CLINICAL PRACTICE GUIDELINES

AUTISM SPECTRUM DISORDER

IN CHILDREN AND ADOLESCENTS

EXECUTIVE SUMMARY

2ND EDITION (2023)

ACADEMY OF MEDICINE SINGAPORE

COLLEGE OF PAEDIATRICS AND CHILD HEALTH, SINGAPORE

COLLEGE OF PAEDIATRICS AND CHILD HEALTH, SINGAPORE (CPCHS)

CLINICAL PRACTICE GUIDELINES ON AUTISM SPECTRUM DISORDER IN CHILDREN AND ADOLESCENTS

ACKNOWLEDGEMENTS

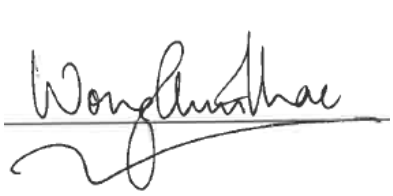
The Clinical Practice Guideline (CPG) Workgroup is sincerely grateful to the Academy of Medicine Singapore (AMS) and Mrs Bernadette Khor (née Khoo Swee Lian), for their kind funding support towards the GRADE training and writing support required for this Clinical Practice Guidelines (CPG).

Although this CPG was commissioned by the College of Paediatrics and Child Health, Singapore (CPCHS) and funded by the parties described above, neither the CPCHS nor the funders influenced the content of this CPG in any way.

The CPG Workgroup is also very grateful to Professor Andrew Whitehouse and Associate Professor David Trembath (both from Autism CRC Australia) and Professor Yngve Falck-Ytter (from GRADE working group) for their generous time for online meetings to advise on the development of this CPG. Similarly, the CPG Workgroup also wishes to acknowledge the Evidence to Practice Office of the Agency for Care Effectiveness (ACE), Ministry of Health, Singapore, for supporting with ad-hoc workshops on applying the GRADE framework, their technical inputs on evidence synthesis, and for their advice on CPG development process/methodology (such as the modified Delphi method for consensus). We would also like to acknowledge the contributions and time of our expert international and local reviewers (listed in **Appendix 1**) for reviewing a draft of this CPG and providing their critical comments.

The CPG Workgroup would also like to acknowledge and dedicate this revised CPG to Associate Professor Lim Sok Bee, advisor and mentor to the co-leads and chairperson of the original 2010 CPG, who passed away during the course of this CPG revision.

The CPG Workgroup would also like to acknowledge funding and time support provided by the various institutions/agencies that the workgroup members represent, in order to allow the workgroup members to conduct CPG-related work. It is also noteworthy that all the CPG workgroup and subgroup members put significant amounts of personal time and effort towards the CPG, without direct renumeration specifically for the CPG, demonstrating the dedication which the members have towards helping children on the autism spectrum.



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[JUNE 2023]

GENERAL INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that results in differences in social communication and social interaction, together with restricted, repetitive behaviours. These social communication and interaction differences, as well as restricted, repetitive behaviours, are also referred to as the 'core symptoms' of autism. It is also known as Autism Spectrum Condition (ASC), to reduce perceived negativity associated with the word 'disorder'. This terminology complements the neurodiversity movement, recognizes that autism is a brain/thinking difference, and that people with autism are different, not less. However, for the purposes of these guidelines, the formal diagnostic term of ASD will be used when referring to the formal diagnosis or its abbreviation. Elsewhere in this document, we use a combination of 'person first' language (e.g., children on the autism spectrum) as well as 'identity first' language (e.g., 'autistic children') to reflect the different preferences in terminology among those in the autism community, parents and professionals. Neurodiversity-affirming language has been used wherever possible, but in some instances, particularly to do with co-occurring medical conditions, terminology relating to a disorder may be difficult to avoid. The workgroup also acknowledges that autism is a lived experience and identity for many of those who are on the spectrum. These guidelines do not seek to cure autism but to improve services where possible.

The World Health Organization estimated the prevalence of autism in children to be approximately 1 in 160 in June 2021[1] although this varies greatly across different populations. The prevalence of autism in Singapore is estimated to be 1 in 150 of the population,[2] but the exact prevalence is unknown.

The severity and prognosis of autism is very variable between individuals, and the needs of affected individuals also evolve across the lifespan. There are also significant long-term demands placed on many caregivers, yet many individuals on the autism spectrum and their caregivers can cope much better with improved healthcare and community support. The majority of autistic individuals are diagnosed in childhood, hence the importance of having clear evidence-based guidelines focusing on this age group.

The first edition of the Academy of Medicine, Singapore – Ministry of Health (AMS-MOH) Clinical Practice Guidelines (CPG) on Autism Spectrum Disorders in Pre-school Children was published in 2010.[3] Since then, research within the field of autism has grown tremendously and, in turn, the number of publications in medical, psychological and educational literature pertaining to various aspects of autism has increased exponentially, giving rise to a need for updated guidelines that also cover a wider age range of children. Crucially, this literature needs to be evaluated in an open and unbiased manner and considered within the local context, so as to inform best practices to serve the needs of children in Singapore.

As a result, these updated guidelines, driven by the College of Paediatrics and Child Health (CPCHS), AMS, now also cover school-age children and adolescents, with new/expanded topics on Co-occurring Conditions, Education and Transition, Follow-up and Prognosis, and Professional Training.

OBJECTIVES AND SCOPE OF GUIDELINES

The primary objectives of these guidelines are to:

1. Promote effective healthcare for children and adolescents on the autism spectrum, by reinforcing good and evidence-based clinical practice, as well as to facilitate changes in professional practice that may not be consistent with current best practice.
2. Evaluate and apply evidence-based practices to use within the local Singapore context.

The guidelines are written to assist professionals who are involved in the surveillance, screening, diagnosis, intervention, and long-term management of children and adolescents on the autism

spectrum; as well as for caregivers of these individuals. However, intervention and management of any child with autism still needs to be individualised depending on specific needs, and with input from experienced professionals who have sound knowledge of guideline recommendations.

Where other local professional practice guidelines (PPGs) or service development guidelines relevant to autistic individuals exist, such as those published by the Ministry of Education (MOE)[4,5] and Autism Resource Centre, Singapore (ARC(S)),[6] effort has been made to avoid duplication, and to cross-reference instead when appropriate.

TARGET POPULATION

The target population covered by these guidelines is children from infancy to adolescence, who have autism of any severity. In Singapore, the age of adulthood is defined as 21 years old. While some sections of these guidelines may mention adults or transitioning to adulthood, the scope is primarily focused on children. Where appropriate, special subgroups may have been given special attention, such as girls on the autism spectrum, racial or cultural differences, or socially-disadvantaged families.

TARGET USERS

The target users of the guidelines are all professionals caring for children on the autism spectrum in Singapore (e.g., primary care physicians, paediatricians, psychiatrists, nurses, psychologists, allied health professionals), as well as social workers, educators, caregivers, and community partners. The term 'professionals' is used when referring to all the above, whereas the sub-terms 'healthcare professionals' and 'educational professionals' are used in instances where these may be distinct. The intent is for the guidelines to be used to inform clinical decisions and inform standards of care for service development. This full guideline document will therefore have an accompanying executive summary and caregiver/lay version.

GUIDELINE WORKGROUP COMPOSITION

These guidelines were produced by a multi-disciplinary workgroup appointed by the CPCHS. The 22-member core workgroup comprised developmental paediatricians, psychiatrists, primary care physician, psychologists, allied health professionals, social worker, educators, early interventionists, and most importantly, caregivers of children on the autism spectrum. The workgroup members also represented public (i.e., KK Women's and Children's Hospital (KKH), National University Hospital (NUH), Institute of Mental Health (IMH)) and private healthcare sectors, the MOE, the National Institute of Education (NIE), and various social service agencies actively involved in supporting children on the autism spectrum (e.g., ARC(S), St Andrew's Autism Centre, Rainbow Centre, SPD). All workgroup members were sent terms of reference and submitted declarations of potential conflicts of interest prior to participation. A complete list of all workgroup members, their professional affiliations, roles in the CPG, as well as declarations of potential conflicts of interest, is provided in **Appendix 1**. None of the declared conflicts of interest were deemed to have influenced the guideline development process.

