [16].

Systematic elicited parents’ concerns through the use of standardized questionnaires have sensitivity and specificity approached standards for screening tests [8]. Recommended developmental screening instruments for 0 to 6 years that tend to be more feasible in primary care settings are these parent-report instruments [10,11]:

- Ages and Stages Questionnaires, 3rd edition (ASQ-3)
- Child Development Review Parent Questionnaire (CDR-PQ)
- Infant Development Inventory (IDI)
- Parents’ Evaluation of Developmental Status (PEDS)

However, they are time consuming and some of them lack Chinese versions.
For all ages combined, the PEDS tool has a sensitivity of 75 percent and a specificity of 74 percent [4]. There is no true numeric scoring; children are instead placed in low-, medium-, and high-risk categories. In general, children found to be at medium or high risk require referral for further testing. An electronic version that can be integrated into the electronic health record is available online at http://www.pedtest.com.

The ASQ, third edition, has a series of 21 age-specific questionnaires starting at one month and ending at five and a half years of age. Overall specificity of the ASQ, third edition, is 86 percent, with an average sensitivity of 85 percent [17]. It takes 10 to 15 minutes for parents to complete; if interviewer assistance is needed, it takes 20 minutes to complete. It also takes one to five minutes to score. It is available online at http://agesandstages.com.

Opportunistic care can be offered by primary care physicians to identify developmental problem in every visit. Those children at risk should be referred for further assessment. Preventive care of child’s development can be tailored to his/her age. (Please refer to Chapter 6 of the Core Document of the Hong Kong Reference Framework for Preventive Care for Children in Primary Care Settings.)

Other suggested opportunistic screening questions [18]

- Do you have any concerns about the way your child is behaving, learning, or developing?
- Do you have any concerns about the way he or she moves or uses his or her arms or legs?
- Do you have any concerns about how your child talks and understands what you say?
- Does your child enjoy playing with toys? Describe what he or she does while playing.
- Has your child ever stopped doing something he or she could previously do?
- Does your child get along with others?
- Do you have any concerns about how your child is learning to do things for himself or herself?

A more practical way for primary care physicians is to elicit parents’ concerns and followed by detailed history and assessment. Simple questions are recommended [8]. Some example questions are:

- “Do you have any concern about your child’s development, behaviour or learning?” (你有沒有特別擔心孩子的發展、行為或學習？)
- “Do the teachers have any concern/complaint about your child’s development, behaviour or learning?” (老師有沒有特別擔心孩子的發展、行為或學習？)
- “Is the child receiving or waitlisted for any specialist services, training, assessment or school placement? (孩子有否正在接受或輪候專科覆診、治療訓練、評估或學位安排?)
Recommendation

• Systematically elicit parental concerns in order to detect behavioural and developmental problems of children.

Supporting evidence

• Systematically eliciting parental concern is effective in early detection of behavioural and developmental problems and can be used to make reasonably accurate referral decisions in primary care setting [13][14].

1.3.4.2 Obtaining a developmental history

A developmental history updated through direct questioning a child’s parent or carer can assist identifying developmental abnormalities that warrant further investigation. There are times when the parent or carer has not noticed any problems in the child’s development.

General questions like “What changes have you seen in your child’s development since our last visit?” (自上次診症,你孩子的發展有什麼轉變?) should be a component of any history taken during a well-child visit [8]. Then more specific questions taking reference from developmental milestone checklists (refer 1.2.2 for details) will help.

Age-specific queries can be asked according to the respective developmental milestone. The Developmental Surveillance Questionnaire (DSQ) [19] used in Maternal and Child Health Centres (MCHCs) of the Family Health Service (FHS) is a set of questionnaires administered at specific time which contains specific questions covering different developmental areas at particular age. They are administered by trained nurses at each MCHC visit. The 6th month, 12th month and 18th month are routine questionnaires while questionnaires of 2nd month, 4th month, 9th month, 24th month, 36th month, 48th month and 60th month are administered for those children who require closer monitoring. The average time for completing the surveillance ranges from 5-15 minutes for DSQs of 12th month and below to 10-15 minutes for DSQs of 18th month and above. Further assessment by trained MCHC doctors will be arranged for those with developmental concerns from nurses / parents. Referral to specialists will be made if abnormality is detected during the doctor’s developmental assessment.

Alerts in the developmental history include [8]:

1) Delay in development — whereby children acquire skills more slowly than their peers.
2) Deviations in development — whereby children develop skills out of the usual sequence, are recognized in disorders such as cerebral palsy and autism.
3) Dissociation in development — differing rates of development in different developmental spheres—commonly occurs with developmental disorders. Children with intellectual disabilities or autistic spectrum disorders, for example, commonly display normal motor skills and delayed language development. Conversely, children with cerebral palsy of the spastic diplegic type often display delayed motor skills with relatively better language function.
4) Regression in development — the loss of developmental skills, is a very serious developmental problem suggestive of an active, ongoing neurologic problem.

1.3.4.3 Making accurate and informative observations
It is advantageous for primary care providers to be equipped with the expertise and knowledge to identify developmental concerns by making accurate and informative observations during a child’s visit [2]. This can be achieved by paying simple but focused attention to specific cues on what the child can and cannot do according to the relevant stage of development, in particularly after eliciting the parent’s / carer’s concern. The expected features of the child of the specific age should also be sought from the developmental milestones (refer 1.2.2 for details). Sometimes, tools such as building blocks, small beads, books, pencil and paper, doll and tea-set toys etc. are needed to aid the assessment.

Apart from specific achievements according to child’s age, physical examinations could also be helpful in detecting developmental problems or even detecting risk factors for future problems, for example, dysmorphic features could indicate high risk of intellectual disabilities and also indicate needs for prompt referral to specialist for genetic workup for any syndromal diagnosis.

1.3.4.4 Identifying the Presence of Risk and Protective Factors
Biological (including genetic) and environmental (including social and demographic) factors can adversely affect a child’s development. Often these risk factors cluster together. There are frequent associations of family and environmental risk factors, which represent the highest identifiable association with mild to moderate developmental delay [3]. The effects by these risk factors could be temporarily or life-long (refer Chapter 2 and 3 for details).

On the other hand, strong connections within a loving, supportive family, along with opportunities to interact with other children and grow in independence in an environment with appropriate structure, are important assets in a child's life. These factors, associated with resiliency in older children, are important components in each family’s story [8].

Primary care physicians should identify protective factors as well as risk factors in children’s lives. Children with known risk factors may be referred directly for developmental evaluation or may require developmental surveillance at more frequent intervals than children without risk factors.

1.3.4.5 Documenting the Process and Findings
All surveillance and screening activities should be documented clearly. Specific actions taken or planned, like specialist referral should also be noted. A medical record should contain a “developmental growth chart” on which the results of developmental surveillance and formal screenings are recorded in relationship to the child’s age and the dates at the time the findings were obtained.
Clear documentation of medical consultation not only aids in continuity of care and building up of rapport, but as well improves communication between professionals. Given the importance of continuous process of developmental surveillance, comparison of previous growth records in particular an updated growth chart of a child can facilitate assessment even by different health care providers. Further enhancement could be made if the child’s growth chart and related growth records could be made hand-held by the child’s parents or carers or make use of the existing Child Health Record given to every child registered with MCHCs. They should be encouraged to bring along this important documents whenever they approach any health care providers.

References:


Chapter 2. Normal Development

2.1 Introduction
Although the rate at which milestones are achieved varies among individuals, the pattern of development is remarkably constant, within fairly broad limits. Later goals often depend on achievement of earlier goals within the same field [1].

The normal age range for attainment of the milestones varies widely. There are two important indicators when describing the age range:

- **Median age**: age at which half a population of children acquire a skill.
- **Limit age**: age at which a skill should have been achieved and is two standard deviations from the mean [1].

2.2 Developmental variation
It is important to bear in mind not all milestones are consistent, and there is considerable variation in the achievement of milestones. Smiling socially by the age of 8 weeks is a consistent milestone, whereas crawling is not. Crawling occurs at a widely varying time point, and some children with normal development never learn to crawl. Level of concern rises if the child is late in achieving several milestones or has significant delay on one area [2].

Individual differences in motor ability are common and depend in part on the child’s weight and build. Environmental stimulations like opportunities to practice and observe determine the individual differences. Atypical motor development such as persistent primitive reflexes beyond 4–6 months or delayed walking may be an indication of developmental delays or neurological problem [3].

Some normal variations are listed below [1]:

- Late talking or walking (including bottom shuffling) may be familial
- Language development may seem delayed at first in children of bilingual families, but counting total words in both languages typically compensates for perceived delay
- Some variations between races, e.g. Indian infants are more likely to have advanced motor skills as compared to Caucasians

2.3 Biological and environmental factors
Genetic or environmental factors are inseparable and interact constantly in normal development [4]. Genetic factors may determine the fundamental developmental potential, but environmental factors have crucial influences on the profile achieved [1]. For example, there is vast evidence that identical twins tend to have similar height than fraternal twins. This would suggest genetic factors exhibit a lot of control over height. However, most western-born children of Asian immigrants are significantly taller than their parents. This would suggest that an environmental factor like diet, as Western diets more protein rich in this case, contributes more over human height.
Biological factors include genetic factors, birth related issues, or chronic illness. Genetic factors can be subdivided into phenotype, characteristics of parents, race, gender, bio-rhythmic and maturation and genetic disorders. A phenotype is any characteristic or trait of an organism such as its morphology, development, physiological properties or behaviour. These characteristics and traits from parents will be inherited to their offspring. Parents with higher intelligence quotient will tend to have children with higher intelligence quotient and vice versa. Daughters might attain menarche at similar age as their mothers. Different race (as illustrated in 2.2) and gender (for example, more boys than girls have simple speech delay) might result in mild difference in terms of child development at particular milestones. Birth related issue like prematurity could give rise to transient developmental delay but would catch up at a later stage.

Environmental risk factors can be (i) in the immediate family, such as low parental education, ordinal position in the family, parental mental illness, poverty and its consequences, and social isolation or (ii) in the community such as poor housing, poor hygiene, cultural factors, poor quality services, and lack of access to services. Often risk factors cluster together, for example, poverty and its frequent associations with family and environmental risk factors (which represents the highest identifiable association with mild to moderate developmental delay).

Studies have also looked into effects of victimization (human-caused harm, such as maltreatment, abuse and neglect, and assault), disaster (one-time or on-going events such as earthquakes that produce stress) and even wars [5]. Children who were exposed to victimization only or to both disaster and victimization had higher levels of anxiety, depression, and aggression than those who were not exposed. For most, trauma symptoms such as feeling depressed, sad, nervous, as well as having trouble concentrating and sleeping, declined over time. When the biological and psychological effects of victimization subside, children can usually catch up with normal development if adequate opportunity in learning is given. However, for some, the trauma effects are long-lasting.

2.4 Physical health and growth
Physical health and growth have important effects on the child’s development. Failure to thrive is a common reason for delayed development [6].

Correctable causes of slow development
- Under-nutrition
- Iron deficiency
- Hypothyroidism
- Heavy metal poisoning
- Sensory impairment e.g. hearing or visual problems
- Chronic stress: persistent neglect or child abuse
Nutrition is the most important component for healthy growth and its effect is largely modifiable. The child’s nutrient needs correspond with the changes in growth rates. It affects the physical growth more significantly during early stages of life as well as adolescence. Poor nutrition can cause serious problems with intellectual development in preschoolers and older children. Children with a poor diet may experience fatigue, be unable to fully participate in learning at school, become sick more frequently and thus be absent from school more. They usually underachieve at school. Getting enough of a good variety of food choices is important for a child’s intellectual development, together with healthy, balanced meal in particular breakfast [7].

In cases where infants and toddlers, for instance with history of injury, experience pain and show restriction in movements, the gross and/or fine motor functions might be disturbed.

2.5 Parenting in development

2.5.1 Introduction
Parenting knowledge includes the understanding of how to care for their children, how they develop, and the roles parents play in children’s lives [8], [9]. Parenting knowledge in these domains constitutes a vital frame of reference from which parents interpret their children’s behaviours. It affects parents’ everyday decisions about their children’s care and upbringing [10], [11], [12], which in turn affect children’s development [11], [12], [13].

As parents are usually the main caregivers of infants and younger children, their parenting knowledge is important as it affects parenting decisions and practices which definitely affects child development [14]. On the other hand, the dearth of positive parenting behaviours plus negative perception of children can negatively affect child development from early infancy [15].

2.5.2 Positive parenting
Evidences have suggested that positive parenting practices can cause significant, enduring, and protective influences on child development and therefore should be promoted. In particular, parental monitoring, open parent-child communication, parent-child connectedness and parental supervision deter involvement of the child in high-risk behaviours. Studies have shown that authoritative parenting style leads to higher academic performance, better adjustment and less risky behaviours in children [16].

There is a variety of parenting intervention strategies. The Positive Parenting Program (Triple P) is one of the evidence-based parenting and family support strategies that aims to prevent behavioural, developmental and emotional problems in children. It is a multi-level parenting intervention with the main goal of increasing the knowledge, skills, and confidence of parents. Evidence has indicated that Triple P can make positive changes in parenting skills, child problem behaviour and parental well-being [17], [18], [19]. Other evidence-based parenting
programmes, such as the Incredible Years and Parent-Child Interaction Therapy have also shown to be effective in improving child behaviour and parenting [20], [21]. Primary care providers should encourage parents to join evidence based parenting programmes available locally.

