

# Medical Treatment Guidelines for ADHD

**Associate Professor John Wong CM, PPA(P)**

MBBS, MMed (Psych), FAMS,  
MSc(Child & Adolescent Mental Health)(UK)

Head and Senior Consultant Psychiatrist  
Dept of Psychological Medicine, NUS and NUH

# Acknowledgement

## ADHD CPG SUBCOMMITTEE ON MEDICAL TREATMENT

Broad based, multi-disciplinary team of Pediatricians, Child Psychiatrists, Pharmacist, Advance Practitioner Nurse, Clinical & Educational Psychologists, Occupational Therapist

- **Assoc Prof John Wong CM**
- **Assoc Prof Daniel Fung**
- **APN Lee Poh Yin**
- **Dr Yvonne SS Toh**
- **Kelly YT Lee;**
- **Eve Tam**
- **Cassandra SEAH**
- **Dr Jiang Min jun**
- **Assoc Prof Mary Daniel**
- **Dr June Lou**
- **Yen Lee Chen**



## **Methodology**

- **PubMed, PsychInfo database**
- **Studies, reports, systematic reviews, national ADHD guidelines**
- **Terms identified: ADHD, ADD, Hyperkinetic disorder, Attention deficit**
- **Analysis of evidence-based systematic reviews and consensus meetings at subcommittee and main committee**
- **Level of evidence 1++ to 4**  
**Grades of recommendation A to D, Good Practice Points(GPP)**
- **Invited consultation (CPG-Singapore HAS Registered list)**

Table III. Top ten causes of disease burden (in DALYs) in Singapore in 2004 by age group.

Rank	0–14 years of age (% of DALY) (n = 24,668)	15–34 years of age (% of DALY) (n = 42,223)	35–64 years of age (% of DALY) (n = 165,873)	≥ 65 years of age (% of DALY) (n = 130,466)
1	Autism spectrum disorders (20.7)	Anxiety & depression (25.9)	Diabetes mellitus (15.6)	Ischaemic heart disease (16.1)
2	Asthma (10.9)	Schizophrenia (9.9)	Ischaemic heart disease (9.5)	Stroke (11.6)
3	Attention-deficit hyperactivity disorder (6.0)	Diabetes mellitus (6.5)	Stroke (6.1)	Diabetes mellitus (8.2)
4	Low birth weight (5.8)	Road traffic accidents (6.1)	Anxiety & depression (5.8)	Alzheimer's disease & other dementias (6.5)
5	Anxiety & depression (5.6)	Self-inflicted injuries (5.5)	Breast cancer (4.6)	Lung cancer (5.3)
6	Congenital heart disease (3.3)	Migraine (4.4)	Lung cancer (3.9)	Lower respiratory tract infections (4.8)
7	Falls (2.8)	Asthma (2.3)	Adult-onset hearing loss (3.7)	Vision disorders (4.2) <sup>†</sup>
8	Migraine (2.5)	Anorexia & bulimia (2.1)	Osteoarthritis (3.2)	Chronic obstructive pulmonary disease (3.7)
9	Other chromosomal disorders* (2.1)	Bipolar disorder (1.7)	Schizophrenia (3.0)	Colon & rectum cancer (3.7)
10	Lower respiratory tract infections (1.7)	Falls (1.5)	Self-inflicted injuries (2.9)	Osteoarthritis (2.8)

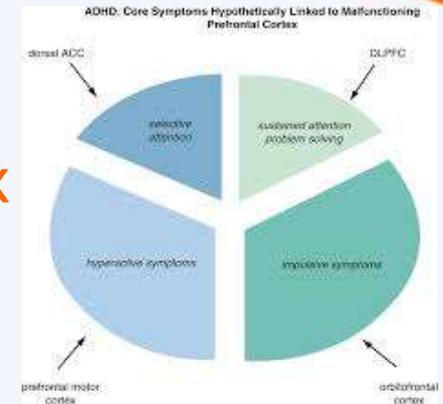
DALY: disability-adjusted life years

\* excludes Down syndrome

† includes low vision or blindness due to glaucoma, cataract, macular degeneration and all other causes; but excludes diabetic retinopathy and sight loss due to congenital causes, other diseases or injuries.