GUIDELINE DEVELOPMENT AND METHODOLOGY

The guideline development process comprised of several stages, the first of which was a systematic review of the literature pertinent to each clinical question that eventually led to a recommendation. Key PICO (Population, Intervention, Comparator, Outcome) clinical questions were drawn up. Search strategies used key words from the respective PICO questions in the following electronic databases:

- CINAHL, Cochrane, Embase, Medline, PsycINFO, Proquest, PubMed, ScienceDirect, Scopus, Web of Science
- Grey literature databases, e.g., Google Scholar, Proquest, ClinicalTrials.gov, conference abstracts, dissertations/theses, surveys.

Search time period was pre-specified as January 2011 to current (2023), inclusive.

Existing clinical practice guidelines from various countries were also reviewed and evaluated using the Appraisal of Guidelines for Research & Evaluation II (AGREE-II) Instrument, using a Staged Appraisal approach with a focus on Domain 3 to achieve >70% as a priority, and >50% for Domains 1, 2, 4 and 6 as secondary requirements. Details of the AGREE-II ratings for various guidelines are provided in Appendix 2: AGREE-II Ratings of Existing Clinical Guidelines, which is available within the main guideline document. Four existing guidelines were of sufficiently high quality (Autism CRC Assessment and Diagnosis, NICE CG128, NICE CG170 and SIGN145) and these were used as references by the entire workgroup.

Existing literature was evaluated using the method of rating evidence and developing recommendations proposed by the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) methodology. Key Recommendation (R) or Good Practice Point (GPP) statements were then derived, taking into account certainty and magnitude of effects, risk-benefit balance, cost-effectiveness, feasibility, stakeholder acceptability, and the context of prevailing legal and national policies in Singapore. Evidence that was not amenable to GRADE evaluation resulted in GPP instead of R statements. Both R and GPP statements hold similar importance in terms of implementation, with the main difference being the strength of evidence behind the statements.

All key R and GPP statements were put through a RAND/UCLA method consensus survey involving the entire guideline workgroup. Statements were revised in the event of any disagreement until all finalised statements achieved group consensus. The final draft of the guideline was then reviewed by a panel of independent external reviewers with review comments considered in the formation of the final recommendations. The list of external reviewers is provided in **Appendix 1**. A public consultation exercise was also conducted over a 1-month period to seek feedback for the final draft guideline; feedback received was also considered in the formation of the final guideline. These guidelines are valid for a period of 5 years, after which it is strongly recommended that a scoping review be conducted to evaluate for newer literature that might inform any significant changes in the recommendations.

EXECUTIVE SUMMARY OF RECOMMENDATIONS

Details of recommendations can be found in the main text.

- **R** = Key Recommendation
- **GPP** = Good Practice Point

CHAPTER 1: SCREENING AND DIAGNOSIS

GPP 1.1 Professionals should identify autism early, because early identification provides the opportunity for prompt referral and intervention, which may lead to improved long-term outcomes. [EM1-1]

GPP 1.2 Surveillance for early signs of autism should be embedded in a national developmental surveillance programme. [EM1-1]

GPP 1.3 Developmental surveillance should be performed on several occasions at periodic intervals so that the signs of autism can be detected. [EM1-2]

GPP 1.4 Caregivers' concerns about a child's communication, social interaction, play and behaviour should be elicited at every well-child clinic visit. Caregivers' attention should be drawn to the 'Parental Concerns' items in the Child Health Booklet, and they should be encouraged to inform healthcare professionals if their child shows any of these difficulties. [EM1-3]

GPP 1.5 Preschool teachers' concerns about a child's communication, social interaction, play and behaviour should be elicited in preschool developmental surveillance programmes. [EM1-3]

GPP 1.6 Professionals should initiate early specialist referrals for preschool children with concerns related to communication, social interaction, play or behaviour, instead of reassuring parents or adopting a wait-and-see attitude. [EM1-4]

*See **Appendix 3: Referrals for Autism Specialist Services in Singapore***

GPP 1.7 Children with one or more of the following clinical features should be referred promptly for comprehensive developmental evaluation [EM1-5]:

- Any regression or loss of language or social skills
- No babbling, use of gestures (waving bye, pointing), shared enjoyment (spontaneous showing, following point/gaze), or response to name by 12 months
- No single words, following of instructions, or pretend play by 18 months
- Lack of eye contact or social response, or any unusual repetitive, rigid, obsessive, or sensory behaviours at any age

GPP 1.8 Professionals should remain vigilant for possible autism in any child or adolescent with ongoing difficulties relating to communication, social interaction, behaviour or mental health. [EM1-5]

GPP 1.9 Healthcare professionals should be aware of the factors associated with an increased likelihood for developing autism, and may consider targeted screening for children presenting with developmental concerns or these factors. Specific factors associated with increased likelihood of autism include:

- History of autism in a sibling
- Prematurity of <35 weeks' gestation or birth weight <2500g

- History of neonatal hypoxic encephalopathy
- Having a genetic syndrome known to be associated with autism
- Intrauterine exposure to maternal anti-epileptic medication
- Advanced parental age at child's birth (>40 years of age)
- Parental history of mental health condition.

[EM1-6, 1-9 and 2-2. Please see Chapter 2 (Sections 2.1 and 2.2) for additional information]

R 1.10 Based on current evidence, the universal use of autism-specific screening tools in the general paediatric population with no risk factors is not recommended. [EM1-7]

R 1.11 Where there are concerns for developmental delay in children, the application of an autism-specific screening tool can supplement the clinical judgement of healthcare professionals, but should not be used as the sole reason to initiate specialist referral or to exclude a diagnosis of autism. [EM1-7]

GPP 1.12 Professionals who decide to implement the use of an autism screening tool should be aware of the performance characteristics (e.g., false positives, false negatives) and limitations of the tool, and that performance characteristics can vary across different cultures and contexts. [EM1-7]

R 1.13 Autism-specific screening tools should be used within the age range for which they are validated. Professionals should be aware that the accuracy of screening tools has been found to be better for older toddlers (i.e., estimated 21 months old and older), than for younger toddlers (i.e., 12 months old to 20 months old). [EM1-8]

GPP 1.14 Although research has found group differences in neurophysiological and other biomarkers between children on the autism spectrum and those without, these are not yet sufficiently developed to be accurate or reliable screening tools for autism. Based on current evidence, isolated neurophysiological and other biomarkers are not recommended for routine clinical use in screening for autism. [EM1-10]

GPP 1.15 Professionals involved in diagnosing autism in children and adolescents should use the current version of either the Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD), and should state which classification system was used. [EM1-11]

GPP 1.16 Professionals involved in the diagnostic assessment of autism spectrum disorder (ASD) should be aware that some children may not meet diagnostic criteria on the DSM-5-TR when they would have done so on the DSM-IV-TR. Some of these children may meet a diagnosis of Social Communication Disorder instead, and may still need interventions similar to those on the autism spectrum. [EM1-11]

GPP 1.17 Children being evaluated for autism should have (or be referred for) a medical examination, in order to facilitate a comprehensive evaluation and further medical treatment if needed. [EM1-12]

GPP 1.18 A multi-disciplinary approach is recommended for the diagnosis of ASD in children and adolescents as far as practically possible, particularly in complex cases or cases where the single clinician determines that high diagnostic confidence cannot be achieved alone. [EM1-13]

GPP 1.19 A single-clinician approach to the diagnosis of ASD may be considered when the following conditions are met: [EM1-15]

- Conducted by specialist medical practitioners or psychologists with adequate training and experience in diagnosing autism in children and adolescents (see Table 1.6).
- Include multi-source feedback from various settings in order to obtain a comprehensive picture of the child being assessed [EM1-16].
- Include direct observation and interaction with the child being assessed.
- Include thorough contemporaneous documentation on the child's symptoms of autism that meet the prevailing international diagnostic criteria for ASD (e.g., DSM-5-TR) [EM1-11].