2.5.3 Attachment
Attachment theory is one of the most popular and empirically grounded theories relating to parenting [22]. Parents play many different roles in the lives of their children, including teacher, playmate, disciplinarian, caregiver and attachment figure. Of all these roles, their role as an attachment figure is one of the most important in predicting the child’s development in particular later social and emotional outcome.

There are four patterns of attachment namely secure, avoidant, resistant and disorganized. A ‘loving’ primary caregiver through responsive parenting (i.e. being sensitive to cues, engage in mutual and synchronized interactions, prompt and appropriate in response) facilitates the development of ‘organized and secure’ attachment to the primary caregiver [23] [24]. This acts as a protective factor against social and emotional maladjustment for infants and children. Attachment insecurity (avoidant and resistant) has been found to be a risk factor for later development, but its high base rate in the normal population (approximately 40%) has reduced its predictive value for psychopathology [22]. Among the four patterns of attachment, disorganized attachment in infancy and early childhood is recognized as a powerful predictor for serious psychopathology and maladjustment in children. There is evidence that disorganized attachments are linked with aspects of neurodevelopment vulnerability in the child. Attachment disorganization is a powerful predictor of a range of later social and cognitive difficulties and psychopathology [25].

2.5.4 Stimulation and development
Nurturing behaviours of parents, such as frequent talking and playing with the child, are considered critical for the development of language and cognitive skills [15]. Investments in early childhood affect outcomes that endure for a lifetime.

2.5.4.1 Talking with children
Frequent talking with the children affects their language outcome [15]. Although many parents know reading with children is an important contributing factor, there are also other parenting behaviours and perceptions contributing to language development.

Clinicians should advise parents routinely on the value of talking frequently with their children on the topics in which their children are interested, modeling and expanding children’s utterances, actively teaching new words, sitting down during meal time together, and describing to children what they are seeing and doing.
2.5.4.2 Playing with children

Play is essential to the social, emotional, cognitive, and physical wellbeing of children beginning in early childhood. Young children learn best through play. It is a natural stimulation for children to develop resiliency as they learn to cooperate, overcome challenges, and negotiate with others during play. Play also allows children to explore, understand and be creative. It provides time for parents to be fully engaged with their children, to bond with their children, and to see the world from the perspective of their child [26].

There are numerous benefits of using play as an opportunity to engage fully with their children. Playtime offers opportunities for parent-child bonding. Playtime offers parents the opportunity to promote healthy social-emotional development in their children through active engagement and shared imagination. Free, unstructured play is also important in the normal development of children. However, children who live in poverty often face socioeconomic difficulties that impede their rights to have playtime, on the other hand, overscheduled children are also found to be deprived of free play [27], thus affecting their healthy social-emotional development.

Parents may be influenced by marketing messages that suggest the best toys are those that are financially out of reach. They should be educated that simple, inexpensive toys, such as dolls, jump ropes, blocks, balls, buckets, or even usual household objects are more effective in allowing children to be creative and imaginative than more expensive toys, which can make play a more passive and less physically involved experience [26].

Primary care physicians should educate parents about the negative impact of media exposure on children and encourage them to limit screen time and substitute other activities, including playtime and outdoor activities, for screen time [28] [29]. Parents should be educated about the importance of children playing outdoors in nature. Spending unstructured time in nature, surrounded by dirt, trees, grass, rocks, flowers, and insects inspires children’s play and offers physical and emotional benefits.

Recommendations

It is important that primary care physicians promote the inclusion of play at homes, in schools and communities. Doctors can provide parents and families with information about community resources that provide physical activities for children, such as team sports and camps.

For children younger than 24 months, they need a large amount of parent-child interaction, avoid use of screen media other than video-chatting under parents’ guidance. If parents want to introduce digital media, they should choose high-quality programming/apps, set limits and use them together with their children to help them understand what they are seeing.

For children ages 2 to 5 years, limit screen use to 1 hour per day of high-quality programs. Parents should co-view media with children to help them understand what they are seeing and
apply it to the world around them.

For all children, place consistent limits on the time spent using media, and the types of media, and make sure media does not take the place of adequate sleep, physical activity and other behaviours essential to health. Media-free times together (e.g. family dinner) and media-free locations (e.g. bedrooms) in homes should be designated. [28] [29]

### 2.6 Some community resources on parenting / family life education

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<td>Education Bureau</td>
<td>Parenting corner</td>
<td><a href="http://s.fhs.gov.hk/v02kc">http://s.fhs.gov.hk/v02kc</a></td>
</tr>
</tbody>
</table>

Disclaimer: The list is not exhaustive and is for reference only. Links to other websites are inserted for the convenience of the readers and do not constitute endorsement of material at those sites, or any associated organisation, product or service. The information may be subject to change. Updated information can be sought from the respective organisations.
References:


Chapter 3. Developmental Assessment

3.1 Introduction
When assessing child development, their functioning is usually divided into four main domains:
[1]

**Major Developmental Domains:**
- Gross and Fine motor skills
- Speech and Language
- Social adaptive and activities of daily living
- Cognition

Developmental disorder covers a heterogeneous group of conditions that start early in life and present with delay or an abnormal pattern of progression in one or more developmental domains.

3.1.1 Definition:
- **Global developmental delay** is defined as a significant delay in two or more of the major developmental domains.
- **Significant delay** is defined as performance at two or more standard deviations below the mean on age appropriate standardised norm-referenced testing [1].

Primary care physicians should bear in mind there are normal variations in development. Moreover, delays in development, especially those that are mild, may be transient and lack predictive reliability for intellectual disability or other developmental disabilities [2]. However, loss of previously acquired skills (regression) is a red flag and should prompt rapid referral for detailed assessment and investigation.
(Please refer to chapter 1.2. for normal developmental milestones)

3.2 How do children present with developmental problems?
Developmental problems are commonly identified in several ways [1]:
- Children with identified risk factors (such as prematurity / chronic illness) usually have regular follow up and developmental surveillance in the health care system, developmental problems may be detected early.
- The problems may be identified during periodic or regular assessment in MCHC / by primary care physicians.
- Parents may suspect that their children have developmental problems and seek professional advice [3].
- Parents’ concerns may be detected opportunistically at health contacts if being asked about development.
- Professionals in a nursery, kindergarten or day care setting may recognize deviant or delayed patterns of development and highlight their concerns to the family, thus prompting referrals.
### 3.3 Identification of developmental problems

Primary care physicians are the first points of contact in the health care system; we have an important role in identifying children with possible developmental delay and make referrals if necessary [2].

The following areas should be covered in a comprehensive assessment of developmental delay:

#### 3.3.1 Genetic Factors

An optimal genetics evaluation starts with a comprehensive history and physical examination, observation of dysmorphic features, including a 3-generation family history with particular attention to family members with the following conditions: [1], [2]

- consanguinity
- intellectual disability
- developmental delays
- psychiatric diagnoses
- congenital malformations
- miscarriages
- stillbirths
- early childhood deaths

The family history can help in suggesting a diagnosis, particularly when other family members are affected similarly [2]. Primary care physicians should adopt a sensitive approach in obtaining these histories.

#### 3.3.2 Prenatal and Neonatal History

On assessing a child with developmental problems, always ask about prenatal, perinatal, and postnatal events, including maternal health during pregnancy [1]. Discharge summaries from hospitals’ or child health records from the Department of Health are useful local sources of information.

- **Antenatal** [1]
  - Early maternal infections, such as rubella, toxoplasma, cytomegalovirus
  - Late maternal infections, such as varicella, malaria, HIV
  - Toxins - for example, smoking, alcohol, illicit drugs, pesticides, radiation
  - Drugs - for example, cytotoxics, antiepileptics
  - Important antenatal history- small for gestational age, serious maternal illness

- **Postnatal** [1], [4]
  - Apgar scores and perinatal events
  - Gestational age
- Birth weight
- Head circumference and growth parameters
- Neonatal jaundice
- Infections - for example, meningitis, encephalitis, congenital infection e.g. cytomegalovirus
- Metabolic disorders, such as hypoglycaemia, hyponatraemia or hypernatraemia, dehydration
- Toxins - for example, lead, mercury, arsenic, chlorinated organic compounds, solvents
- Trauma, especially head injury
- Severe understimulation, maltreatment, or domestic violence
- Malnutrition, especially deficiency of iron, folate, and vitamin D
- Maternal mental health disorders, most commonly depression
- History of seizures,
- Major illness or operation, e.g. NICU care
- Long term medication

These perinatal events give hints to the likelihood of subsequent developmental abnormalities [4].

3.3.3 Physical Health and Growth
Children with poor health and growth have a higher rate of developmental delay [5]. Feeding is one of the important tasks for an infant and developing toddler and has been associated with later developmental outcomes [6]. Beyond feeding, the presence of additional medical or genetic comorbidities and poor growth were the most significant risk factors for poorer outcomes.

Much information can be gained by observing the child entering and moving around the clinic while playing with a few age appropriate toys, such as blocks, toy cars, pull-along toys, paper, and crayons. Always consider problems of hearing and vision when there are concerns about development. The following table shows the main physical examination features pertinent to developmental assessment [1].
<table>
<thead>
<tr>
<th>Key features on examination</th>
<th>Possible diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head circumference</td>
<td>Microcephaly / macrocephaly</td>
</tr>
<tr>
<td>Dysmorphic features</td>
<td>Genetic, metabolic or syndromal conditions</td>
</tr>
<tr>
<td>Skin abnormalities: café au lait patches, axillary freckling, neurofibromas, or hypopigmented patches (ash leaf macules)</td>
<td>Possible neurocutaneous syndromes</td>
</tr>
<tr>
<td>Child’s posture and movements with unsteadiness, asymmetry, weakness, or abnormal muscle tone</td>
<td>Underlying neurological disorder</td>
</tr>
<tr>
<td>Neurological examination (including newborn reflexes)</td>
<td></td>
</tr>
<tr>
<td>Child’s ability to sit up and to stand up from lying down supine and to clear the floor on jumping from a standing position</td>
<td>Muscle weakness suggestive of neuromuscular disease</td>
</tr>
<tr>
<td>Eye examinations looking for cataracts, nystagmus, or wobbly eye movements</td>
<td>Disorder of vision; underlying neurological condition</td>
</tr>
<tr>
<td>Ear examination and hearing screening</td>
<td>Acute otitis media, chronic serous otitis media</td>
</tr>
<tr>
<td>General examination of respiratory and cardiovascular systems</td>
<td>Underlying systemic disease</td>
</tr>
<tr>
<td>Abdominal examination for hepatomegaly, examination of genitalia</td>
<td>Metabolic disorder, syndromal diagnosis</td>
</tr>
</tbody>
</table>

### 3.3.4 Developmental History

Obtaining developmental history is essential in assessing children with developmental problems. Primary care physicians should always ask about and check the health records for the child’s acquisition of developmental milestones (refer to 1.2.2 Developmental milestone checklists). Doctors should bear in mind to adjust for gestational age for preterm infant up to 2 years old.

Many parents make video recordings of their child on a camera or mobile telephone and these may be invaluable for illustrating the past and present developmental profile. Observation of child’s performance and behaviour, as well as parent-child interaction is also important in the assessment process.

### 3.3.4.1 Red flags

It is important to identify developmental concerns early so that proper management can be provided. A single red flag may not always be an indication for concern or referral, rather the impact of one or more red flags on the child’s everyday functioning and participation, should be taken into consideration. The following are some red flags as suggested by the Children’s
Module on Development

Health Queensland Hospital and Health Service [7].

a) Red flags at any stage:
- Strong parental concerns
- Significant loss of skills
- Lack of response to sound or visual stimuli
- Poor interaction with adults or other children
- Lack of or limited eye contact
- Differences between right and left sides of body in strength, movement or tone
- Marked low tone (floppy) or high tone (stiff and tense) and significantly impacting on development and functional motor skills

b) Red flags according to age group:
- By 6 months
  - Does not smile or interact with people
  - Not starting to babble (e.g. aahh; oohh) (e.g. 呀呀、咕咕)
  - Hands frequently clenched; not reaching for and holding toys; does not bring hands together at midline; does not explore objects with hands, eyes and mouth
  - Not holding head and shoulders up with good control when lying on tummy; not holding head with control in supported sitting
- By 9 months
  - Not sharing enjoyment with others using eye contact or facial expression
  - Not using gestures for communication (e.g. pointing, showing, waving); not using 2 part babble (e.g. bubu, dada) (e.g. 巴巴、打打)
  - Cannot move toy from one hand to another
  - Not rolling; not sitting independently / without support; not taking weight on legs when held in standing
- By 12 months
  - Does not notice someone new; does not play early turn-taking games (e.g. peekaboo, rolling ball)
  - No babbled phrases that sound like talking; no response to familiar words (e.g. bottle, daddy)
  - Has not developed pincer grasp; does not feed self finger foods or hold own bottle / cup
  - No form of independent mobility (e.g. crawling, bottom shuffle); not pulling to stand independently and holding on for support
- By 18 months
  - Lacks interest in playing and interacting with others
  - No clear words (e.g. ball, apple) (e.g. 波、蘋果); not able to understand short requests (e.g. “Where is the ball?”) (e.g. “波波呢?”)
  - Does not scribble with a crayon; not attempt to stack blocks after demonstration
Module on Development