# ADHD:

- core symptoms linked to Pre-frontal cortex
- dysregulation of dopamine and norepinephrine



- **Inattentive symptoms**

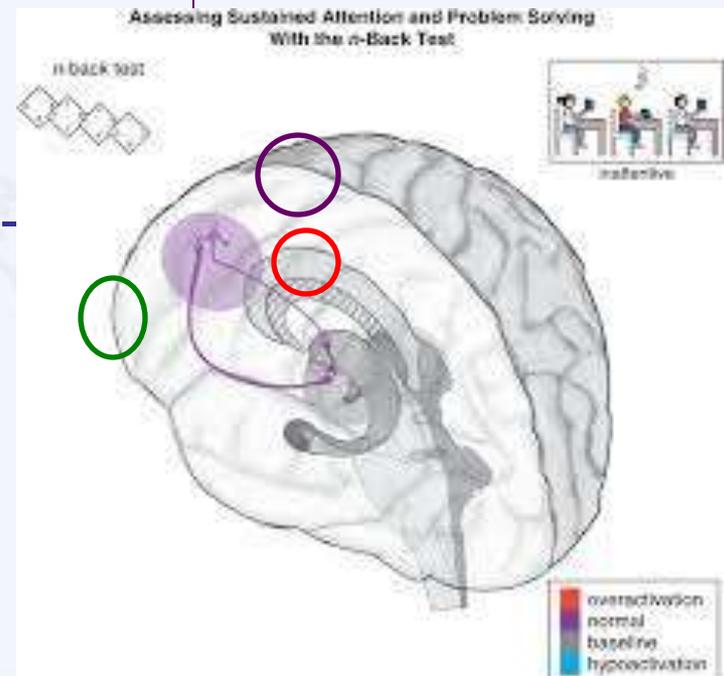
- Selective attention –  
**Dorsal anterior cingulate cortex**
- Sustained attention problem solving –  
Dorsal lateral prefrontal cortex

- **Hyperactive symptoms**

- Prefrontal motor cortex

- **Impulsive Symptoms**

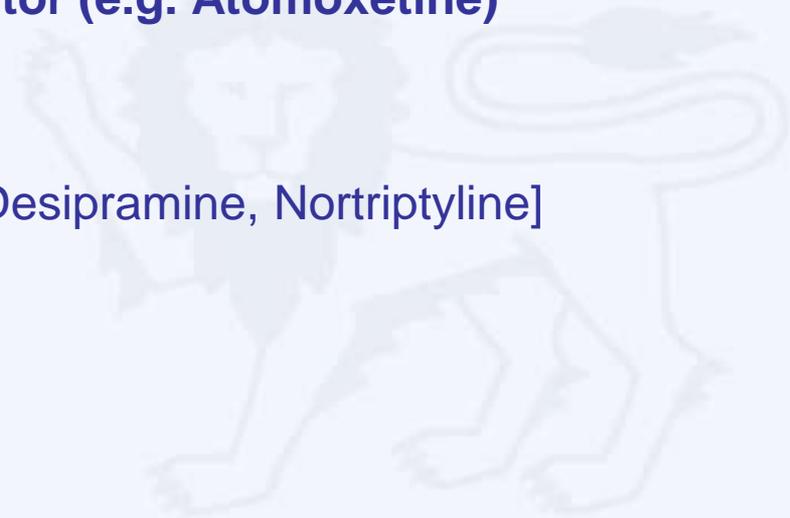
- Orbitofrontal cortex



# Pharmacological Treatment

This section will focus on pharmacological treatment for pre-schoolers, school-aged children and adolescents. Pharmacological agents used in children with ADHD include

- **Stimulants (e.g. methylphenidate, amphetamine such as mixed amphetamine salts, dexamphetamine)**
- **Non-stimulants**
- **Selective norepinephrine reuptake inhibitor (e.g. Atomoxetine)**
  - $\alpha$ 2-agonists [Clonidine, Guanfacine]
  - Bupropion
  - Tricyclic antidepressants [Imipramine, Desipramine, Nortriptyline]
  - Others [Modafinil, Pemoline]



- When medication is considered for the treatment of attention deficit hyperactivity disorder, methylphenidate should be considered first (pg 32).