Table 1.6: Criteria for specialist medical practitioners or psychologists with adequate training and experience in diagnosing autism in children and adolescents

Criteria (Both 1 and 2 need to be met)	
1. Professional Qualification	Medical practitioners Specialist registration with the Singapore Medical Council in Paediatrics, Psychiatry, or Neurology *Or* Psychologists Registered or eligible to be registered with Singapore Register of Psychologists (SRP) AND holding a Master or Doctorate Degree in Clinical/ Neuro/ Educational Psychology that has a practicum component.
2. Clinical Experience in Autism Diagnosis	The professional should have at least 3 years of experience working in a multi-disciplinary team that conducts autism diagnostic assessments in order to have an understanding of the wide variation in presentation across the spectrum and of the normal variance in child development; how gender, cognitive ability, and other medical/genetic factors may affect presentation; and have adequate decision-making abilities to know when to refer a child on for multi-disciplinary team diagnoses instead. Having attended formal training on a validated autism-specific diagnostic tool would also be beneficial, as well as knowing when and how to use the tool appropriately.

R 1.20 Assessment and diagnosis of ASD should not solely rely on autism-specific diagnostic instruments, but should encompass a holistic profile of the child including developmental, medical, and social history, physical examination, consideration of differential diagnoses and co-existing conditions, cognitive, sensory, academic and adaptive behaviour profiles, as well as strengths, skills and needs to facilitate management plans. Autism-specific diagnostic instruments can complement the assessment process and supplement clinical observation and information collection. [EM1-14]

GPP 1.21 Information gathered to make a diagnosis should include reports on or observations of the child in the home, community or outside the clinic setting. [EM1-16]

GPP 1.22 Professionals involved in the diagnostic process should consider that females on the autism spectrum may present with a different symptom profile and level of needs as compared to males with autism. [EM1-17]

GPP 1.23 Professionals should be aware of cultural differences when assessing for autism. Understanding these cultural variations in appropriateness of behaviour would help the professional to cater their assessment to patients from different cultural backgrounds. [EM1-18]

GPP 1.24 Professionals should be aware that there are overlapping features between intellectual disability (ID) and autism when assessing for autism in individuals with an intellectual disability. Autism should not be diagnosed if symptoms are better accounted for by ID. [EM1-19

CHAPTER 2: AETIOLOGY AND INVESTIGATIONS

GPP 2.1 Healthcare professionals should be aware of the strong genetic heritability of autism and monitor for features of autism in children who have siblings and/or first-degree relatives on the autism spectrum. [EM2-1]

GPP 2.2 Healthcare professionals should be aware that some genetic conditions or syndromes may be associated with autism and should monitor the affected child for features of autism. Examples of genetic conditions or syndromes include Fragile X syndrome, Angelman syndrome, Tuberous Sclerosis, Rett syndrome, PTEN Hamartoma syndrome and Down Syndrome. [EM2-1]

Table 2.1*: *Genetic disorders commonly associated with autism

Syndrome	Genetic Abnormality	Clinical Features	Complication	Genetic Test	Inheritance
Fragile X syndrome	CGG trinucleotide repeat expansion in *FMR1* on Chr X	Frontal bossing, long jaw, large testicles, delayed milestones (symptoms in males more than females)	Learning and intellectual disability	CGG trinucleotide repeat expansion analysis in *FMR1* gene	X-linked
Angelman syndrome	Maternal 15q11-q13 deletion, Paternal uni-parental disomy, imprinting defect of maternal 15q11-q13 region, pathogenic variant in maternally derived *UBE3A*	Distinctive craniofacial features, delayed milestones, feeding difficulty	Seizures, sleep disorders, obesity	DNA methylation analysis, DNA sequencing and deletion/ duplication analysis of UBE3A gene	Most cases are due to *de novo* genetic alteration with a very low risk of recurrence; Rarely, imprinting pattern of autosomal dominant inheritance, unbalanced translocation, non-disjunction
Tuberous Sclerosis	Heterozygous pathogenic variant in *TSC1* (Chr 9) or *TSC2* (Chr 16)	Ash-leaf macules, facial angiofibroma, shagreen patch, subungual fibromas, seizure	Brain tubers, cardiac rhabdomyoma, renal angiomyolipo-ma	DNA sequence analysis of *TSC1* and *TSC2* genes	Autosomal Dominant
Rett syndrome	Heterozygous pathogenic variant in *MECP2* (Chr X) (females)	Hand stereotypies, (especially flapping, wringing), drooling, hypotonic facies	Sleep disruption, eating difficulty	DNA sequence analysis of *MECP2* gene	X-linked (affected males have severe neonatal-onset encephalopath y)

Syndrome	Genetic Abnormality	Clinical Features	Complication	Genetic Test	Inheritance
PTEN Hamartoma syndrome	Germline heterozygous pathogenic variant in *PTEN* suppressor gene	Macrocephaly (head circumference >2.5 SD above the mean) in 94%	Increased cancer risk (breast, kidney, thyroid, colon, endometrium)	DNA sequence analysis of *PTEN* gene	Autosomal Dominant-
Down syndrome	Trisomy of Chr 21	Epicanthic folds, slanted palpebral fissures, short fingers and toes, brachycephaly, hypotonia, delayed milestones	Congenital cardiac disorders, intellectual disability	Karyotype	Non-disjunction, Unbalanced translocation, Mosaicism; Risk increases with maternal age

Note: chr = chromosome

GPP 2.3 Healthcare professionals should be aware that there is insufficient evidence for any association between maternal ingestion of paracetamol during pregnancy and the probability of autism in their offspring. Pregnant mothers do not need to avoid paracetamol ingestion in pregnancy if it is indicated. [EM2-3]

GPP 2.4 Healthcare professionals should discuss the indications and side-effects of various anti-epileptic medications with pregnant women requiring such treatment, because there is evidence linking certain types of maternal anti-epileptic medication (especially sodium valproate) in pregnancy with the probability of developing autism in their offspring. [EM2-4]

GPP 2.5 Healthcare professionals should be aware that there is insufficient evidence for any association between the use of epidural analgesia for labour/delivery in women and the probability of autism in their offspring. Pregnant mothers in labour do not need to avoid epidural analgesia if deemed necessary. [EM2-5]

GPP 2.6 Parents should be reassured that childhood vaccinations are not associated with autism, and should proceed with their child's vaccination schedule as recommended on the National Immunization Schedule. Healthcare professionals should continue to provide nationally recommended childhood vaccinations to children on the autism spectrum, including the Measles, Mumps, Rubella (MMR) vaccine. [EM2-6]

GPP 2.7 Routine heavy metal (i.e., antimony, aluminium, arsenic, cadmium, lead, manganese, mercury, nickel, silver, and thallium) concentration testing or screening is not recommended for children on the autism spectrum as there is insufficient evidence for any causative link. [EM2-7]

GPP 2.8 Healthcare professionals may consider investigating for mercury toxicity in selected children on the autism spectrum who present with serious neurological and immunological problems. [EM2-7]

GPP 2.9 Healthcare professionals may consider investigating for lead toxicity in selected children on the autism spectrum where pica is suspected or diagnosed. [EM2-7]

GPP 2.10 Children who present with autism and have additional clinical features suggestive of an underlying genetic condition (such as microcephaly, seizures, dysmorphic features, congenital anomalies or a positive family history of developmental disability) should be referred to a genetic specialist for diagnostic confirmation and counselling. Examples of

genetic conditions or syndromes include Fragile X syndrome, Angelman syndrome, Tuberous Sclerosis, Rett syndrome, PTEN Hamartoma syndrome and Down Syndrome. [EM2-1]

GPP 2.11 Children who are diagnosed with autism may benefit from genetic testing which can be offered by healthcare professionals. Discussion on the exact genetic test(s) to consider should be conducted by a genetic specialist or similarly-trained professional. [EM2-1]