- Not attempting to walk without support
  - By 2 years
    - Tends to bang, drop, or throw toys when playing with them rather than use them for their purpose
    - Not learning new words; not putting words together (e.g. “push car”) (e.g. “去街”、
      “飲水”、“推車”
    - Does not attempt to feed self using a spoon and / or help with dressing
    - Not able to walk independently; not able to walk up and down stairs holding on
  - By 3 years
    - No interest in pretend play or interacting with other children; difficulty in noticing and understanding feelings in themselves and others (e.g. happy, sad)
    - Speech difficult for familiar people to understand; not using simple sentences
    - Does not attempt everyday self-care skills (such as feeding or dressing); difficulty in manipulating small objects (e.g. threading beads)
    - Not able to run or jump; not able to walk up and down stairs independently
  - By 4 years
    - Unwilling / unable to play cooperatively
    - Speech difficult to understand; not able to follow directions with 2 steps (e.g. “Put your bag away and then go play”) 
    - Not able to draw lines and circles; not toilet trained by day
    - Not able to walk, run, climb, jump and use stairs confidently; not able to catch, throw or kick a ball
  - By 5 years
    - Play is different from their friends
    - Difficulty in telling a parent what is wrong; not able to answer questions in a simple conversation (e.g. “What’s your name?” “What do you like to watch on TV?”)
    - Concerns from teacher about school readiness; not able to draw simple pictures; not able to independently complete everyday routines such as feeding and dressing
    - Not able to hop 5 times on one leg and stand on one leg for 5 seconds

There are some age specific warning signs that require more detailed assessment by Child Assessment Service or paediatrician as suggested by our local health service:

<table>
<thead>
<tr>
<th>By 7-month</th>
<th>By 12-month</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Does not support head well in sitting position</td>
<td>- Does not sit alone</td>
</tr>
<tr>
<td>- Does not reach and grasp objects</td>
<td>- Does not have eye contact with carer</td>
</tr>
<tr>
<td>- No social smiles, does not show affection to carer</td>
<td>- Does not respond to name calling frequently</td>
</tr>
<tr>
<td></td>
<td>- Does not show intent to communicate through vocalization, pointing or other gestures</td>
</tr>
</tbody>
</table>
By 18-month
- Cannot walk alone
- Not picking up tiny objects with pincer grasp
- Does not play meaningfully but still engage in throwing and mouthing of objects
- Has poor eye contact with carer
- Does not respond to simple command with gestured cues e.g. wave “bye-bye”, “clap your hands”
- Does not try to communicate through words, pointing or gestures

By 24-month
- Still being unsteady when walking slowly (after walking for 6 months or so)
- Unable to identify common household objects and body parts
- Does not speak single words
- Has poor eye contact with carer

By 36-month
- Has difficulty going upstairs on his own (despite holding onto rail)
- Fails to communicate in combined words (e.g. “drink juice”)
- Shows no interest in interacting with other children
- Cannot name common objects or pictures

By 48-month
- Appears clumsy in movement or manipulating simple tools such as spoons, forks etc.
- Has difficulty in following verbal instructions
- Does not speak well in sentences
- Ignores other children and shows little interest to interact with others
- Shows excessive or persistent disruptive behaviour both at school and at home
- Has significant learning problem at school as complained by teachers

3.3.5 Psychosocial factor
Family and social relationships are central to all children’s lives. Optimal child development is dependent on the positive role of parents or caregivers. On the other hand, parents or caregivers are responsible for providing a suitable environment to protect children from harm and promote their emotional and physical health and development [8].

Psychosocial problems, such as food insecurity, housing instability, inadequate parental education, and parental substance use, are associated with higher rates of behavioural, developmental, and learning problems in children [9].

In the WE CARE (Well-child Care Visit, Evaluation, Community Resources, Advocacy, Referral, Education) survey of the Bright Futures pediatric intake, ten family psychosocial problems are selected and found to have significant impact on the children’s development. They are namely: lack of high school education, unemployment, smoking, drug abuse, alcohol abuse, depression, intimate partner violence, child care need, homelessness, and inadequate food supply [9]. Another study found ≥3 children in the family, ≥2 household moves in the past year also have negative impact on the children’s development [10].
Parents with multiple burdens and fewer resources are less likely to enjoy interacting with their children, to remain interested in talking to them, or to engage in positive parenting practices. These in turn adversely affect the children’s development [10].

Frequent screen time with television and video games use may be associated with risk for development of attention problems, learning difficulties, and adverse long-term educational outcomes [11], [12].

3.3.6 Role of primary care physicians

Primary care physicians should be familiar with the developmental milestones and always be alert on the red flags which suggest a more detailed assessment to rule out developmental problem. If significant problem is identified, referral to Child Assessment Service or paediatrician should be considered. A detailed psychosocial history covering the family social background, parenting, and recent major social events in the assessment of children with developmental problem should be taken. Parenting advices and referral to appropriate service for support may also be helpful.
References:
Chapter 4. Developmental Problems

4.1 Global developmental delay

4.1.1 Introduction
Global developmental delay (發展遲緩) refers to children, usually taken as under 5 years of age, whose developmental levels are substantially behind the average expectations of children of the same age across two or more developmental domains of development [1], [2], [3]. It encompasses a spectrum of problems of different kinds and severity.

Global developmental delay is often a precursor to intellectual disability [4]. Early recognition of delays requires knowledge and clinical judgment. Detailed assessment and appropriate referrals should be arranged when developmental delay is suspected [2]. In Hong Kong, around 1500 children were newly diagnosed to have developmental delay in the year 2004 [3].

Causes for global developmental delay vary. Possible causes include: [4], [5]
- Prematurity
- Fetal alcohol syndrome
- Hypoxia or prenatal / neonatal injuries
- Genetic and hereditary disorders, e.g. Down Syndrome, Fragile X, etc.
- Metabolic and endocrine disorders e.g. inborn errors of metabolism, congenital hypothyroidism, etc.
- Infections in particular neurological
- Toxic exposures, e.g. lead toxicity
- Unknown

4.1.2 Intellectual disability.

4.1.2.1 What is Intellectual Disability (ID) (智力障礙)?
Intellectual Disability refers to a condition in which intellectual and concurrent adaptive functioning are significantly below average [1], [2]. It is manifested during a child's years of development (before 18 years old).

4.1.2.2 Classification and presentation of Intellectual Disability
A "three-tier system" is normally used in Hong Kong for operational classification, i.e. ID is classified into "mild", "moderate" and "severe" (including severe and profound) grades for the provision of special educational and training services.
- Mild
  ◆ Usually present with relatively mild delay in cognitive ability during preschool period
  ◆ Show difficulties in learning academic skills in school age
  ◆ Able to acquire general daily living and self-care skills with proper training and


assistance.

- **Moderate**
  - Usually present with significant delay in cognitive development during infancy and preschool years
  - Suffer from significant impairment in learning and applying concepts
  - Intensive training and support are needed to deal with basic needs in daily life.

- **Severe/ Profound**
  - Significant deficits identified during infancy
  - Maybe able to achieve basic skills in daily life with intensive support and training.

### 4.1.3 Symptoms and presentation of developmental delay

Children are usually noticed to have developmental problems by their parents or teachers. They may also be identified during developmental surveillance by primary care physicians, which the domains of development are noticed to be significantly delayed. Please refer to 1.2.2 Developmental milestone checklists for the expected attained skills at each stage.

Other common aspects affected in older children are [1]:

- Ability to communicate
- Self-care
- Housework
- Social Skills
- Working and learning
- Community life

### 4.1.4 Management of developmental delay

Children could be suspected to have developmental delay during developmental surveillance in primary care setting. Prompt assessment and referral is needed so that timely intervention can be carried out by specialized units. Children with developmental delay can benefit from early intervention and diagnosis with improved outcome, especially when they came from socially-deprived families [6], [7]. Children diagnosed to have borderline developmental delay during the preschool period had nearly a 50% chance of catching up in terms of cognitive function at the pre-primary school stage [3].

Specialists will perform the followings to evaluate causes for global developmental delay: [5]

- Initial assessment: obtain detailed history and examination; perform auditory and ophthalmologic screening; consider metabolic studies and thyroid function tests if newborn screening not done; obtain EEG if epilepsy syndrome is suspected; screen for autism or language disorder
- Exploration of any close family member with global developmental delay and obtain specific tests and cytogenetic screening
- Further comprehensive evaluation including MRI, cytogenetic screening, metabolic testing, etc.
Establishing a diagnosis of intellectual disability may require the involvement of subspecialists and other disciplines. However, knowing the diagnosis have benefits for the patient and family in the following ways:

- Specific treatment or cure, if available
- Identifying an underlying genetic cause may give a better indication of prognosis
- Recurrence risk for the patient and family
- A genetic diagnosis may provide the ability to anticipate associated comorbidities and other affected organ systems that have not yet been recognized
- Help families gain access to services which can be disease-specific therapies, as well as financial assistance and support groups

4.1.5 Some resources on developmental delay:

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Resource</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Health Service, Department of Health</td>
<td>Developmental surveillance and identification, information for parents</td>
<td><a href="http://s.fhs.gov.hk/yeyj3">http://s.fhs.gov.hk/yeyj3</a></td>
</tr>
<tr>
<td>Child Assessment Service, Department of Health</td>
<td>Developmental series</td>
<td><a href="https://www.dhcas.gov.hk/en/common_conditions.html">https://www.dhcas.gov.hk/en/common_conditions.html</a> (English)</td>
</tr>
<tr>
<td>Education Bureau – Special Education</td>
<td>School placement, training and counselling</td>
<td><a href="http://www.edb.gov.hk/en/edu-system/list-page.html#">http://www.edb.gov.hk/en/edu-system/list-page.html#</a></td>
</tr>
<tr>
<td>Social Welfare Department</td>
<td>Pre-school Rehabilitation Services</td>
<td><a href="https://www.swd.gov.hk/en/index/site_pubsvc/page_rehab/sub_listofserv/id_sps/">https://www.swd.gov.hk/en/index/site_pubsvc/page_rehab/sub_listofserv/id_sps/</a></td>
</tr>
<tr>
<td></td>
<td>- Early Education and Training Centre</td>
<td></td>
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<tr>
<td></td>
<td>- Integrated Programme in Kindergarten-cum-Child Care Centre (IP in KG-cum-CCC)</td>
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<tr>
<td></td>
<td>- Special Child Care Centre</td>
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<td></td>
<td>- Residential Special Child Care Centre</td>
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<tr>
<td></td>
<td>- Occasional Child Care Service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On-site Pre-school Rehabilitation Services</td>
<td><a href="http://www.swd.gov.hk/en/index/site_pubsvc/page_rehab/sub_listofserv/id_psp/">http://www.swd.gov.hk/en/index/site_pubsvc/page_rehab/sub_listofserv/id_psp/</a></td>
</tr>
</tbody>
</table>
References:
4.2 Hearing problems

4.2.1 Role of primary care physicians in the management of hearing problem
Hearing impairment in children has significant impact on their communication skills, psychosocial well-being and educational attainment. Evidence shows that early detection and treatment improve language and cognitive outcomes [1]. Primary care providers have important role in initial assessment, treatment of reversible conditions, appropriate referral, counselling and co-ordination of services.

4.2.2 Universal screening for hearing impairment in newborn
Universal screening has been proposed to detect children with permanent congenital hearing impairment since half of the children with hearing impairment have no identifiable risk factors. There is good evidence that newborn hearing screening is highly sensitive and leads to earlier identification and treatment of infants with hearing impairment [1]. In Hong Kong, 2-stage Automated Auditory Brainstem Response (AABR) is used to screen all babies born in hospitals of Hospital Authority while Automated Oto-Acoustic Emission (AOAE) Test is offered to babies, not screened before discharge from birthing hospitals, aged between 2 weeks and 4 months in Maternal Child Health Centre (MCHC).