Grade A, Level 1+

- Methylphenidate may be used for long term treatment of attention deficit hyperactivity disorder symptoms, although the benefits of treatment should be reviewed regularly (pg 32).

Grade B, Level 1+

- Drug holidays during treatment with methylphenidate may be considered in order to limit adverse effects. Attention deficit hyperactivity disorder symptoms and impairment during the non-medication days should be monitored (pg 33).

Grade B, Level 1+

- The height, weight and body-mass-index (BMI) of children receiving treatment with methylphenidate should be regularly monitored (pg 33).

Grade A, Level 1<sup>++</sup>

- The height, weight and body-mass-index (BMI) of children receiving treatment with methylphenidate should be monitored every 6 months. If there is concern about slowing of growth rate, the need for continued medication use should be reviewed and jointly decided with parents, and there may be a need to evaluate for other medical reasons explaining this (pg 34).

Grade D, Level 4

- During treatment with methylphenidate, start at a low dose and slowly titrate upwards according to the child's response, or adjust the timing of medication, to minimise short-term adverse effects (pg 34).

Grade B, Level 1+

- A careful personal and family history of cardiovascular disease should be taken before starting medication treatment for attention deficit hyperactivity disorder. Children with pre-existing cardiac problems should be referred to a cardiologist for evaluation before treatment with methylphenidate or atomoxetine is initiated (pg 34).

Grade C, Level 2+

- Methylphenidate may be used to treat attention deficit hyperactivity disorder in children with comorbid tic disorder but treatment should be stopped if the tics worsen following treatment (pg 35).

Grade A, Level 1+

- The use of methylphenidate should be considered when treating attention deficit hyperactivity disorder in the presence of co-morbid disruptive behavioural disorder (pg 35).

Grade B, Level 1+



- The use of an extended-release methylphenidate instead of immediate-release methylphenidate should be considered if there is concern about medication abuse. Medication use by these patients should be carefully monitored (pg 36).

Grade B, Level 1+

- Methylphenidate may be considered for the treatment of attention deficit hyperactivity disorder in individuals who have also been diagnosed with autistic spectrum disorder. Care should be taken to watch for side effects (pg 36).

Grade A, Level 1+

- Atomoxetine may be used for the treatment of attention deficit hyperactivity disorder symptoms when there is increased risk with methylphenidate use [e.g. high risk of abuse or diversion] (pg 37).

Grade A, Level 1+

- During treatment with atomoxetine, there should be periodic monitoring of growth (height and weight) and mental state (suicidal thinking). If there is concern about slowing of growth rate, the need for continued medication use should be reviewed and jointly decided with parents, and there may be a need to evaluate for other medical reasons explaining this (pg 37).

Grade A, Level 1++

- The height, weight and body-mass-index (BMI) of children receiving treatment with atomoxetine should be monitored every 6 months (pg 38).

Grade D, Level 4

- Atomoxetine may be used as first line treatment when there is comorbid attention deficit hyperactivity disorder and tic disorder (pg 38).

Grade B, Level 1+

- The combination of methylphenidate and atomoxetine should not be used for the treatment of attention deficit hyperactivity disorder symptoms (pg 41).

Grade C, Level 2+

- To improve treatment adherence, treatment should be individualised for each patient with attention deficit hyperactivity disorder, and the parents' and their child's preferences should be considered (pg 41).

Grade A, Level 1+

- The use of methylphenidate or atomoxetine in pre-schoolers should be considered only if psychosocial interventions have failed. Care should be taken to regularly assess response and monitor for side effects, so as to decide if medication should continue to be administered (pg 41).

Grade A, Level 1++

- The use of methylphenidate or atomoxetine in pre-schoolers should be considered only if psychosocial interventions have failed. Care should be taken to regularly assess response and monitor for side effects, so as to decide if medication should continue to be administered (pg 42).

Grade A, Level 1++

# Q & A



**Thank you**