GPP 2.12 Magnetic resonance imaging (MRI) of the brain may be performed in selected children on the autism spectrum who present with microcephaly, milestone regression or where structural brain lesions are suspected. [EM2-8]

GPP 2.13 Electroencephalography (EEG) may be performed in selected children on the autism spectrum who develop clinical seizures, seizure-like movements and/or regression of developmental milestones. [EM2-8]

GPP 2.14 Targeted screening for an inborn error of metabolism (IEM) may be indicated in selected children on the autism spectrum who present with clinical features such as cyclic vomiting, microcephaly, ataxia, epilepsy, intellectual disability or have a family history of consanguinity. [EM2-8]

GPP 2.15 Routine stool investigations to test for yeast or microbiota profile are not recommended for children on the autism spectrum. [EM2-8]

CHAPTER 3: INTERVENTION

R 3.1 Augmentative and Alternative Communication (AAC) may be used for children and adolescents on the autism spectrum to support communicative understanding and expression. The AAC system should be customized to the individual's communication needs, preferences and environment. [EM3-1]

R 3.2 Cognitive Behavioural Therapy (CBT) may be used for children and adolescents on the autism spectrum who have sufficient verbal and reasoning abilities, to address emotion-related issues such as anxiety and anger. Modifications may be required to facilitate understanding and application of CBT strategies in this population. Involvement of caregivers can support the generalization of strategies for younger children. [EM3-2]

R 3.3 Communication-based interventions (e.g., language training, pivotal response training) may be used for children and adolescents on the autism spectrum as they lead to improved social communication outcomes (including joint attention, social engagement and initiation), and may lead to improved receptive language, expressive language, and speech prosody outcomes. [EM3-3]

R 3.4 Developmental interventions, (a group of interventions that are implemented based on developmental sequence and focus on supporting children's learning of skills through interactions with other people, particularly caregivers) may be used for children and adolescents on the autism spectrum to improve core difficulties in social communication and social interactions. [EM3-4]

R 3.5 Early Intensive Behavioural Intervention (EIBI) may be considered to improve the development of adaptive skills and cognitive ability in children on the autism spectrum. It should be implemented by trained professionals and with sufficient intensity and be based on the intended goals for the child and family. [EM3-5]

R 3.6 Emotion Regulation Therapy (ERT) involves a range of treatment modalities (e.g., computer software programmes, videos, games) to teach emotion recognition, perception, and management skills, in children and adolescents on the autism spectrum, using a social pragmatic approach. ERT-based intervention may be considered for improving emotion recognition and socio-communication skills in children and adolescents on the autism spectrum. [EM3-6]

R 3.7 Naturalistic Developmental Behavioural Interventions (NDBIs) (a group of intervention practices that integrate behavioural and developmental theories, which are delivered in natural settings and use child-centred and motivation-based strategies to teach developmentally appropriate skills in the context of play and routine activities) may be used for children on the autism spectrum to improve social communication, language, cognitive, and play skills. [EM3-7]

R 3.8 Play-based intervention may involve the use of a variety of materials such as games, toys and activities to address play and social communication skills, while play-therapy is a non-directive approach that aims to address emotional and behavioural issues. These approaches may be used with children on the autism spectrum to improve language, joint-attention and social engagement skills, especially for those aged 12 years and below. [EM3-8]

R 3.9 Sensory integration therapy involving elements as described by Ayres may be recommended as a therapeutic intervention in children (3-12 years old) on the autism spectrum to improve functional and social participation outcomes. [EM3-9]

R 3.10 Sensory environmental modifications and sensory modulation strategies may be considered for selected children and adolescents on the autism spectrum to address their specific sensory needs. [EM3-10]

R 3.11 Weighted vests are not recommended for use as a therapeutic intervention in children and adolescents on the autism spectrum due to insufficient evidence for benefit, and potential for harm. [EM3-11]

R 3.12 Social skills intervention is recommended for children and adolescents on the autism spectrum to improve social communication and interaction skills. It can also lead to positive effects on challenging behaviours, adaptive and cognitive skills, and school and learning skills. The social skills intervention should be customized to the individual's needs, preferences and environment. [EM3-12]

R 3.13 Visual supports (e.g., pictures, objects, written words, lists, schedules, choice boards) should be used for children and adolescents on the autism spectrum. [EM3-13]

CHAPTER 4: PHARMACOLOGICAL TREATMENT

Table 4.1: Summary of recommendations

Clinical Feature	Summary of Recommendations
Core symptoms of autism (social difficulties and RRBs)	No pharmacological agent has sufficient evidence to justify use. Ongoing research results are awaited for oxytocin and bumetanide.
Co-occurring conditions	*Attention-deficit Hyperactivity Disorder (ADHD)* • Methylphenidate should be the first line medication, and be used in conjunction with non-pharmacological approaches.

	• Atomoxetine may be considered if methylphenidate has been tried unsuccessfully or is contraindicated/not tolerated. • Guanfacine may be considered after methylphenidate and atomoxetine have been tried unsuccessfully or if they are contraindicated. *Challenging Behaviours and Psychiatric Conditions* • Risperidone and aripiprazole can be used for challenging behaviours (irritability and hyperactivity) in the short term. • In consultation with an appropriately trained specialist: ▪ SSRIs may be used to treat psychiatric conditions (e.g., anxiety, depression, OCD). ▪ TCAs may be considered as a second- or third-line option to treat psychiatric conditions (e.g., depression). ▪ Anticonvulsants/mood stabilisers may be considered as a second- or third-line option to treat challenging behaviours or psychiatric conditions. ▪ Mirtazapine may be considered as a second- or third-line option to treat anxiety. *Sleep Difficulties* • Melatonin can be considered for sleep issues if there is no benefit from a psychosocial intervention.

Abbreviations: ADHD, attention-deficit hyperactivity disorder; OCD, obsessive-compulsive disorder; RRB, repetitive restricted behaviour; SSRI, selective serotonin reuptake inhibitors; TCA, tricyclic antidepressant.

R 4.1 Methylphenidate should be considered as the first line pharmacological treatment of attention deficit hyperactivity disorder in children and adolescents on the autism spectrum. Any treatment plan should include non-pharmacological approaches. [EM4-1]

R 4.2 Atomoxetine may be considered for managing attention deficit hyperactivity disorder in children and adolescents on the autism spectrum if methylphenidate has been tried unsuccessfully or is contraindicated/not tolerated. [EM4-2]

R 4.3 Guanfacine may be considered for managing attention deficit hyperactivity disorder in children and adolescents on the autism spectrum after methylphenidate and atomoxetine have been tried unsuccessfully or if they are contraindicated. [EM4-6]

R 4.4 Risperidone and aripiprazole can be used for challenging behaviours (irritability and hyperactivity) in children and adolescents on the autism spectrum in the short term. There is insufficient evidence to conclude that risperidone and aripiprazole are beneficial in the long term (more than 6months). Both risperidone and aripiprazole can cause weight gain and somnolence. [EM4-4]

R 4.5 Selective serotonin re-uptake inhibitors (SSRIs) (e.g., fluoxetine, fluvoxamine, sertraline, escitalopram, citalopram, paroxetine) should not be used for the treatment of core symptoms of autism in children and adolescents. SSRIs may be used to treat psychiatric conditions (e.g., anxiety, depression, OCD) in consultation with an appropriately trained specialist. [EM4-5]

R 4.6 Tricyclic antidepressants (TCAs) (e.g., clomipramine, tianeptine) should not be used for the management of challenging behaviours in children and adolescents on the autism spectrum. TCAs may be considered as a second- or third-line option to treat psychiatric conditions (e.g., depression) in consultation with an appropriately trained specialist. [EM4-6]

R 4.7 Anticonvulsants/mood stabilisers should not be routinely used for the management of challenging behaviours in children and adolescents with autism. They may be considered as a second- or third-line option to treat challenging behaviours or psychiatric conditions in children and adolescents on the autism spectrum, in consultation with an appropriately trained specialist. [EM4-7]