4.2.3 Risk factors of hearing impairment [1-5]
Risk factors associated with permanent congenital, delayed onset, and/or progressive hearing impairment in childhood:

- Caregiver concern regarding hearing, speech, language, or developmental delay
- Intrauterine infections
- Neonatal intensive care unit (NICU) admission ≥5 days
- Extracorporeal membrane oxygenation (ECMO)
- Readmissions in the first month of life for conditions associated with potential hearing impairment, e.g. hyperbilirubinaemia that requires exchange transfusion or culture-positive sepsis
- Congenital syndromes, e.g. neurofibromatosis, Usher syndrome
- History of meningitis
- Recurrent or persistent otitis media for at least 3 months
- Head trauma, especially basal skull/ temporal bone fracture that requires hospitalization
- Exposure to chemotherapy or ototoxic medications such as aminoglycosides
- Craniofacial abnormalities involving the pinna, ear canal, ear tags, ear pits and temporal bone, e.g. cleft palate, deformed auricle, defects of ear canal, white forelock
- Family history of childhood hearing impairment
4.2.4 Types of hearing impairment [2]

A. Conductive hearing impairment

- Congenital
  - Structural abnormality of ear, e.g. aural atresia
  - Vernix

- Acquired
  - Ear wax
  - Foreign body
  - Eardrum perforation
  - Otitis media
  - Otitis externa
  - Cholesteatoma

B. Sensorineural hearing impairment

- Congenital
  - Genetic causes, e.g. Down syndrome
  - Intrauterine infections e.g. cytomegalovirus (CMV), rubella
  - Prematurity, especially those with birth weight less than 1.5kg
  - Birth asphyxia
  - Congenital hypothyroidism

- Acquired
  - Infections, e.g. measles, mumps
  - Meningitis
  - Tumour, e.g. Schwannoma
  - Head injury
  - Hyperbilirubinaemia
  - Ototoxic drug, e.g. aminoglycosides
  - Prolonged loud noise exposure

C. Mixed hearing impairment

4.2.5 Approach to hearing problem

4.2.5.1 History

4.2.5.1.1 Symptoms of hearing impairment [6]

- Infant:
  - Not startled by sudden sound. (1-3 months old)
  - Unable to turn to the source of sound. (4-6 months old)
  - Do not look at the person being mentioned. (7-9 months old)
  - Do not respond to own name. (10-12 months old)

- Children:
  - Language delay
  - Cannot hear clearly or request for repetition during conversation
  - Misinterpret instructions
  - Poor attention in class
  - Turn up the sound volume of television
4.2.5.1.2 Characteristic of hearing impairment
- Onset
- Duration
- Progression
- Unilateral / bilateral

4.2.5.1.3 Associated symptoms
- Tinnitus
- Vertigo
- Ear pain
- Ear discharge

4.2.5.1.4 Past medical history
- History of illnesses causing hearing impairment, e.g. ear infections, injury

4.2.5.1.5 Drug history
- Ototoxic drug, e.g. aminoglycosides

4.2.5.1.6 Birth history
- Intrauterine infections
- Prematurity
- Neonatal jaundice
- Admission to neonatal intensive care unit for 2 or more days

4.2.5.1.7 Family history
- Family history of congenital hearing impairment

4.2.5.1.8 Social history
- Prolonged exposure to loud noise, e.g. TV, music, use of ear phones

4.2.5.1.9 Developmental history
- Receptive and expressive language development
- Learning
- Social-emotional development

4.2.5.2 Physical examination
- Dysmorphic features
- Craniofacial abnormalities
- Ear examination
- Weber and Rinne tests in older children
4.2.6 Management

4.2.6.1 Advice on protection of hearing
Meticulous care of hearing must be stressed. The following advice should be given to parents to protect their children’s hearing: [6]

- Avoid prolonged exposure to noisy environment.
- Do not bottle feed infants lying on their backs to avoid backflow of milk into the nasopharynx, leading to otitis media.
- Seek immediate treatment in case of high fever or suspecting ear infection.
- Be careful in the use of ototoxic drugs.
- Avoid traumatizing ear.
- Avoid picking ears or putting foreign objects into ear canals.

(Please refer to 4.2.9 for education leaflet for parents and carers.)

4.2.6.2 Treatment of conductive causes
Offer treatment for reversible causes of hearing impairment such as ear wax impaction and otitis media. Follow up assessment might be needed to monitor the progress and look for less common complications such as cholesteatoma or mastoiditis.

4.2.6.3 Referral
A. Further assessment of suspected hearing impairment
Children with suspected hearing impairment should be referred to otolaryngologists or Child Assessment Centre (below 12 years of age) for further audiological assessment. Consider referral if the following features are present:

- Symptoms of hearing impairment
- Parental concern of hearing problem
- Risk factors of hearing impairment
- Children with significant language delay or articulation problem

B. Multidisciplinary care for confirmed hearing impairment

- Once the diagnosis of hearing impairment has been made, the infant or child should be referred to a multidisciplinary, comprehensive early intervention program.
- The child with hearing impairment should be referred to the Education Bureau for hearing aid fitting and follow-up as appropriate.
- Otolaryngologists would identify the etiology of hearing impairment, follow up the progress and assess the candidacy for surgical intervention if appropriate [4].
- Surgical intervention may be of benefit for some forms of permanent conductive hearing impairment, for instance in children with atresia [7].
Module on Development

- Amplifications including hearing aids and assistive listening devices enable children to maximize their use of residual hearing [2].
- Cochlear implants are usually indicated for children with severe to profound sensorineural hearing impairment in both ears [2].
- Auditory brainstem implant can be considered for those with non-functioning nerve, or those with abnormal cochlea.
- Medical geneticist is responsible for clinical evaluation and diagnosis of inherited disorders, and provision of genetic tests and counselling [4].
- Ophthalmologist’s evaluation is suggested for infant with confirmed hearing impairment to rule out concomitant vision disorders such as Usher syndrome [4].
- Comprehensive developmental assessment by developmental paediatrician should be arranged.
- Early education and training of spoken and sign languages are important in language development [7].
- Physiotherapist assessment can be considered to evaluate balance and coordination.

(Please refer to 4.2.9 for providers of early education and training service.)

4.2.6.4 Audiological habilitation for confirmed hearing impairment
Parents should be encouraged to participate in training of children with hearing impairment. Family involvement in children’s early years has significant impact on vocabulary and verbal reasoning skills [2]. Amplification is an important part of the habilitation. Hearing aids can be used by children of any age and should be fitted as soon as a hearing impairment has been identified. However, the child and family must be counselled regarding realistic expectations from amplification, and the importance of speech and language therapy and the need to modify the listening environment of the child.

4.2.6.5 Continuing care for confirmed hearing impairment [4]
Primary care physician can help monitoring the general health, developmental milestones, and social well-being of children with hearing impairment. Children with cochlear implants may be at increased risk of acquiring bacterial meningitis. Age-appropriate immunisations such as pneumococcal and Haemophilis influenza type b vaccines should be offered.

4.2.7 Recommendations
Universal screening for hearing impairment in all newborn infants.

Supporting evidence:
Children with hearing impairment who had universal newborn hearing screening have better language outcomes at school age than those not screened. Infants

B
2++
identified with hearing impairment through universal screening have significantly earlier referral, diagnosis, and treatment than those identified in other ways.

4.2.8 Role and work of Student Health Service of Department of Health

The Student Health Service (SHS) of the Department of Health provides hearing screening to students attending the service. Hearing screening is routinely conducted for all primary 1 and secondary 2 students, students attending the SHS for the first time and those who have missed the screening opportunities in primary 1 and secondary 2. Other students who have concerns about hearing could also request for hearing screening during annual health assessments. After the initial hearing screening at the Student Health Service Centres, students suspected to have hearing problems will be referred to the SHS audiologist for further audiological assessment or directly to otorhinolaryngologists of the Hospital Authority as necessary. Following audiologist assessment, the audiologist will refer the students to otorhinolaryngologists of the Hospital Authority, and Speech and Hearing Services Section of Education Bureau, as well as provide informative counselling for students and their families, according to individual's hearing status and service needs.

4.2.9 Some resources on hearing problem for parents and carers

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Resource</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Health Service, Department of Health</td>
<td>Hearing Screening for Newborn: Oto-Acoustic Emission Test</td>
<td><a href="http://s.fhs.gov.hk/ntihz">http://s.fhs.gov.hk/ntihz</a> (English)</td>
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<tr>
<td></td>
<td></td>
<td><a href="http://s.fhs.gov.hk/fenyy">http://s.fhs.gov.hk/fenyy</a> (Chinese)</td>
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<tr>
<td></td>
<td>Can Your Baby Hear You?</td>
<td><a href="http://s.fhs.gov.hk/ufd2u">http://s.fhs.gov.hk/ufd2u</a> (English)</td>
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<td></td>
<td><a href="http://s.fhs.gov.hk/8pj1">http://s.fhs.gov.hk/8pj1</a> (Chinese)</td>
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<td>Child Assessment Service, Department of Health</td>
<td>Hearing impairment</td>
<td><a href="https://www.dhcas.gov.hk/en/common_conditions.html">https://www.dhcas.gov.hk/en/common_conditions.html</a> (English)</td>
</tr>
<tr>
<td>Organization</td>
<td>Services Offered</td>
<td>Website</td>
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<tr>
<td>--------------</td>
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<td>---------</td>
</tr>
<tr>
<td>Suen Mei Speech and Hearing Centre</td>
<td>Early education and training, Speech therapy</td>
<td><a href="http://www.suenmeicentre.com/">http://www.suenmeicentre.com/</a></td>
</tr>
</tbody>
</table>

Disclaimer: The list is not exhaustive and is for reference only. Links to other websites are inserted for the convenience of the readers and do not constitute endorsement of material at those sites, or any associated organisation, product or service. The information may be subject to change. Updated information can be sought from the respective organisations.
References:
4.3 Visual problems

4.3.1 Introduction
To achieve normal proper visual pathways development, the brain needs to receive equally clear, focused images from both eyes simultaneously [1]. Retinal abnormalities, cataracts, glaucoma, retinoblastoma, eye muscle imbalances, and systemic disease with ocular manifestations may affect the visual stimuli perceived and lead to visual impairment. It has been estimated that about 36% of the children aged 5-16 in Hong Kong has myopia [2].

Visual problems may present at birth or as developmental, academic or behavioural problems [3], [4]. Since a small child rarely complains that one eye is not seeing properly, vision screening should be performed for a child at the earliest age that is practical [1]. Primary care physicians should provide appropriate and timely intervention to maximize the potentials of the children [3].

4.3.2 Vision Screening
Vision screening should be carried out as part of developmental surveillance beginning at 3 years of age. Vision screening guidelines have been endorsed by the American Academy of Pediatrics (AAP), the American Association for Pediatric Ophthalmology and Strabismus (AAPOS), and the American Academy of Ophthalmology (AAO) [1]. In Hong Kong, the Family Health Service of the Department of Health provides vision screening for preschool children at 4 years of age or above by registered optometrist / orthoptist [5].

On the other hand, infants at risk for eye problems, such as retinopathy of prematurity, or those with family histories of congenital cataracts, retinoblastoma, and metabolic and genetic diseases, should have ophthalmologic examinations early and regularly by paediatricians and ophthalmologists [1]. Newborn / infant eye examination for presence of red reflex is another important screening exam to identify significant problems that may present at birth or infancy e.g. congenital cataract, retinoblastoma. Patients with visual impairment may co-exist with other disabilities including developmental delay, intellectual disability, cerebral palsy, epilepsy, hearing impairment, and behavioural and emotional problems [6].

4.3.3 Visual Impairment (VI)

4.3.3.1 Classification
Visual impairment (VI) is defined as impairment of visual functioning even after treatment and/or standard refractive correction. It is measured mainly by visual acuity and visual field defects. There has been various definitions and classifications used in different studies.

According to WHO, in the practice of low vision services or care, 'LOW VISION' is defined as follows:
“A person with low vision is one who has impairment of visual functioning even after treatment and/or standard refractive correction, and has a visual acuity of less than 6/18 to light perception, or a visual field less than 10 degrees from the point of fixation, but who uses, or is potentially able to use, vision for the planning and/or execution of a task for which vision is essential.”

4.3.3.2 Common presenting features of visual impairment [6]

- **During Infancy:**
  - Lack of eye contact
  - Do not look at his/ her hands
  - Do not blink to bright light
  - Do not visually follow objects moving in front of his/ her face
  - Do not reach out for toys
  - Responds only to sound and slow response to visual hints
  - No imitation of others’ action or facial expression
  - Fear of gross motor activities like crawling

- **During early childhood:**
  - Lack of eye contact
  - Tend to hold objects very close to eyes when looking at them
  - Limited facial expression and body language
  - Abnormal responses to bright light
  - Often bump into objects or fall over
  - Get confused with directions, use hands to search for directions
  - May press on eyeballs with fingers
  - Jerky movement of the eyeballs
  - Abnormal head tilt when looking
  - Maybe presented as emotional, behavioural and learning problem
  - Physical signs such as strabismus, nystagmus, leukokoria or microphthalmia

4.3.4 Examinations

Eye evaluation in the physician’s office should include the following:

1. External inspection of the eyes
2. Tests for visual acuity on an age-appropriate basis
3. Tests for ocular muscle motility and eye muscle imbalances
4. Ophthalmoscopic examination

The child should be comfortable and in good health at the time of the examination and, if at all possible, should have some preparation for the testing situation. Particularly for younger children, parents should demonstrate the anticipated testing procedures [1].
Children who have eyeglasses generally should have their vision tested while wearing the eyeglasses. However, eyeglasses prescribed for use while reading should not be worn when distance acuity is being tested.

4.3.4.1 From birth to 2 years of age [1]
An eye evaluation for infants and children from birth to 2 years of age should include:

- Eyelids and orbits;
  - Symmetry and functions, e.g. asymmetrical prominence of one eye compared with the other, the presence of masses such as haemangiomas, ptosis, or craniofacial abnormalities involving the orbital bones.

- External examination;
  - Penlight evaluation of the conjunctiva, sclera, cornea, and iris. A cloudy or asymmetrically enlarged cornea, for example, may be a sign of congenital glaucoma. Red reflex should be present. White pupil should raise the suspicion on retinoblastoma.
  - The pupils should be equal, round, and reactive to light on both sides.

- Motility and Eye muscle balance;
  - Infants older than 3 months of age may be able to fix on a target, such as a toy, and follow it.
  - Asymmetry of the appearance of the corneal light reflex may be an indication of strabismus.

4.3.4.2 From 2 to 4 years of age [1]
On top of the tests above, two additional tests also should be included in this age group: vision testing and ophthalmoscopy.

- Vision testing with picture cards is recommended for all children starting at 3 years of age. If the child is unable to cooperate, a second attempt should be made in 4 to 6 months. Children who cannot be tested after repeated attempts should be referred to ophthalmologists experienced in the care of children for eye evaluations.