R 4.8 Mirtazapine should not be routinely used for the management of challenging behaviours in children and adolescents with autism. It may be considered as a second- or third-line option to treat anxiety in children and adolescents on the autism spectrum, in consultation with an appropriately trained specialist. [EM4-8]

R 4.9 Buspirone should not be used as an adjunct with risperidone for the treatment of challenging behaviours in children and adolescents on the autism spectrum. [EM4-9]

R 4.10 Celecoxib should not be used as an adjunct with risperidone for the treatment of challenging behaviours in children and adolescents on the autism spectrum. [EM4-10]

R 4.11 Galantamine should not be used as an adjunct with risperidone for the treatment of challenging behaviours in children and adolescents on the autism spectrum. [EM4-11]

R 4.12 Melatonin can be considered for sleep issues if there is no benefit from a psychosocial intervention. It should be used in conjunction with a psychosocial intervention and in consultation with a specialist trained in assessing and managing sleep issues in children and adolescents on the autism spectrum. [EM4-12]

R 4.13 Acamprosate should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-13]

R4.14 Amantadine should not be used for the treatment of core symptoms of autism in children and adolescents. Amantadine should also not be used as an adjunct with risperidone for the treatment of irritability in children and adolescents on the autism spectrum. [EM4-14]

R 4.15 Arbaclofen should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-15]

R 4.16 Based on current evidence, bumetanide should not be used for the treatment of core symptoms of autism in children and adolescents. Further results from clinical trials on bumetanide are awaited. [EM4-16]

R 4.17 D-cycloserine should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-17]

R 4.18 Memantine should not be used for the treatment of core symptoms of autism in children and adolescents. Memantine should also not be used as an adjunct with risperidone for the treatment of irritability in children and adolescents on the autism spectrum. [EM4-18]

R 4.19 N-acetylcysteine should not be used for the treatment of core symptoms of autism in children and adolescents. There is currently insufficient evidence for the use of N-acetylcysteine as an adjunct with risperidone for the treatment of irritability in children and adolescents on the autism spectrum and further studies need to be conducted. [EM4-19]

R 4.20 Riluzole should not be used for the treatment of core symptoms of autism in children and adolescents. Riluzole should also not be used as an adjunct with risperidone for the treatment of irritability in children and adolescents on the autism spectrum. [EM4-20]

R 4.21 Based on current evidence, intranasal oxytocin should not be used for the treatment of core symptoms of autism in children and adolescents. Further results from clinical trials on oxytocin are awaited. [EM4-21]

R 4.22 Balovaptan should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-22]

R 4.23 Insulin-like growth factor 1 (IGF-1; e.g., trofinetide, mecasermin) should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-23]

R 4.24 mTOR inhibitors (everolimus, rapamycin) should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-24]

R 4.25 Metformin should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-25]

R 4.26 Cholinesterase inhibitors (e.g., donepezil, galantamine, rivastigmine) should not be used for the routine treatment of core symptoms of autism in children and adolescents. There may be grounds for further well-designed clinical trials on galantamine for treating core symptoms of autism in children and adolescents. [EM4-26]

R 4.27 Cannabinoids should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-27]

R 4.28 Suramin should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-28]

R 4.29 Naltrexone should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-29]

R 4.30 Piracetam should not be used for the treatment of core symptoms of autism in children and adolescents. [EM4-30]

CHAPTER 5: EDUCATION AND TRANSITION

GPP 5.1 Parents and caregivers should consult appropriate professionals when considering educational interventions and school placement for their child on the autism spectrum, such as clinical and educational psychologists who are informed on the special educational provisions in Singapore. [EM5-1]

GPP 5.2 Professionals should be closely guided by Professional Practice Guidelines: Developmental and Psycho-educational Assessments and Provisions for Preschool-aged Children (2021) and Professional Practice Guidelines: Psycho-educational Assessment & Placements of Students with Special Educational Needs (2018) when advising parents on matters relating to education and transition. [EM5-1]

GPP 5.3 When making recommendations for appropriate educational intervention and school placement, professionals should take into account (i) the developmental needs of individual children, their preferences, strengths and special interests, (ii) family contexts, and (iii) the range of support and services available for Early Intervention and School-age provisions for children with developmental and/or special educational needs. [EM5-2]

GPP 5.4 Professionals should ensure that parents and/or caregivers are adequately supported to make informed decisions that can meet the longer-term educational needs, each child's preferences, strengths, and special interests, as well as the families' contexts. [EM5-2]

GPP 5.5 Professionals should engage in information sharing across agencies, if necessary, to ensure common understanding and to coordinate support for the child. [EM5-2]

GPP 5.6 Parent and/or caregiver engagement with regard to educational placement should be an ongoing process that is initiated as timely as possible, typically initiated as the child approaches 5 years old and/or is in Kindergarten 1. [EM5-2]

GPP 5.7 Professionals should assist parents to obtain a Comprehensive Needs Assessment for Transition Support for their children on the autism spectrum who are approaching school-going ages. [EM5-2]

GPP 5.8 Educators teaching students on the autism spectrum should be provided with knowledge and skills to provide reasonable accommodations and supports for these students in their classrooms. The depth/scope of information and mode of training should be adapted/customised to their specific teaching and learning context. [EM5-3]

GPP 5.9 School-based support provisions in mainstream schools should be based on the students' observed needs, and not solely on their diagnoses. [EM5-3]

GPP 5.10 School-based educational provisions offered to students on the autism spectrum should be determined by educational professionals working directly with the child, in consultation with parents, schools and when necessary, allied health professionals. [EM5-3]

GPP 5.11 Parents and caregivers should be referred to the MOE website for an up-to-date list of special education (SPED) schools that support students on the autism spectrum. [EM5-3]

GPP 5.12 Educational support for students on the autism spectrum with moderate-to-severe special educational needs in SPED schools should involve a multi-disciplinary team of specially trained teachers and Allied Health Professionals, as well as customised facilities to support teaching and learning. [EM5-3]

GPP 5.13 Specialised and individualised curriculum, guided by MOE's SPED Curriculum Framework, should be provided in accordance to each student's needs and ability. [EM5-3]

GPP 5.14 Professionals should ensure that transition support is systematically planned, holistic and person-centric; this includes having transition support differentiated based on the students' identified needs. [EM5-4]

GPP 5.15 Professionals should encourage and empower parents and caregivers to plan ahead and support their child to reduce the impacts of transitions; this includes advocating for the child, sharing information, and working closely with receiving schools. [EM5-4]

GPP 5.16 Professionals should provide families information about relevant support groups and organisations and recommended sources of information, as needed (i.e., taking into consideration family members' needs and contexts). [EM5-5]

GPP 5.17 When transitioning from preschool to formal schooling, children on the autism spectrum may benefit from explicit teaching and/or reinforced practices in the home and community in skills such as functional communication, emotional regulation, behavioural regulation, social, and adaptive skills. [EM5-6]

GPP 5.18 Professionals working with students on the autism spectrum who are transitioning within and across formal schooling settings (i.e., mainstream schools, specialised schools and SPED schools) should work alongside schools and parents to support the timely and accurate dissemination of relevant information with receiving school personnel. [EM5-7]

GPP 5.19 When transitioning to post-school pathways, students on the autism spectrum and their parents and/or caregivers should be provided information about the range of post-school options and the pre-employment and/or employment support. [EM5-8]

CHAPTER 6: COMPLEMENTARY AND ALTERNATIVE TREATMENT

Complementary and Alternative Treatment or Medicine (CAM) therapies refer to healthcare approaches that are not typically part of conventional medical care or that may have origins outside of usual Western practice. CAM interventions which demonstrate no evidence of treatment benefit and/or significant potential for harm "should not be used", while those with insufficient evidence of treatment benefit with no/low potential for harm are "not recommended".

Table 6.1: Summary of recommendations

Type of recommendation	CAM
CAM that should NOT be used in the treatment of children and adolescents on the autism spectrum	Antimicrobial therapy Aromatherapy Chelation therapy Chiropractic, osteopathy and cranio-sacral therapy Facilitated communication Helminth therapy Hyperbaric oxygen therapy Immunoglobulin therapy Microbial transfer therapy Stem cell therapy Vagal nerve stimulation
CAM that is not recommended as treatment for core symptoms of autism in children and adolescents	Acupuncture Amino acid supplementation Animal-assisted interventions Art therapy Auditory integration therapy Camel milk Coenzyme Q10 Dance movement therapy Digestive enzymes Folinic acid Gluten-free casein-free (GFCF) diet Ketogenic diet Mesalazine Mindfulness intervention Minerals including Zinc, Magnesium and Iron Neurofeedback Omega-3 fatty acids Probiotics Qigong massage or other types of massage Secretin Sulforaphane Transcranial direct current stimulation Vitamins including B12 and B6

CAM that may be considered in children and adolescents on the autism spectrum	Music therapy Visual motor exercises

GPP 6.1 Professionals should be prepared to discuss the evidence for Complementary and Alternative Medicine (CAM) with caregivers of children and adolescents on the autism spectrum. Shared decision-making on trials of CAM for autism is strongly encouraged between professionals and parents, so that the trials are time-based with clear objectives, outcome measures and endpoints. Parents and caregivers should not replace mainstream interventions with CAM. [EM6-1]

R 6.2 A gluten-free casein-free (GFCF) diet is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-2]

GPP 6.3 In children and adolescents on the autism spectrum, a healthy diet of a variety of fresh foods is recommended. Healthcare professionals should be equipped with information on recommended daily allowances of vitamins, minerals and other supplements for children and adolescents (appropriate to their age) and be able to discuss with parents possible benefits and harms of the various supplements and dosages. Intake of vitamins, minerals and probiotics in the form of natural fresh food should be encouraged. [EM6-2]

R 6.4 A ketogenic diet is not recommended as treatment for core symptoms of autism in children and adolescents. However, in children on the autism spectrum who have drug-resistant epilepsy, adoption of a ketogenic diet may be considered. A dietician should be involved in the management and monitoring of a child on a ketogenic diet. [EM6-3]

R 6.5 Camel milk is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-4]

R 6.6 Vitamin supplementation (of any type) is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-5]

R 6.7 Children and adolescents on the autism spectrum who exhibit symptoms suggestive of a vitamin, mineral, amino acid or other nutritional deficiency, should be evaluated, treated and monitored following appropriate clinical guidelines. [EM6-5]

R 6.8 Vitamin B6 is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-6]

R 6.9 Folinic acid is not recommended as treatment for core symptoms of autism in children and adolescents. Further research is needed to establish potential treatment benefits. [EM6-7]

R 6.10 Vitamin B12 is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-8]

R 6.11 Supplementation with zinc, magnesium, iron or any other minerals is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-9]

R 6.12 Amino acid supplementation is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-10]

R 6.13 Omega-3 fatty acids in any form or combination (including with phosphatidylserine) are not recommended as treatment for core symptoms of autism in children and adolescents. Further research is needed to establish potential treatment benefits. [EM6-11]

R 6.14 Probiotics are not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-12]

R 6.15 Secretin and digestive enzymes are not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-13]

R 6.16 Sulforaphane is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-14]

R 6.17 Coenzyme Q10 is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-16]

R 6.18 Antimicrobial therapy should not be used in the treatment of core symptoms of autism in children and adolescents, as there is potential for harm, and no evidence of benefit. [EM6-16]

R 6.19 Microbial transfer therapy should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm, and no evidence of benefit. [EM6-17]

R 6.20 Helminth therapy (in any type or form) should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm, and no evidence of benefit. [EM6-18]

R 6.21 Mesalazine is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-19]

R 6.22 Immunoglobulin therapy (in any form of administration) should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm, and no evidence of benefit. [EM6-20]

R 6.23 Stem cell therapy (in both intravenous and intrathecal forms) should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm. [EM6-21]

R 6.24 Hyperbaric oxygen therapy should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm, and no evidence of benefit. [EM6-22]

R 6.25 Chelation therapy should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm, and no evidence of benefit. [EM6-23]

R 6.26 Neurofeedback is not recommended as treatment for core symptoms of autism in children and adolescents. Further research is needed to establish potential treatment benefits. [EM6-24]

R 6.27 Vagal nerve stimulation should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm, and no evidence of benefit. [EM6-25]

R 6.28 Transcranial direct current stimulation is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-26]

R 6.29 Auditory integration therapy and other sound therapies are not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-27]

R 6.30 Music therapy may be recommended as a complementary intervention approach for children and adolescents on the autism spectrum. Specifically, there is moderate level of evidence

for an increased chance of global improvement, improved quality of life and reduced total autism severity. [EM6-28]

R 6.31 Dance movement therapy (DMT) is not recommended as treatment for core symptoms of autism in children and adolescents. Further research is needed to establish potential treatment benefits. [EM6-29]

R 6.32 Art therapy is not recommended as treatment for core symptoms of autism in children and adolescents. Further research is needed to establish potential treatment benefits. [EM6-30]

R 6.33 Vision therapy is not recommended as treatment for core symptoms of autism in children and adolescents. However, visual motor exercises may be considered for selected children on the autism spectrum who have visual difficulties as there is emerging evidence that such exercises have the potential to improve social communication and reduce repetitive behaviours. [EM6-31]

R 6.34 Aromatherapy should not be used as treatment for core symptoms of autism in children and adolescents, as there is potential for harm. [EM6-32]

R 6.35 Acupuncture is not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-33]

R 6.36 Qigong massage or other types of massage are not recommended as treatment for core symptoms of autism in children and adolescents. [EM6-34]

R 6.37 Chiropractic, osteopathy and cranio-sacral therapy should not be used in the treatment of children and adolescents on the autism spectrum, as there is potential for harm. [EM6-35]

R 6.38 Children and adolescents on the autism spectrum are recommended to engage in a variety of physical activities, at age-appropriate intensity and frequency, as indicated in the national physical activity guideline for children. [EM6-36]

R 6.39 Animal-assisted interventions are not recommended as treatment for core symptoms of autism in children and adolescents. Further research is needed to establish potential treatment benefits. [EM6-37]

R 6.40 Mindfulness intervention is not recommended as treatment for core symptoms of autism in children and adolescents. However, it may be considered for selected children and adolescents on the autism spectrum to improve general wellbeing. [EM6-38]

R 6.41 Facilitated communication should not be used in the treatment of children and adolescents on the autism spectrum, as there is no evidence of benefit. [EM6-39]

CHAPTER 7: CO-OCCURRING CONDITIONS IN AUTISM

GPP 7.1 Children and adolescents on the autism spectrum should be followed up serially at spaced intervals in a holistic manner as they are at increased risk of academic, neuropsychological, adaptive challenges and certain medical conditions. Assessments and evaluations for these should be considered as needed when issues in these domains are identified. [EM7-1]

R 7.2 Children and adolescents on the autism spectrum presenting with academic challenges should be evaluated for their learning needs so as to guide parents and educators on further diagnostic assessments, interventions and support required, including access arrangements for learning. [EM7-1]

R 7.3 Professionals should be aware that children and adolescents on the autism spectrum may have significant delays in adaptive skills even in the absence of cognitive delays. Adaptive function should be assessed and monitored to support the functional needs of the child as indicated using standardised measures. [EM 7-2]

R 7.4 Professionals should be aware of the higher incidence of attention-deficit hyperactivity disorder (ADHD) among children and adolescents on the autism spectrum. In the presence of symptoms of ADHD, especially after the age of 5, prompt screening and referral for a thorough diagnostic evaluation using validated measures should be made to facilitate early management. [EM 7-3]