- Ophthalmoscopy may be possible in very cooperative 4-year-olds who are willing to fixate on a toy. It is used to evaluate the optic nerve and retinal vasculature in the posterior pole of the eye.

4.3.4.3 From 5 years onwards [1]
Ophthalmological evaluation for children older than 5 years should include the previously described components of the eye evaluation for younger children. Virtually all of them should be able to undergo vision testing by this time, and most children should be sufficiently cooperative for ophthalmoscopy.
4.3.5 Management
Primary care physicians should provide information and support to parents on learning disabilities and their treatment to visual impairment and should dispel the myths surrounding these disorders. This should include discussion regarding the lack of efficacy of vision therapy and other "alternative treatment" with parents [7]. Scientific evidence does not support the efficacy of eye exercises, behavioural vision therapy, or special tinted filters or lenses for improving the long-term educational performance in these complex pediatric neurocognitive conditions [3].

4.3.5.1 Referral criteria
Any child unable to be tested after two attempts or in whom an abnormality is detected should be referred for an initial eye evaluation by an ophthalmologist experienced in the care of children [1], [8].

4.3.5.2 Specific management
Strabismus, amblyopia, and refractive errors may require glasses, eye patching, eye drops, or eye-muscle surgery [3]. These would be offered by ophthalmologists or optometrists.

Improving visual acuity or treating convergence insufficiency can make reading more comfortable but does not improve the decoding or understanding of reading. We should bear in mind that visual impairment may be a manifestation of underlying development / physical problems. Children with learning disabilities should undergo assessments of their health, development, hearing, and vision [3].

4.3.6 Recommendations
Screen for vision problems for all children at least once between the ages of 3 to 5 years, to detect the presence of amblyopia or its risk factors.

Supporting evidence
There is good evidence on diagnostic accuracy and treatments suggest that preschool vision screening could lead to increased detection of visual impairment and greater improvement in visual outcomes than if children were never screened.

4.3.7 Role and work of Student Health Service of Department of Health
The SHS provides vision screening to students attending the Service. Visual acuity screening is provided annually to students of primary one to secondary six, colour vision screening to students of primary six, stereopsis screening to students of primary one. An additional vision screening test for amblyopia would be performed for students aged 10 or less who failed the visual acuity test. The students with suspected vision problem would be referred to optometrists of the SHS for optometry assessment and health education on vision / eye health. If indicated,
optometrists would provide a prescription sheet for glasses to students with simple refractive errors to purchase glasses in an optical shop; and occlusion therapy, vision training and follow-up to students with amblyopia. Since 2014, the SHS of the Department of Health has set up a Student Amblyopia Management Programme with the Ophthalmology service of Hospital Authority to improve the referral and management of school children with pure refractive amblyopia after assessment by SHS optometrists. Doctors of SHS would refer the students to Ophthalmologists for further diagnosis and treatment of amblyopia owing to other causes and other eye problems if necessary.

4.3.8 Some resources on vision problem for parents and carers

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Health Service, Department of Health</td>
<td><a href="http://s.fhs.gov.hk/4tiv1">http://s.fhs.gov.hk/4tiv1</a></td>
</tr>
<tr>
<td>Child Assessment Service, Department of Health</td>
<td><a href="https://www.dhcas.gov.hk/en/common_conditions.html">https://www.dhcas.gov.hk/en/common_conditions.html</a> (English)</td>
</tr>
<tr>
<td>Hong Kong Blind Union</td>
<td><a href="http://www.hkbu.org.hk/b5_index.php">http://www.hkbu.org.hk/b5_index.php</a></td>
</tr>
<tr>
<td>The Hong Kong Society for the Blind</td>
<td><a href="http://www.hksb.org.hk">http://www.hksb.org.hk</a></td>
</tr>
<tr>
<td>Ebenezer School &amp; Home for the Visually Impaired</td>
<td><a href="http://www.ebenezer.org.hk">http://www.ebenezer.org.hk</a></td>
</tr>
</tbody>
</table>

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References:
4.4 Language impairment

4.4.1 Role of primary care in the management of language impairment
Primary care is the first point of contact in the healthcare system; it is not uncommon to encounter parents expressing worry on their child’s language development. Although there was insufficient evidence to recommend for or against screening of speech and language delay in children in primary care setting [1], parental concerns on language delay should be addressed. Speech and language delay in children is associated with increased difficulty with reading, writing, attention and socialization. Primary care providers have important role in initial assessment, appropriate referral, counselling and coordination of services.

4.4.2 Definition [2] [3] [4]
- **Language** - A system of symbols whereby ideas are represented for communication and thinking
- **Speech** - A medium to express verbal language
- **Receptive language** - Understanding of language
- **Expressive language** - Use of language to share thoughts, protest, or comment
- **Developmental language disorder (DLD) (previously named as specific language impairment)** - A significant impairment in language ability when there is no obvious accompanying biomedical condition such as intellectual disability, autism spectrum disorder, neurological damage or hearing impairment.

4.4.3 Normal development
Speech and language development is a continuous progress, going through stages of cooing, babbling, words, phrases and sentences. Environmental stimulation in family and school has significant impact on the development of proficiency in vocabulary and language. Please refer to 1.2.2 Developmental milestone checklists for the expected attained skills at each stage.

4.4.4 Differential diagnoses of speech and language problem [5]

4.4.4.1 Primary
- Normal variation
- Developmental language disorder

4.4.4.2 Secondary
- **Conditions affecting language input**
  - Hearing impairment
  - Language environment
    - Psycho-social deprivation
- **Conditions affecting language processing**
  - Autism Spectrum Disorder
  - Intellectual disability
  - Functional brain abnormality
    - Epilepsy
    - Head injury
- **Conditions affecting language output**
  - Structural abnormalities
• Cleft palate
  ◆ Disorders of oro-motor control
  • Cerebral palsy

4.4.5 Approach to speech and language problem

4.4.5.1 History
Parental concern about language development is highly predictive of true problem. Reliable information can be obtained from parents provided that right questions are asked. It is important to ask open questions but to insist on precise answers, often qualified with examples. Some toys can be given to the child while the parent is interviewed. This allows rapport to be established between the child and the health care provider. Free play or interaction between parent and child can be observed. Useful information such as parenting style and language skills can be obtained.

4.4.5.1.1 Receptive and expressive language [6]
- Concern about child’s speech
- Child’s ability of understanding (Receptive)
- Child’s ability of communicating what he / she wants (Expressive)

4.4.5.1.2 Associated behavioural problems
There are times when school teachers identify behavioural concern at school and ask parents / caregivers to seek medical advice. This can be an important part of the history to aid in assessment.

4.4.5.1.3 Hearing
- Concern about hearing
- Risk factors of hearing impairment (Please refer to Chapter 4.2)

4.4.5.1.4 Oral motor ability
- Structural abnormalities – cleft lip, cleft palate
- Disorders of oral motor control – cerebral palsy
- Problems related to control of oral muscles, lips and tongue

4.4.5.1.5 Developmental history
- There would be coexisting intellectual disability, gross and fine motor delay in children with cerebral palsy.
- Social communication skill is impaired in children with autism spectrum disorder.

4.4.5.1.6 Past medical history
- History of illnesses which have caused regression of skills

4.4.5.1.7 Birth history
- Concerns about the pregnancy, birth and neonatal period
- Prematurity and low birth weight are risk factors of speech and language delay [7].
4.4.5.1.8 Family history
- Family history of speech and language delay is risk factor of speech and language delay [2] [7].

4.4.5.1.9 Social history
Lack of appropriate language learning environment is a common cause of language delay in children. For example: [8]
- Over-protection by caregivers reduces child's opportunities to learn to communicate
- Lack of role model in communication
- Social deprivation

4.4.5.2 Physical examination

4.4.5.2.1 Dysmorphic features
Look for syndromal features which could be found in some congenital syndromes leading to language disorders such as elongated face, large or protruding ears, and macroorchidism for Fragile X Syndrome, small head and jaw and wide eyes for Cri du Chat Syndrome, hypertelorism, hooded eyelids, tubular nose, broad nose tip, small mouth and mild ear abnormalities for DiGeorge Syndrome, etc.

4.4.5.2.2 Hearing
- Arrange initial hearing screening if not previously done
- Ear examination to look for otitis media with effusion

4.4.5.3 Language assessment
Comprehensive assessment should be done by trained professionals. Simple assessment can be done by primary care doctors with reference from normal developmental milestones.

- Can be reassured about the child’s language development if: [9]

| By 9 Months | Can respond to familiar words with contextual cues e.g. “milk”
| Can babble consonants like “ba”, “da”, “ka” |
| By 12 months | Can respond to familiar words with gestured cues. e.g. wave “bye bye”, “no”
| Can vocalize strings of syllables or say a few meaningful words |
| By 18 months | Can recognize names of familiar people and objects
| Can understand more daily words and phrases e.g. “give mummy”, “sit down” with gradual withdrawal of gestured cues
| Can start to use single words, most are nouns e.g. “baby”, “dolly”; then a few verbs appear e.g. “go”, “jump” |
| By 2 years | Can follow simple instructions like “give me the ball”
| Can point to body parts when asked
| Can recognize common pictures
| Can say more single words
| Can start combining words e.g. “that’s mine”, “daddy gone” |
### Module on Development

| By 3 years | • Can understand simple “yes/no”, “what” and “where” questions  
| • Can speak in phrases or simple sentences e.g. “Mummy wants cookie”  
| • Can speak short sentences with pronouns e.g. “I want my cup”  
| • Can use adjectives e.g. “hot”, “pretty”  
| • Like to ask “what”, “where” questions |
| By 4 years | • Can understand most wh-questions  
| • Can attend to storytelling, may ask adults to repeat his favorite parts  
| • Can describe events and what is going on in simple terms  
| • Like to ask “why” questions  
| • Can speak fluently |

N.B. Correct for pre-maturity when the child is one year old or younger.

#### Should seek further evaluation if:

| At any age | • Appears not hearing well, having poor eye contact with carer or others  
| By the end of 9 months | • Does not babble (“mama”, “baba”, “dada”)  
| By the end of 12 months | • Does not respond to calling of her name often  
| • Does not use sounds or gestures to point to indicate needs  
| By the end of 18 months | • Does not understand the name of familiar person and objects e.g. “cup”, “grandma”  
| • Does not use finger to point to indicate needs  
| • Does not have meaningful words  
| By the end of 24 months | • Does not respond to one-step commands without prompting gestures e.g. “give me the ball”  
| • Does not recognize a few simple pictures  
| • Speak single words only e.g. “apple” “蘋果”  
| By the end of 3 years | • Cannot understand two-step commands e.g. “get your coat and close the door”  
| • Not speaking with 2-3 words phrases |
| By the end of 4 years | • Cannot follow adult’s daily instructions  
| • Cannot comprehend simple stories or cartoons  
| • Cannot retell events in simple words  
| • Does not speak in sentences  
| • Has unclear speech and difficulty in being understood  
| By the end of 5 years | • Not able to answer questions in simple conversation  
| • Cannot comprehend complicated stories  
| • Cannot retell simple stories in an organized way |

### 4.4.5.4 Parent-child interaction

Observe the method of communication between parent and child, including use of words, tone of speech, eye gaze and gestures. Special attention should be paid to the parenting style and even parental stress especially when problem behaviours are identified.
4.4.6 Management
4.4.6.1 Reassurance
Provide reassurance and explanation for normal variants. Sometimes, follow up assessments should be arranged accordingly.

4.4.6.2 Advice
Development of proficiency in vocabulary and language use depends heavily on family and early school education. Here are some tips for families to aid their children’s language development:

- Enhance child’s motivation to communicate through activities and games that would arouse his / her interest.
- Recite rhymes and songs.
- Read aloud to children.
- Make use of daily happenings as topics when talking to the child.
- Encourage the child to express his / her needs and listen to him / her patiently.

(Please refer to 4.4.7 for resources on language development for parents and carers.)

4.4.6.3 Referral for further assessment and management
When speech and language delay is suspected, children could be referred for developmental surveillance by Maternal and Child Health Service or directly to speech therapist. Children with significant language delay or multiple problems may need further assessment at Child Assessment Centre.

4.4.6.4 Multidisciplinary care
Treatment program includes general encouragement and stimulation of communication, which is individualized for the special area of deficit of each child. Evidence shows that there is a positive effect of speech and language therapy interventions for children with expressive language disorder, but the effect for receptive language disorder appears to be much smaller.

4.4.7 Some resources on language development for parents and caregivers

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Resource</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Health Service, Department</td>
<td>Normal Child Development</td>
<td><a href="http://s.fhs.gov.hk/veyj3">http://s.fhs.gov.hk/veyj3</a></td>
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<td></td>
<td>Language Development and Language Facilitation</td>
<td><a href="http://s.fhs.gov.hk/2ox6w">http://s.fhs.gov.hk/2ox6w</a> (1-2 years old)</td>
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<td><a href="http://s.fhs.gov.hk/h19bp">http://s.fhs.gov.hk/h19bp</a> (2-4 years old)</td>
</tr>
<tr>
<td></td>
<td>Let baby tells you</td>
<td><a href="http://s.fhs.gov.hk/qsr7j">http://s.fhs.gov.hk/qsr7j</a></td>
</tr>
</tbody>
</table>

For more information about the service providers, please refer to Annex on Resources for Chapter 4.