R 7.5 Professionals should be aware that children and adolescents on the autism spectrum are also likely to have motor difficulties. Formal screening for and diagnosis of developmental coordination disorder (DCD), using validated measures, should be undertaken in those with ongoing concerns for motor coordination and organizational skills beyond the preschool period. [EM 7-4]

R 7.6 Professionals should be aware of the need to assess for language, learning and other co-occurring developmental disorders in children and adolescents on the autism spectrum and support them accordingly. Caregivers would benefit from counselling regarding these co-occurring conditions and their potential impact on their child's learning and adaptive behaviour. [EM 7-5]

R 7.7 Children on the autism spectrum who have global developmental delay should be evaluated towards the end of the child's preschool period for the presence of intellectual disability. The diagnosis of global developmental delay should not be used when the child is past 5 years of age. [EM 7-6]

R 7.8 Children and adolescents on the autism spectrum with concerns for sensory processing difficulties, should be assessed via multiple modes of assessment including questionnaires, direct observations, and validated assessments, by an appropriately-trained individual, to facilitate a comprehensive evaluation. [EM 7-7]

R 7.9 Children and adolescents on the autism spectrum presenting with mental health symptoms (e.g., depression, anxiety) that impact on their daily functioning should be referred for further evaluation. Professionals should therefore have a high index of suspicion and be trained to look for co-occurring mental health issues in this group of individuals. [EM 7-8]

GPP 7.10 Professionals should be aware of the association between gender variance and autism. Children and adolescents on the autism spectrum who present with gender variance issues (where gender variance is an umbrella term used to describe gender identity, expression, or behaviour that falls outside of culturally-defined norms associated with a specific gender) may need further referral for evaluation and support for their social-emotional needs. [EM7-9]

R 7.11 Professionals should be aware of an increased prevalence of feeding and eating disorders among children and adolescents on the autism spectrum. These may be related to multiple factors including feeding dysfunction, sensory sensitivity, adaptive delays, behavioural issues and cognitive difficulties as well as pica (eating of non-food items), rumination (the process of regurgitating and re-chewing previously swallowed foods), obesity and food neophobia (fear of new foods) which should be evaluated for, as necessary. [EM7-10]

GPP 7.12 Children who are on the autism spectrum and have a history of persistent early-onset regulatory problems (defined as persistent problems with eating, sleeping and excessive

crying beyond 3 months of age) may have a higher risk for feeding disorders and should be monitored for possible feeding and eating disorders. [EM7-10]

R 7.13 Healthcare professionals should be aware that children and adolescents on the autism spectrum have a higher occurrence of gastrointestinal conditions. Referrals for thorough evaluation should be made for those who present with persistent or recurrent gastrointestinal symptoms, such as colic or recurrent abdominal pain, vomiting, nonspecific diarrhoea, or constipation. [EM7-11]

GPP 7.14 Healthcare professionals should be aware that children and adolescents on the autism spectrum, with gastrointestinal disorders may present with atypical behavioural issues that may be indicative of acute abdominal conditions. Evaluation for the presence of a gastrointestinal disorder should be considered for children and adolescents on the autism spectrum who present with unexplained, persistent or sudden-onset atypical behavioural symptoms (such as head banging or increased stimulatory behaviours). [EM7-11]

GPP 7.15 Healthcare professionals should be alert to potential nutritional problems in children and adolescents on the autism spectrum. They should be monitored for their growth and nutritional status, in view of increased risk of metabolic and psychosocial complications related to being over or under weight. Referrals should be made as needed in the presence of poor growth or obesity. [EM7-11]

R 7.16 A complete audiological assessment is recommended in all children in whom there is a suspicion for autism so as not to delay the diagnosis of hearing impairment and subsequent management as needed in the event that hearing loss and autism co-exist. [EM 7-12]

GPP 7.17 There is an increased risk of obesity in children and adolescents on the autism spectrum, as differences in social interaction, challenges in motor coordination and psychosocial issues in autism can add to increased sedentary risks. Professionals should encourage prevention measures to reduce these risks, and monitor weight, height, body mass index and any significant changes in growth percentiles over time. [EM7-13]

R 7.18 Sleep difficulties are common in children and adolescents on the autism spectrum. Healthcare professionals should monitor sleep patterns and treat sleep dysfunction, as poor sleep quality is associated with various negative consequences, including increased risk of being overweight and obesity. [EM7-13]

GPP 7.19 Healthcare professionals should be aware that there is an earlier onset of puberty, as well as an increased risk of precocious puberty, amongst girls on the autism spectrum as compared to neurotypical children. Routine surveillance, and referral for further evaluation should be done in the presence of symptoms or signs of concern. [EM7-14]

GPP 7.20 There is an increased incidence of visual problems (e.g., strabismus, refractive errors, anisometropia and amblyopia) amongst children and adolescents on the autism spectrum, which may present as unexplained behavioural issues or academic challenges. Routine vision screening and monitoring for visual problems, should be performed in these individuals and specialty referral be made as needed. [EM7-15]

GPP 7.21 Professionals should be aware that there is a higher incidence of cavities and gum disease amongst the children and adolescents on the autism spectrum, and these are associated with food selectivity and feeding issues. Routine dental screening and care should be facilitated, especially in the presence of untreated or undertreated cavities and gum disease in these individuals. [EM7-16]

CHAPTER 8: FOLLOW-UP AND PROGNOSIS

GPP 8.1 Interventions that promote positive parenting, mothering and fathering, should be encouraged. This should include support structures which help parents to understand their children/adolescent's autism and the associated challenges as early as possible. Parent training on how to respond to behaviours of concern and their participation in support groups should be encouraged. [EM8-1]

GPP 8.2 The focus of intervention for children and adolescents on the autism spectrum should address the holistic needs of these individuals across the entire lifespan. This includes addressing adaptive functioning and emotional wellbeing, in addition to academic achievement, in order to maximise the quality of life of the individual on the autism spectrum in the long run. The goals of the child/adolescent and his/her family should also be taken into consideration. [EM8-1]

GPP 8.3 Systematic transition planning should be encouraged for predictable major transitions for children and adolescents on the autism spectrum. Such transition planning should be proactive, holistic and person-centric. Of particular importance is the need for early transition planning for adolescents on the autism spectrum ahead of their graduation from mainstream or SPED school. [EM 8-1]

CHAPTER 9: CAREGIVER AND FAMILY SUPPORT

GPP 9.1 Professionals should be equipped with the understanding of how autism can affect caregivers and families in terms of social, economic, physical and mental health to support caregivers and families optimally. [EM 9-1]

GPP 9.2 Professionals should provide caregivers and family with information tailored to the child's/ adolescent's developmental age and needs and also support caregivers and families in accessing appropriate services for the child/ adolescent as well as caregivers. [EM9-2, 9-3, 9-4]

GPP 9.3 Professionals should strive to adopt a collaborative and family-centred approach in supporting caregivers towards optimal outcomes for a child/ adolescent on the autism spectrum, the caregiver and the family. [EM9-2, 9-3, 9-4]

GPP 9.4 Professionals should assess the emotional well-being of the caregiver and how the family is coping to provide necessary resources or support in the holistic care of a child and adolescent on the autism spectrum. [EM9-2, 9-3, 9-4]

GPP 9.5 Professionals should support caregivers and family during the child's/adolescent's transition across the lifespan, especially in terms of future care planning. [EM9-4]

R 9.6 Caregiver education and training programmes should be incorporated in intervention programmes for child and adolescents on the autism spectrum whenever possible as there is evidence to suggest positive effects on outcomes for both the child/adolescent as well as caregiver. [EM9-5]

CHAPTER 10: PROFESSIONAL TRAINING

GPP 10.1 Access to autism-related information should be provided for staff who interact with/care for children and adolescents on the autism spectrum (directly/indirectly). Extent and depth of information should be tailored to the specific professional's needs. [EM10-1]