**References:**
4.5 Social developmental problems

4.5.1 Introduction

Autism Spectrum Disorder (ASD) is one of the major neurodevelopmental disorders. It refers to a group of clinical behavioural syndromes characterized by impairment in reciprocal social interaction and communication, and with the presence of stereotyped behaviours, interests and activities. The qualitative abnormalities are pervasive, affecting an individual’s functioning in various aspects of development and situations. The abnormalities are usually evident in the first 3 years of life.

With the advent of the Diagnostic and Statistical Manual of mental disorders (DSM-5), individual clinical characteristics are noted through the use of specifiers within the diagnosis of ASD. Diagnostic specifiers are as follows:

- Severity recorded as level of support needed
- With or without accompanying intellectual impairment
- With or without accompanying language impairment
- Associated with a known medical or genetic condition or environmental factor
- Associated with another neurodevelopmental, mental, or behavioural disorder
- With catatonia

Studies in Asia, Europe, and North America have identified individuals with ASD with an average prevalence of between 1% and 2%. According to the report of The Centers for Disease Control and Prevention (CDC), it estimates that 1 in 59 children (or 16.8 per 1,000 children aged eight years) in multiple communities in the United States has been identified with ASD in 2014.

4.5.2 Symptoms and presentations

ASD is a biologically based neurodevelopmental disorder characterized by impairments in two major domains:

- deficits in social communication and social interaction
- restricted repetitive patterns of behaviour, interests, and activities
4.5.2.1 Problems in Social Interaction

Delay in social skills milestones achievement and impairment in social interaction are the earliest signs of autism [2], [4]. Features include:

- Poor eye contact
- Poor response when name called
- Lack of spontaneous sharing of enjoyment or showing objects of interest to others
- Poor reciprocal social and emotional response and failure to develop appropriate peer relationships

4.5.2.2 Impairments in Communication and Language

Poor communication and language development:

- Delay in verbal language, which is not compensated through other means such as gestures, facial expression
- Persistent echoing what others say
- Inability to sustain conversation
- Abnormal use of language e.g. idiosyncratic speech, pronoun reversal
- Poor symbolic, make-believe and social imitative play, such as playing with toy cooking sets, or acting out an imaginative family or classroom scenarios.

4.5.2.3 Restricted and Repetitive Behaviours

Stereotyped, repetitive behaviour and narrow interests such as in road maps or numbers that are abnormal in content and focus, persistent preoccupation with parts of objects like wheels of toy cars; and inflexible adherence to specific, non-functional routines or rituals such as insistence on a same route or taking a certain bus ride every day [2].

Repetitive behaviours and restricted interests may not be noted until after social skill and communication impairments are exhibited [4].

4.5.2.4 Sensory problems

Hyper-or hypo-reactivity to sensory input or unusual behaviour in seeking sensory stimulation from the environment (e.g. apparent indifference to pain / temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement) [5].

4.5.2.5 Other associated features

Symptoms of ASDs may be accompanied or modified by features of global delay / intellectual disability, which may also be present in up to 31.6% of children with ASD [6].
Other associated physical problems include: epilepsy, gastrointestinal problems (diarrhea or constipation), and motor impairment. Comorbid psychiatric disorders like attention deficit / hyperactivity disorder, anxiety disorder, depression, obsessive-compulsive disorder and sleep problems are common among ASD children [7].

4.5.3 Assessment in primary care setting

Evidence shows that early treatment is beneficial; therefore, early diagnosis of ASDs is critical [8], [9]. This is made more likely with routine developmental surveillance and appropriate screening tools [10].

The elements in the developmental surveillance concerning ASDs include:

- Elicit parents’ concern on their children’s developmental or behavioural aspects
- Look out for early signs of ASDs (see 4.5.2),
- Document a family history of ASDs.

The American Academy of Pediatrics recommends administering an autism-specific screening tool to all children at the 18- and 24-month visits, not just to children who demonstrate autistic behaviours [8].

4.5.3.1 Autism specific screening tests

The Modified Checklist for Autism in Toddlers M-CHAT-R is a validated screening tool for children from 16-30 months old and is designed for a parent or caregiver to complete in two minutes. It may be downloaded at http://www.mchatscreen.com. However, the Chinese version is not yet validated locally in Hong Kong.

The M-CHAT-R is a two-step screening instrument consisting of a 20-question checklist and a structured follow-up interview (M-CHAT-R Follow-up) that is designed to identify false-positive results from the checklist. The Modified Checklist for Autism in Toddlers has been shown to identify a considerable number of children with ASDs who were missed by surveillance alone [11]. It has been shown to have high sensitivity and specificity [8], but it is important to note that a positive M-CHAT result does not automatically mean the diagnosis of ASDs. Referral for further assessment is necessary.

4.5.4 Management

- Physicians should refer children to experts for a diagnostic evaluation when diagnosis is suspected during surveillance or screening to prevent unnecessary delays in the diagnostic and treatment processes [4], [8]
- Treatment include:
  - Appropriate education:
    - Training based on behavioural modification
• Focus on improving communication: social skill training
  ◆ Appropriate structured and predictable environment: graded change approach
  ◆ Medication to reduce undesirable behaviours or associated behavioural disorders

The goals of long-term management are to maximize functional independence and community engagement, minimize maladaptive behaviours, and provide family and caregiver support.

A multidisciplinary approach is usually adopted. The use of alternative therapy in treating ASD is not supported by adequate scientific evidence. Physicians play an important role in coordinating care through an interdisciplinary team; referring families for specialized services; and treating children’s associated conditions, including sleep disturbances, gastrointestinal problems, anxiety, and hyperactivity [4]. They also need to look out and work up for underlying organic or genetic causes which may presented as autism phenotype [12].

Autism is a lifelong condition, but early recognition, diagnosis, and treatment can improve the prognosis, whereas associated medical conditions, psychiatric conditions, and intellectual disability can worsen the prognosis.

4.5.5 Some resources on ASDs

Identification and assessment

<table>
<thead>
<tr>
<th>Organization</th>
<th>Resource</th>
<th>Website</th>
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<td>Family Health Service, Department of Health</td>
<td>Developmental surveillance and Identification</td>
<td><a href="http://www.fhs.gov.hk">www.fhs.gov.hk</a></td>
</tr>
<tr>
<td>Child and Adolescent Psychiatric Clinic (Hospital Authority)</td>
<td>Diagnosis and long term treatment</td>
<td><a href="http://www.ha.org.hk/visitor/ha_visitor_index.asp?Content_ID=10053&amp;Lang=CHI&amp;B5&amp;Dimension=100&amp;Parent_ID=10042&amp;Ver=HTML">http://www.ha.org.hk/visitor/ha_visitor_index.asp?Content_ID=10053&amp;Lang=CHI&amp;B5&amp;Dimension=100&amp;Parent_ID=10042&amp;Ver=HTML</a></td>
</tr>
</tbody>
</table>

Education and Training Service

<table>
<thead>
<tr>
<th>Organization</th>
<th>Resource</th>
<th>Website</th>
</tr>
</thead>
</table>

N.B. For more information about the service providers, please refer to Annex on Resources for Chapter 4.
References:

4.6 Specific learning disabilities

4.6.1 Introduction
In Chinese society, students who perform badly in reading and writing are often mistaken as being lazy or having low intellectual ability. However, their academic underperformance might have been caused by specific learning disabilities. Problems in learning, emotions, behaviour and family relationship may occur if early intervention is not offered [1].

Specific learning disabilities (also named specific learning difficulties) are a diverse group of disorders in which children who generally possess at least average intelligence have problems processing information or generating output in learning [2], [3].

Specific learning difficulties (SLD) are a spectrum of disorders involving academic difficulties, like reading, writing or mathematics [3], [4]. They include:
- Specific learning difficulties in reading and writing or dyslexia (讀寫障礙)
- Specific difficulty in writing (書寫障礙)
- Dyscalculia (數學運算障礙)

4.6.1.1 Dyslexia
Dyslexia is the commonest type of specific learning disability [3], [5], which accounts for 80% of cases [6]. It is estimated that the prevalence of dyslexia among children in Hong Kong is about 9.7% to 12.6%, in which 6.2% to 8.7% with mild, 2.2 to 2.3% moderate and 1.3% to 1.6% severe problem. Boy to girl gender ratio was 1.6:1 [7], [8].

Dyslexia is a primary reading disorder due to abnormality in word decoding [3]. It is not the direct result of intellectual disability, sensory impairment, environmental factors, inadequate educational opportunities, or social / emotional problems [5]. Children with dyslexia usually have difficulties in
- Word recognition, spelling and dictation
- Reading comprehension (as a secondary problem)

4.6.1.1.1 Presentations
Please note that these symptoms may not be all present in the same child [1], [9]:

a. Word recognition and reading:
- Difficulty in recognizing, reading and pronouncing characters or words.
- Mixing up characters with similar shape, e.g. pronounce "毛"as "手"
- Mixing up words with similar or related meaning, e.g. read "快樂" as "高興", "秩序" as "規則"
- Slow in reading and sometimes may skip words or lines
- Easily tired or may have headaches during reading
Module on Development

4.6.1.2 Dyscalculia

Dyscalculia is defined as difficulty in understanding numbers, learning how to manipulate numbers, and facts in Mathematics [10].

4.6.2 Impact of learning disability on children [5] [9]

- **Academic Performance:** Repeated failure in dictations and examinations leads to loss of interest in learning and poor academic results.
- **Behaviour and Emotion:** Difficulty in reading, writing and homework may end up into avoidance and uncooperative behaviour. Studies show that around 30% of children with dyslexia also have attention deficit / hyperactivity disorder, and may be inattentive or daydream in class.
- **Self-image:** They are often considered naughty or lazy by others, this leads to low self-image and self-confidence.
- **Family:** The failure to recognize and understand the problem may prevent parents from seeking appropriate management. Parents may feel frustrated as child’s academic performance is still poor despite much parental effort in coaching. This will affect parent-child relationship and increase the family’s psychological burden.

4.6.3 Identification of learning problems

4.6.3.1 Initial suspicion and identification

Children who may have dyslexia are usually suspected by parents or teachers [5]. Preliminary screening can be conducted by teachers, including the use of the Hong Kong Specific Learning Difficulties Behaviour Checklist (for Primary School Students). The problem may also be identified by primary care physicians in clinic visits when parents raise their concern.

4.6.3.2 Assessment by primary care physicians

In many cases, the problem is not discovered until children experience academic difficulties when they start school. Furthermore, many parents who notice that their child is exhibiting learning difficulties may adopt a “wait and see approach” before seeking assistance. However, early recognition is essential as remediation is more effective in early years [6].

During well-child visits, primary care providers should be alert to parents’ concern on difficulty
in language, learning rhymes, recognizing letters and sound/symbol connections, as these could be clues to learning problems [6].

When a child has suspected learning difficulties, primary care physicians should assess the child for medical problems that could affect the child’s ability to learn: [3]

- perinatal problems (e.g. preterm birth, low birth weight, fetal exposure to drugs or alcohol);
- neurological problems (e.g. infections of the central nervous system; severe head injuries);
- medical problems that may have caused school absences;
- psychiatric problems (e.g. anxiety, depression, ADHD, autism);
- developmental delay;
- hearing, language, or speech problems;
- family history of learning disabilities.

Although most children with learning disability have normal physical examination, assessment for growth parameters, dysmorphic features and neurological deficit is required to rule out genetic or neurologic condition associated with learning problem. Hearing and vision, which may affect learning, should also be examined.

**4.6.4 Training and Treatment**

It is not in the child’s best interest to have “wait and see” approach or hope that the child will “grow out of” his or her problems [3]. On the contrary, early referral and intervention is necessary. Primary care providers may help by providing information to parents in order to elicit appropriate parental observations [8].

Children with learning disabilities should undergo assessments of their health, development, hearing, and vision and, when appropriate, medical and psychological interventions for associated and related conditions [6]. In addition, family physicians should be aware of other medical problems which affect the child’s ability to learn and refer suspected cases for further assessment.

It is essential to adopt a multidisciplinary approach in the management of learning disabilities, which the family, school, doctors, allied health staff and other supporting organizations should be included [6].

If the diagnosis is confirmed, parents should be encouraged to inform school. The educational system has the triple responsibility of early detection, evaluation, and treatment of children with learning disabilities [6]. Education Bureau will arrange remedial teaching or individualised support at school and offer parental education on supporting the child.
### 4.6.5 Some resources on learning disability

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Website</th>
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</thead>
<tbody>
<tr>
<td>Dyslexia Association (Hong Kong)</td>
<td><a href="http://www.dyslexia.org.hk/">http://www.dyslexia.org.hk/</a></td>
</tr>
<tr>
<td>Hong Kong Association for Specific Learning Disabilities</td>
<td><a href="http://www.asld.org.hk">http://www.asld.org.hk</a></td>
</tr>
</tbody>
</table>

Disclaimer: The list is not exhaustive and is for reference only. Links to other websites are inserted for the convenience of the readers and do not constitute endorsement of material at those sites, or any associated organisation, product or service. The information may be subject to change. Updated information can be sought from the respective organisations.

N.B. For more information about the service providers, please refer to Annex on Resources for Chapter 4.
References:


Annex on Brief Description of Relevant Services of the Department of Health

Family Health Service (FHS)

The Family Health Service (FHS) of the Department of Health contributes to a significant proportion of the maternal and child health service provided at the primary care level in Hong Kong. It provides a comprehensive range of health promotion and disease prevention services to children from birth to 5 years and women below 65 years of age to help mothers, their children, and their families lead healthy lives. The Service operates through 31 Maternal & Child Health Centres (MCHCs) and 3 Woman Health Centres across the territory. Each MCHC’s scope of service covers child health, maternal health and woman health services. FHS has implemented the ‘Integrated Child Health and Development Programme’ (ICHDP) in all MCHCs. It comprises three components, namely i) health and developmental surveillance, ii) immunisation, and iii) parenting. Over 90% of the local newborns whose parents are Hong Kong residents receive services from the MCHCs each year. A series of routine reviews are conducted by health professionals to provide parents with the appropriate anticipatory advice as well as timely identification and referral of children with developmental or health problems.

The health and developmental surveillance programme includes a) Newborn Consultation, b) Growth Monitoring and Diet Assessment, c) Developmental Surveillance, d) Hearing Screening and e) Vision Screening.

Regarding developmental surveillance, parents are empowered to monitor the child's development through anticipatory guidance. At specified ages, health professionals obtain relevant developmental history, identify parental concerns, perform observation on the child's development, and provide parents with appropriate advice. Children identified to have significant developmental problems are referred to the Child Assessment Service (CAS) for further management. A referral mechanism has been developed for preschool teachers to refer children with suspected developmental problems to MCHCs for initial assessment.

General practitioners can advise parents to attend MCHC (0-5 years) for developmental surveillance, or make referral to CAS or other specialists for further assessment should developmental problem is suspected as appropriate.

Student Health Service (SHS)

The SHS of the Department of Health aims to safeguard both the physical and psychosocial health of school children through comprehensive, promotive and preventive health programmes and enable them to develop their full potential. The target groups are students of all primary and secondary day schools. Enrolled students will be given an annual appointment at one of the 12 Student Health Service Centres (SHSCs) where they receive health screening
and related services.

The health services at SHSCs are designed to cater for students' health needs at various stages of development. These include screening on vision, hearing, blood pressure, scoliosis, psychosocial health, physical examination, health counselling and health education. Students with problems detected may be referred to the Special Assessment Centres (SACs) of SHS, where audiologist, clinical psychologists, optometrists and dietitians would conduct detailed assessment on respective area, provide health advice and follow-up service. Students will also be referred to specialist, school guidance staff, school social workers, or other relevant organisations, if indicated. A summary of health services provided to different grades of students attending SHSCs is at the following link:
http://www.studenthealth.gov.hk/english/resources/resources_forms/appendixb.html

In addition to the centre-based services at SHSCs and SACs, the SHS also provide outreaching services to the schools. The Adolescents Health Programme of SHS provides services to adolescents in school settings to promote psychosocial health. The Programme adopts a multidisciplinary approach to provide health promotion services to adolescents, their parents and teachers through interactive activities and workshops. The Programme aims to enhance knowledge, attitudes and skills in adolescents in understanding and accepting self and others, building relationship among themselves and with their various counterparts, as well as building up their resilience to face challenges now and in the future.

**Child Assessment Service (CAS)**

Currently, there are seven Child Assessment Centres located in Kowloon and the New Territories serving the whole populations in Hong Kong. The CAS provides comprehensive assessment and diagnosis for children under 12 years of age who are suspected to have developmental problems. After assessment, follow-up plans will be formulated according to the individual needs of children. Children will be referred to other appropriate service providers for training and education support. While children await rehabilitation services, interim support will be provided to parents, including information factsheets, seminars, workshops and practical training, with a view to enhance the parents' understanding of their children and community resources so that the parents could provide home-based training to facilitate the development and growth of the children. Besides provision of clinical assessment, CAS also participates in public and professional education, and clinical related research and studies.

The CAS adopts a multidisciplinary approach in providing assessments and follow-up support. The multi-disciplinary group of healthcare and professional staff in CAS comprises paediatricians, nurses, audiologists, clinical psychologists, occupational therapists, optometrists, physiotherapists, speech therapists and medical social workers.
Reference:
### Annex on Developmental Milestones [1-5]

<table>
<thead>
<tr>
<th>Age</th>
<th>Gross motor</th>
<th>Fine motor / Self-care</th>
<th>Communication / Language</th>
<th>Cognitive</th>
<th>Social / Emotional Behaviour</th>
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<tbody>
<tr>
<td>1 month</td>
<td>- Moves with jerky arm thrusting and leg kicking</td>
<td>- Keeps hands fisted most of the time but can reflexively grasp whatever is placed in hand</td>
<td>- Startled by sudden noises&lt;br&gt;- Pays attention to human voices especially high-pitched ones&lt;br&gt;- Responds to sound by blinking, jerking of limbs, or &quot;freezing&quot; of own activity</td>
<td>- Shows preference for human face, followed by high-contrast patterns&lt;br&gt;- Focuses best at near, about 8 to 10 inches (20 - 25 cm)&lt;br&gt;- Follows human face or large attractive objects briefly</td>
<td>- Recognizes the scent of mother&lt;br&gt;- Smiles unselectively at first and then in response to social stimulation</td>
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<td></td>
<td>- Lifts head briefly when lying on tummy but cannot support head without assistance</td>
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<td>3 months</td>
<td>- Lifts head and chest when lying on tummy and supports body with both forearms&lt;br&gt;- Keeps head up fairly steadily when held in sitting position</td>
<td>- Keeps hands open most of the time&lt;br&gt;- Grasps rattle placed in palm</td>
<td>- Turns head to the direction of sound&lt;br&gt;- Starts cooing or vocalizing with different sounds e.g. &quot;Ah&quot;, &quot;Ooh&quot;</td>
<td>- Recognizes and visually follows familiar people at distance (several feet or 1 to 2 m away)&lt;br&gt;- Moves head and turns eyes from side to side to follow moving objects&lt;br&gt;- Looks and plays with own hands</td>
<td>- Communicates feelings and needs by crying, cooing, different facial expressions and body movements&lt;br&gt;- Imitates adult's facial expressions directed towards him&lt;br&gt;- Laughs out when played with and may cry when playing stops</td>
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<tr>
<td>Age</td>
<td>Gross motor</td>
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| 7 months | - Rolls over from tummy to back and reverse  
- Pushes up head and body with hands when lying on tummy  
- Sits with support of his hands or even free his arms for short while | - Reaches out and grasp objects  
- Transfers object from one hand to the other  
- Rakes small objects with fingers  
- Grasps an object with thumb, index and middle fingers against palm (radial-palmar grasp) | - Localizes the source of soft noise produced on either side  
- Responds to people calling him  
- Babbles chains of consonants like bah-bah, dada  
- Imitates different sounds made by adult | - Shows interest in colourful pictures  
- Readily recognizes familiar persons at a distance (several feet away)  
- Fixates and follows tiny objects (e.g. choco beads) at near (about 12 to 15 inches/30-40cm)  
- Enjoys making sound with toys or objects repeatedly (e.g. shaking of rattle or keys)  
- Finds partially hidden objects | - Shows strong preference for mother or care person  
- Stranger anxiety  
- Shows Interest in his own image in the mirror |
| 9 months | - Sits well without support  
- Begins to stand holding on  
- Crawls | - Bangs 2 cubes together  
- Throws or shakes objects  
- Grasps with thumb, index and middle fingers without the use of the palm (radial-digital grasp) | - Makes a lot of different sounds like “mamamama” and “bababababa”  
- Imitates speech sounds  
- Responds to own name  
- Copies sounds and gestures | - Plays peek-a-boo  
- Searches for hidden toy  
- Actively takes toys offered and manipulates with interest | - May be clingy with familiar adults |
| Age       | Gross motor                                                                 | Fine motor / Self-care                                                                 | Communication / Language                                                                 | Cognitive                                                                                      | Social / Emotional Behaviour                                                                 |
|-----------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 12 months | - Gets to sitting position without assistance  
- Creeps on tummy, or crawls on hands and knees, or shuffles on bottom  
- Pulls self up to standing position  
- Walks when hands held by adult or may take a few steps on his own | - Pokes with index finger  
- Picks up small objects with thumb and index finger like a pincer (neat pincer grasp)  
- Releases objects voluntarily  
- Takes objects out and put into containers  
- Finger feed  
- Helps in dressing by holding out arms and legs | - Responds to simple situational (i.e. familiar activity with environmental cues) commands e.g. Wave "bye-bye", "give mummy"  
- Understands "no"  
- Makes his wants known by gestures, pointing with index fingers  
- Vocalizes long babbles (long strings of syllables) or jargon (speech-like vocalizations)  
- Speaks 1 to 2 words spontaneously in a meaningful way like "ma-ma" or "da-da" | - Explores objects in many different ways (shaking, banging, throwing and dropping)  
- Finds hidden toys easily  
- Understands the correct use of daily objects (e.g. comb for combing hair, spoon for eating)  
- Starts engaging in make-believe play with household objects involving only himself (e.g. babbling into the telephone) | - Appears shy or anxious with strangers, shows distress when parents leave  
- Shows preference for certain persons and toys  
- Enjoys imitating other's action in her play |
| 18 months | - Stands and walks alone  
- Walks up stairs | - Can build a tower of 2 to 4 blocks  
- Holds a crayon to make | - Follows one-step command (e.g. "get your shoes" "shut the door") | - Imitates using real props (e.g. sweeps with broom, wipe furniture) | - Imitates peers  
- May have temper tantrums |
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</table>
| 2 years | - Walks with quick steps or even run  
- Walks down stairs with both feet on each step while holding on rail  
- Jumps off ground with two feet together  
- Kicks a ball | - Builds towers of 6 or more bricks/blocks  
- Turns several pages (not thick ones) of book at a time  
- Turns knobs and unscrew bottle cap  
- Scribbles with crayon  
- Tries feeding self with spoon | - Recognizes and names familiar objects and pictures  
- Follows simple verbal instructions without gestured cues (e.g. "give me the ball")  
- Says many single words (both nouns and verbs, some adjectives)  
- Starts combining words e.g. "Mummy eats", "want | - Sorts objects by shapes and sizes | - Being self-centred  
- Shows possessiveness and competes for toys  
- Learns to play with others in an interactive way  
- Imitates behaviours and activities of others, especially adults and older kids |
| | while holding on rail with one hand | scribbles on paper  
- Drinks from a cup  
- Helps with dressing  
- Shows tendency to use one hand | - Points to one to a few body parts  
- Points to familiar objects when named  
- Can say 10 or more words (usually name of person or objects)  
- Says and shakes head for “No” | - Functional object use (e.g. brushes own hair with brush, pushes toy car)  
- Enjoys pretend play involving others (e.g. feeding Mummy or a doll)  
- Starts learning to solve problems with trial and error | - |
<table>
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<tbody>
<tr>
<td>3 years</td>
<td>- Runs fast&lt;br&gt;- Jumps and climbs well&lt;br&gt;- Walks up stairs with alternating feet without holding on rail&lt;br&gt;- Pedals tricycle</td>
<td>- Helps with dressing or undressing&lt;br&gt;- Takes off shoes&lt;br&gt;- Starts indicating toilet needs</td>
<td>- cookies”&lt;br&gt;- By 30m, speaks in 2-3 words phrases or sentences (e.g. “Mummy want cookie”, “Where’s the ball?”), answers simple &quot;Yes/No&quot;, &quot;What&quot; and &quot;Where&quot; questions</td>
<td>- Sorts and identifies a few colours&lt;br&gt;- Begins to understand number concepts, knows the concept of &quot;one&quot; and &quot;two&quot;&lt;br&gt;- Completes puzzles of 3-4 pieces&lt;br&gt;- Becomes more elaborate in pretend play, taking roles (e.g. pretending to be a doctor or a teacher)</td>
<td>- Imitates mannerisms and behaviours of adults and playmates&lt;br&gt;- Shows affection for familiar playmates&lt;br&gt;- Starts taking turns and sharing.&lt;br&gt;- Shows temper tantrum and rebellious behaviours when obstructed</td>
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- Helps with dressing or undressing
- Takes off shoes
- Starts indicating toilet needs
- Helps with dressing or undressing
- Takes off shoes
- Starts indicating toilet needs
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<tbody>
<tr>
<td>4 years</td>
<td>- Runs, jumps and climbs confidently</td>
<td>- Holds pencil in an adult manner</td>
<td>- Understands most wh-questions including those about a story they have recently heard</td>
<td>- Understands basic concept of quantity (e.g. big &amp; small, tall &amp; short, long &amp; short etc.)</td>
<td>- Takes part and enjoys fantasy play and role-playing games</td>
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<td></td>
<td>- Throws and catches large ball</td>
<td>- Draws recognisable circle and square</td>
<td>- Has an active vocabulary of hundreds of words</td>
<td>- Names a few colors</td>
<td>- Engages in simple cooperative play with other kids</td>
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<td></td>
<td>- Stands on one foot momentarily</td>
<td>- Starts learning to copy some simple letters</td>
<td>- Expresses needs or feelings in simple sentences.</td>
<td>- Says numbers up to 10 and may count up to 3 to 4 objects correctly</td>
<td>- Starts to identify with his own sex</td>
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<tr>
<td></td>
<td>- Pedals tricycle with ease</td>
<td>- comprising mainly of vertical or horizontal strokes (e.g. 1, +, □, L, T)</td>
<td>- Begins to hold conversations with adults</td>
<td>- Understands concept of time in relation to his own daily routine e.g. expecting playground activities some time after his brother is back from school</td>
<td>- Shows preference for same-sex playmates</td>
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<td></td>
<td>- Walks down stairs with alternating feet</td>
<td>- Draws a person with a few body parts</td>
<td>- Speaks clearly and understandable to strangers</td>
<td>- Controls his behaviours increasingly and agrees to rules</td>
<td>- Controls his behaviours increasingly and agrees to rules</td>
</tr>
<tr>
<td></td>
<td>without holding on rail</td>
<td>- commonly with head, limbs, eyes, and mouth</td>
<td>- Sings nursery rhymes together with actions</td>
<td>- Aware of the feelings of others and may try to comfort playmates in distress</td>
<td>- Aware of the feelings of others and may try to comfort playmates in distress</td>
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<tr>
<td></td>
<td></td>
<td>- Tries to use scissors to cut paper strip</td>
<td>- Likes to ask &quot;Why&quot;, &quot;Who&quot; and sometimes &quot;How&quot; questions</td>
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<td></td>
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<td>- Be dry by day and night usually</td>
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<td>- Feeds self skillfully with spoon</td>
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<td></td>
<td>- Takes off simple garments without assistance,</td>
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|           |             | including undoing buttons; but may need a little help in dressing up properly | - Puts on shoes (without laces)  
- Washes hands |          |                              |
| 5-6 years | - Manages stairs and playground activities skillfully  
- Kicks a moving ball  
- Stands on either leg and maintains balance for five seconds or longer  
- Hops forward on one foot for 2-3 metres  
- Moves in rhythm to music | - Builds more elaborate models with building blocks  
- Colours picture neatly, staying within outlines  
- Draws simple pictures, recognisable person with more features (commonly with head, eyes, nose, mouth, trunk, limbs with hands and feet)  
- Writes numerals and alphabets with good control  
- Does simple art work | - Speaks clearly and fluently using well-formed sentences  
- Responds appropriately and talks in turn while maintaining the topic of conversation  
- Gives full name, age, and home address when asked  
- Re-tells a few events from a story just heard  
- Gives a logical account of what has happened recently  
- Enjoys jokes and riddles  
- Asks meaning of new words heard |                              | - Focuses with increasing attention and completes task  
- Does simple one-digit addition and subtraction within 10  
- Names 10 or more colours  
- Understands basic concept of time e.g. morning and afternoon, today and tomorrow, weekdays and holidays, etc. | - Controls his feelings generally and behaves according to social rules  
- Begins to think and asks about other people's thoughts and feelings, and may try to hide his own  
- Engages in group games that require taking turns and following rules and to play cooperatively with companions most of
<table>
<thead>
<tr>
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<tr>
<td></td>
<td></td>
<td>involving cutting with scissors, applying glue, and sticking objects into position</td>
<td>usually unable to consider several possible factors at the same time.</td>
<td></td>
<td>the time</td>
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<td></td>
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<td>- Can use chopsticks, knife and fork</td>
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<td>- Enjoys pretend play with his friends like pretending to be other people, e.g. parents, policemen, superheroes</td>
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<td></td>
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<td>- Washes face and brushes teeth independently</td>
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<td>- Tells the names of most of his classmates, and chooses companions that he likes</td>
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<td>- Wants to be like his friends</td>
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<tr>
<td></td>
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<td></td>
<td>- Be aware of role characteristics and physical differences between males and females</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Distinguishes fantasy from reality</td>
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</table>