APPENDIX 1: GUIDELINE DEVELOPMENT GROUP AND EXTERNAL REVIEWERS

MAIN WORKGROUP MEMBERS

No.	Name	Subgroup Lead	Subgroup Contribution
1	**Dr WONG Chui Mae** ***(CPG Co-Lead)*** *Senior Consultant Paediatrician* Departments of Child Development and Neonatology, KK Women's and Children's Hospital	Screening and Diagnosis	1. Screening and Diagnosis 2. Pharmacological Treatment 3. Complementary and Alternative Treatment
2	**Dr Aishworiya RAMKUMAR** ***(CPG Co-Lead)*** *Consultant Paediatrician* Child Development Unit (Division of Developmental and Behavioural Paediatrics), Department of Paediatrics, KTP-NUCMI, National University Hospital	Professional Training	1. Aetiology and Investigations 2. Complementary and Alternative Treatment 3. Professional Training
3	**Adj Assoc Prof Sharifah Mariam ALJUNIED** *Principal Educational Psychologist* Special Educational Needs Division, Ministry of Education	Education and Transition	1. Education and Transition 2. Professional Training
4	**A/Prof Daisy CHAN Kwai Lin** *Senior Consultant* Department of Neonatal and Developmental Medicine, Singapore General Hospital *Visiting Senior Consultant* Department of Child Development KK Women's and Children's Hospital	Aetiology and Investigations	1. Aetiology and Investigations
5	**Ms Janice CHEONG Mun Yi** *Psychologist* Department of Psychological Medicine, KK Women's and Children's Hospital		1. Screening and Diagnosis 2. Co-occurring Conditions
6	**Mr Bernard CHEW** *Chief Executive Officer* St Andrew's Autism Centre	Follow-up and Prognosis	1. Follow-up and Prognosis 2. Caregiver and Family Support
7	**Dr CHIN Chee Hon** *Senior Consultant Psychiatrist* Department of Developmental Psychiatry, Institute of Mental Health		1. Pharmacological Treatment 2. Follow-up and Prognosis
8	**Dr Sylvia CHOO Henn Tean** *Senior Consultant Paediatrician* Department of Child Development, KK Women's and Children's Hospital	Complementary and Alternative Treatment	1. Complementary and Alternative Treatment 2. Follow-up and Prognosis 3. Caregiver and Family Support
9	**Dr Angelia CHUA Hwee Ling** *Family Physician, Consultant*		1. Professional Training

	National Healthcare Group Polyclinics		
10	**Ms Magdalene FOO Tze Suang** *Principal Medical Social Worker* Department of Developmental Psychiatry, Institute of Mental Health	Caregiver and Family Support	1. Caregiver and Family Support
11	**Dr GOH Tze Jui** *Principal Clinical Psychologist* Department of Developmental Psychiatry, Institute of Mental Health	Intervention	1. Screening and Diagnosis 2. Intervention 3. Co-occurring Conditions
12	**Dr Majeed KHADER** *Principal Consultant Psychologist* *Chief Psychologist* Ministry of Home Affairs Singapore		1. Caregiver and Family Support
13	**Mrs Stephenie KHOO Koon Miang** *Deputy Executive Director* Autism Resource Centre (Singapore)		1. Intervention 2. Professional Training
14	**Dr KOH Hwan Cui** *Principal Psychologist* Department of Child Development, KK Women's and Children's Hospital		1. Screening and Diagnosis 2. Intervention 3. Co-occurring Conditions
15	**Dr LIAN Wee Bin** *Paediatrics and Neonatal Specialist* Medical Director SpecialKids Child Health & Development Clinic Singapore	Co-occurring Conditions	1. Complementary and Alternative Treatment 2. Co-occurring Conditions 3. Follow-up and Prognosis
16	**Dr LIM Hong Huay** *Director*, Rophi Clinic, *Board Member*, SG Enable *Board Chair and Project 3i Lead*, CaringSG		1. Caregiver and Family Support
17	**Prof Kenneth POON Kin Loong** *Associate Dean (Education Research)*, Office of Education Research; *Centre Director*, Centre for Research in Child Development; National Institute of Education, Nanyang Technological University		1. Intervention 2. Education and Transition 3. Professional Training
18	**Dr SIM Zi Lin** *Psychologist & Autism Therapist* Autism Resource Centre		1. Intervention 2. Education and Transition
19	**Dr SUNG Min** *Senior Consultant Psychiatrist* Department of Developmental Psychiatry, Institute of Mental Health	Pharmacological Treatment	1. Pharmacological Treatment 2. Co-occurring Conditions
20	**Ms TAN Peng Chian** *Freelance Consultant Occupational Therapist* *PhD Student*	Complementary and Alternative Treatment	1. Intervention 2. Complementary and

	Psychology Child and Human Development Academic Group National Institute of Education, Nanyang Technological University		Alternative Treatment 3. Professional Training
21	**Ms Sarah YONG** *Head of Clinical Services* Specialised Assistive Technology Centre, SPD		1. Intervention 2. Complementary and Alternative Treatment
22	**Ms ZHANG Guiyue** *Senior Psychologist* Child Development Unit, Division of Developmental and Behavioural Paediatrics, National University Hospital		1. Aetiology and Investigations 2. Intervention 3. Complementary and Alternative Treatment

SUBGROUP-ONLY MEMBERS (IN ALPHABETICAL ORDER OF SURNAME)

No	Name	Subgroup Contribution
1	**Mr CHAN Hui Jun** *Associate Psychologist* Ministry of Education	Education and Transition
2	**Ms CHIM Yi Hui** Senior Specialist Special Education, Ministry of Education	Education and Transition
3	**Dr CHONG Suet Ling** *Principal Educational Psychologist* Special Education, Ministry of Education	Education and Transition
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Additional acknowledgements for the following:

Dr Koh Ai Ling, Tang Wai Ying, Erica Chervon, Afiq S/O A'Azman, Leow Hui En Karen, Louisa Jagmetti, Tan Manting, Claire Ang Qian Wen, Lim Jia Xuan, Lee Ting Yu, Dana Kaitlyn Chua, Low Jing Hwee Grace, Sharmaine Chia, Goh Shu Juan, Nurhafizah binte Mohd Zambri, Alyssa Yap Su Lyn, Soong Rou Yi, Andy Teo and Chee Tian Loh

Acknowledgements for the following secretariat/staff members from the College of Paediatrics and Child Health (CPCHS) and Academy of Medicine, Singapore (AMS):

Ser Hui Wen, He Shu Wei, Kuan Mun Yee, Tan Li Ting, Pearl Yap, Goh Chew Lin and Era Syairah

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APPENDIX 3: REFERRALS FOR AUTISM SPECIALIST SERVICES IN SINGAPORE

DIAGNOSTIC SERVICES

For preschool children (i.e., 6 years and below and not yet in Primary One):

KK Women's and Children's Hospital (KKH), Department of Child Development (DCD)

Tel: (65) 6394 1543/7216

Email: kkh.dcd@kkh.com.sg

Website: https://www.kkh.com.sg/patient-care/areas-of-care/childrens-services/Pages/child-development.aspx

or

National University Hospital (NUH) Child Development Unit (CDU) @ Jurong Medical Centre or Keat Hong

Tel: (65) 6665 2530 (Jurong Medical Centre) or 6769 4537 (Keat Hong)

Email: cdu@nuhs.edu.sg

Website: https://www.nuh.com.sg/our-services/Specialties/Paediatrics/Pages/Developmental-and-Behavioural-Paediatrics.aspx

For school-age children (i.e., Primary One and above):

Child Guidance Clinic @ Health Promotion Board or Sunrise Buangkok

Tel: (65) 6389 2200 (same number for both)

Website: www.imh.com.sg

INTERVENTION SERVICES

Intervention services are provided by the agencies above, and a comprehensive list of services for children and adolescents on the autism spectrum in Singapore is available at:

SG Enable

20 Lengkok Bahru (Enabling Village)

#01-01 Singapore 159053

Tel: 1800-8585-885

Email: contactus@sgenable.sg

Website: www.enablingguide.sg/service-directory

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PUBLISHED: JUNE 2023

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