N.B: It is only used as a reference for developmental milestones but not as a substitute for standardised validated screening for developmental-behavioural problems.
References:
Annex on Resources for Chapter 4

Disclaimer: The list is not exhaustive and is for reference only. Links to other websites are inserted for the convenience of the readers and do not constitute endorsement of material at those sites, or any associated organisation, product or service. The information may be subject to change. Updated information can be sought from the Social Welfare Department and the respective organisations.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Assessment Service, Department of Health</td>
<td><a href="http://www.dhcas.gov.hk/">http://www.dhcas.gov.hk/</a></td>
</tr>
<tr>
<td>衛生署兒童體能智力測驗服務</td>
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<tr>
<td>Family Health Service, Department of Health</td>
<td><a href="http://www.fhs.gov.hk">http://www.fhs.gov.hk</a></td>
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<tr>
<td>衛生署家庭健康服務</td>
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<tr>
<td>教育局特殊教育資源中心</td>
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<tr>
<td>社會福利署</td>
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</table>

List of some Non-Government Organisations (NGOs) providing services for children with developmental problems

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization Name</td>
<td>Website Link</td>
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<tr>
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<tr>
<td>Caritas Hong Kong</td>
<td><a href="http://www.caritas.org.hk/">http://www.caritas.org.hk/</a></td>
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<tr>
<td>Fu Hong Society</td>
<td><a href="http://www.fuhong.org/">http://www.fuhong.org/</a></td>
</tr>
<tr>
<td>Haven of Hope Christian Service</td>
<td><a href="https://www.hohcs.org.hk/">https://www.hohcs.org.hk/</a></td>
</tr>
<tr>
<td>Heep Hong Society</td>
<td><a href="http://www.heephong.org/">http://www.heephong.org/</a></td>
</tr>
<tr>
<td>St. James’ Settlement</td>
<td><a href="https://www.sjs.org.hk/">https://www.sjs.org.hk/</a></td>
</tr>
<tr>
<td>Organization Name</td>
<td>Website</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
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<tr>
<td>Watchdog Ltd. / Watchdog Early Education Centre</td>
<td><a href="http://www.watchdog.org.hk/">www.watchdog.org.hk/</a></td>
</tr>
<tr>
<td>Hong Kong Lutheran Social Service</td>
<td><a href="http://www.hklss.hk/">http://www.hklss.hk/</a></td>
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</table>
### The Hong Kong Society for the Deaf
香港聾人福利促進會  

### Kwun Tong Methodist Social Service
循道衛理觀塘社會服務處  

### NAAC
鄰舍輔導會  

### The Boys’ and Girls’ Club Association of Hong Kong
香港小童群益會  
[https://www.bgca.org.hk/](https://www.bgca.org.hk/)

### Yan Chai Hospital
仁濟醫院  
[https://www.yanchai.org.hk/](https://www.yanchai.org.hk/)

### Parents / Relatives Resource Centre for Disabled Persons

<table>
<thead>
<tr>
<th>Service Unit</th>
<th>Address</th>
<th>Tel. No.</th>
</tr>
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<tbody>
<tr>
<td><strong>Caritas-Hong Kong</strong></td>
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<tr>
<td>Parents Resource Centre</td>
<td>Rm. 101, Caritas House, 2-8 Caine Road, Hong Kong</td>
<td>2843 4627</td>
</tr>
<tr>
<td>香港明愛 家長資源中心</td>
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<tr>
<td><strong>Heep Hong Society</strong></td>
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<tr>
<td>Hoi Fu Parents Resource Centre</td>
<td>G/F., Hoi Yan House, Hoi Fu Court, Mongkok, Kowloon</td>
<td>2777 5588</td>
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<tr>
<td>協康會 海富家長資源中心</td>
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<tr>
<td><strong>Hong Kong Down Syndrome Association</strong></td>
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<tr>
<td>Bradbury Parents Resource Centre</td>
<td>G/F., Wing A, Chun Tung House, Tung Tau Estate, Kowloon</td>
<td>2718 7774</td>
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<tr>
<td>香港唐氏綜合症協會白普理家長資源中心</td>
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<tr>
<td>Service Unit</td>
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</tr>
<tr>
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<tr>
<td>Heep Hong Society</td>
<td>Wing B, G/F, Cheung Chi House, Cheung Wah Estate, Fanling, N.T.</td>
<td>2656 6211</td>
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<tr>
<td>Fanling Parents Resource Centre</td>
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<tr>
<td>Yuk Chi Resource Centre Limited</td>
<td>Rm. 124-125, Oi Ming House, Yau Oi Estate, Tuen Mun, N.T.</td>
<td>2440 2413</td>
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<tr>
<td>Yuk Chi Resource Centre</td>
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<tr>
<td>Hong Kong Society for the Blind</td>
<td>Rm. 238, 2/F, Main Town Plaza, 223-227 Nam Cheong Street, Shek Kip Mei, Kowloon</td>
<td>2994 9655</td>
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<tr>
<td>Family Resource Centre for Visually Impaired *#</td>
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<tr>
<td>Hong Kong Society for the Deaf</td>
<td>Unit B, G/F Sheung Mei House, Sheung Tak Estate, Tseung Kwan O, N.T.</td>
<td>2178 0838</td>
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<tr>
<td>Parents Resource Centre*#</td>
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<tr>
<td>SAHK</td>
<td>Unit 202, Carpark Block No. 1, Shek Wai Kok Estate, Tsuen Wan</td>
<td>2492 4200</td>
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<tr>
<td>Shek Wai Kok Parents Resource Centre#</td>
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<tr>
<td>SAHK</td>
<td>1-2, G/F, Wang Leung House, Wang Tau Hom Estate, Kowloon</td>
<td>2338 2185</td>
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<tr>
<td>East Kowloon Parents Resource Centre#</td>
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<tr>
<td>Heep Hong Society</td>
<td>G01, Oi Sin House, Oi Tung Estate, Aldrich Bay, Shaukeiwan, Hong Kong</td>
<td>2827 2830</td>
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<tr>
<td>Jockey Club Parents Resource Centre#</td>
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<td>協康會 賽馬會家長資源中心 #'</td>
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<td>协康會 粉嶺家長資源中心</td>
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</tr>
<tr>
<td>Yuk Chi Resource Centre</td>
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<tr>
<td>傳智中心有限公司 傳智中心</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong Society for the Blind</td>
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<tr>
<td>家庭資源中心視障人士家庭資源中心*#</td>
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<td>Service Unit</td>
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<tr>
<td>Heep Hong Society Ma On Shan Centre#</td>
<td>G4-5, G/F. Heng On Estate Community Centre, Ma On Shan, N.T.</td>
<td>2640 6611</td>
</tr>
<tr>
<td>Heep Hong Society Tung Chung Parents Resource Centre#</td>
<td>G/F., Yat Tung Shopping Centre, Yat Tung Estate, Tung Chung, Lantau Island</td>
<td>2109 2262</td>
</tr>
<tr>
<td>Heep Hong Society Jockey Club STAR Resource Centre#</td>
<td>Room 106-117, G/F, Sun Man House, Oi Man Estate, Homantin, Kowloon</td>
<td>3956 4651</td>
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</table>

*This Parents Resource Centre has its specific target group.
#This is a self-financing Parents Resource Centre.

**Self Help Groups (家長互助組織)**

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Tel. No./Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>學前弱能兒童家長會</td>
<td>2324 6099 / <a href="http://www.parentsassn.org.hk/">http://www.parentsassn.org.hk/</a></td>
</tr>
<tr>
<td>The Parents’ Association of Pre-School Handicapped Children</td>
<td></td>
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<tr>
<td>香港唐氏綜合症協會家長委員會</td>
<td>2718 7777</td>
</tr>
<tr>
<td>The Hong Kong Down Syndrome Association Parents Committee</td>
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<tr>
<td>Organization</td>
<td>Contact Information</td>
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<tr>
<td>----------------------------------------------------------------------------</td>
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<tr>
<td>Hong Kong Christian Service---Chih Ai Parents’ Association</td>
<td>2451 6738 / <a href="http://www.hkcs.org/tc/services/capa">http://www.hkcs.org/tc/services/capa</a></td>
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<tr>
<td>The Hong Kong Joint Council of Parents of the Mentally Handicapped</td>
<td>2778 8131 / <a href="https://www.hkjcpmh.org.hk/">https://www.hkjcpmh.org.hk/</a></td>
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<tr>
<td>The Intellectually Disabled Education and Advocacy League</td>
<td>2728 8377 / <a href="http://www.ideal.org.hk/">http://www.ideal.org.hk/</a></td>
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<tr>
<td>Hong Kong Association for Specific Learning Disabilities</td>
<td><a href="http://www.asld.org.hk">http://www.asld.org.hk</a></td>
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<tr>
<td>Hong Kong Association for AD/HD</td>
<td><a href="http://www.adhd.org.hk">http://www.adhd.org.hk</a></td>
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<tr>
<td>The Parents Association of Autistic Children in Mainstream Education</td>
<td>5160 5516/ <a href="http://www.paacme.org.hk/">http://www.paacme.org.hk/</a></td>
</tr>
<tr>
<td>Hong Kong Parents Association for the Hearing-impaired (HKPAHI)</td>
<td>8208 0816</td>
</tr>
<tr>
<td>The Hong Kong Society for the deaf</td>
<td>2178 0838/ <a href="http://www.deaf.org.hk/">http://www.deaf.org.hk/</a></td>
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<td>The Hearing Impaired Children Parents Association</td>
<td><a href="http://www.hkbu.org.hk">http://www.hkbu.org.hk</a></td>
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<td>香港盲人輔導會 / The Hong Kong Society for the Blind</td>
<td><a href="http://www.hksb.org.hk">http://www.hksb.org.hk</a></td>
</tr>
<tr>
<td>香港肢體弱能人士家長協會 / Hong Kong Association for Parents of Persons with Physical Disabilities</td>
<td>9064 9783</td>
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