BRAINCHILD
The Official Publication of HKCNDP

The Hong Kong Society of Child Neurology and Developmental Paediatrics
香港兒童腦科及體智發展學會

Address : c/o Suite 3509 , Bank of America Tower , 12 Harcourt Road , Central, Hong Kong
Fax : 29045371 (Society Hon. Secretary Dr K T Liu)
Email : hkcndp@hongkong.com
Website : www.fmshk.com/hk/hkcndp

Printer : Printhouse Production Center Limited
Flat A, 15/F, Gee Luen Hing Industrial Building, 2 Yip Fat Street, Wong Chuk Hang, Hong Kong

BRAINCHILD
The Official Publication of HKCNDP

The Hong Kong Society of Child Neurology and Developmental Paediatrics

www.fmshk.com.hk/hkcndp
June 2008. Volume 9 No.1

SPECIAL ISSUE ON
ATTENTION DEFICIT - HYPERACTIVITY DISORDER

CONTENTS Page

BRAINCHILD
The Official Publication of HKCNDP

The Hong Kong Society of Child Neurology & Developmental Paediatrics

BRAINCHILD – MAY 2008 ISSUE

Message from the President

An Overview for Attention Deficit/Hyperactivity Disorder (ADHD) in Hong Kong

The WHO definition of health evolves over the past five decades from "a state of freedom from diseases" to "a state of physical, mental, psychological, spiritual and social well being" and now "an ability to attain one's potential in life". This illustrates the concept of health consequent to the good control of infectious and genetic diseases, effective medical care of pregnancy and child delivery, excellent paediatric care in decreasing birth asphyxia and complication of prematurity as well as improvement of environmental health which we have just started to promote. We are now at a better stage of child survival and can afford to focus on the quality of life. Childhood mental health thus stands out as a subject of concern amongst professionals. The Hong Kong Joint Committee on Child Health formed by the Hong Kong Paedatiric Society, the Department of Health of the Hong Kong SAR Government and the Hospital Authority has as far back as 2001 created a Task Force on Mental Health Services for Children in Hong Kong headed by Dr. Ernest Luk (child psychiatrist) and Dr. William Wong (paediatrician) to study mental health problems in this locality. Through the dedicated work of the Task Force, two notable products were achieved: "The Survey on Mental Health Problems for Children in Hong Kong" (which revealed major problems including Attention Deficit/Hyperactive Disorder (ADHD), Autistic Spectrum Disorders (ASD), Specific Learning Disabilities (SLD), Behavioural Disorders, and others amongst our children) and a "Model for Child Mental Heath Services in Hong Kong". The Model proposed to divide childhood mental health services into four levels of care by different professionals (Level I by primary care paediatricians, Level II by child neurologists and developmental paediatricians, Level III by psychiatrists, and Level IV by child psychiatrists under hospital care). The model sets a good prototype for further study and alerts all professionals to line up themselves to make the services effective, efficient, seamless and integrative. Active measures are being undertaken to update paediatricians to take up this challenging and yet important aspect in child health.

Attention Deficit/Hyperactivity Disorder (ADHD) is one of the commonest behavioural problems in childhood. It is a distinct neuro-behavioural problem with strong neurobiological bases, which was reliably proven in recent neuro-imaging and genetic findings. Its existence is cross-cultural and it was estimated that 7% of Hong Kong school children (8.9% in boys) suffered from ADHD.

Affected children will be excessively inattentive, hyperactive and impulsive leading to functional impairment in family, school and social situations. They have poor school achievement, poor social relationship, lack of confidence and low self esteem. ADHD also has impact on family leading to increased stress and conflict. Furthermore, ADHD is associated with high incidence of neuro-behavioural co-morbidities, namely specific learning disabilities, developmental coordination disorder, anxiety disorder, other mood disorders, oppositional defiance disorder and conduct disorder. The impact on affected children will be life long and they will not grow out of these conditions. Adolescents with ADHD have a higher incidence of various forms of delinquency and substance abuse. In adulthood, people with ADHD are likely to have a low occupational attainment, poor social relationship and higher rate in conflict with law. An upstream management of these adolescent and later life social problems is necessary. Hence a timely diagnosis and treatment will be of paramount importance as there is only a short window period for intervention to prevent aforementioned problems.

Pharmacotherapy and behavioural therapy are proven effective treatment of ADHD. In 1999, the results of MTA study was published and which confirmed clinically and statistically that medication alone or in combination with behavioural therapy is more effective treatment regime for children with ADHD than treatment with behavioural therapy alone. However it must be stressed that while such treatment regime is good for control of clinical features, appropriate educational support is essential for the holistic care of our children with ADHD. It thus follows good standard of service (covering the medical, social and educational sectors) should involve accurate diagnosis, assessment of other behavioural or social issues, parental education, behavioural intervention and monitoring of drug treatment and its side effects.

The HKCNDP Working Group on ADHD established by the Society Council in October 2005, consisting of Professor Patrick Leung (CUHK), Professor Tatia Lee (HKU), Professor Shiu Ling Po (CUHK), Mr. Joseph Lau and Dr. Stephanie Liu (Child Assessment Service), Dr. Catherine Lam and Dr. Chok-wan Chan (HKCNDP). The Group is charged with the terms of reference to equip local professionals in child health with the most up-to-date information and knowledge on the subject so that their work and services can converge well with our child psychiatrists at the tertiary and quaternary levels (service system recommended by Dr. Ernest Luk, Convenor of the Task Force for Mental Health Service for Children in Hong Kong). The Group met three times to discuss practical approach, do mapping of local experience and literature, and set recommendations for management of this disorder in Hong Kong with the ultimate target to formulate a position paper to set directions for future services in our locality. In order to bring cutting-edge information to Hong Kong, the Society organized a series of meetings in Hong Kong. This started with the innovative lecture jointly hosted by our Society together with the reputable organization FOCUS (Focus On Children's Understanding in Schools) on "Advanced Assessment and Treatment of ADHD" by Dr. Thomas Brown Ph. D., Clinical Psychologist from Yale Clinic for Attention and Related Disorders and world authority on the subject, held on 4th October 2005 in Queen Elizabeth Hospital. This successful kick-off was followed by significant series of scientific activities working towards professional solidarity on the subject in Hong Kong.

The Hong Kong Society of Child Neurology and Developmental Paediatrics hosted our 2006 Annual Scientific Meeting (ASM) in November 2006 on ADHD. The Course Director was Professor Drake Duane MD of the Institute for Developmental Behaviour Neurology, Arizona State University, Scottsdale, Arizona, USA. Professor Duane is an experienced child neurologist cum developmental paediatrician currently ranked as top world expert in the area of childhood ADHD in private practice which is appropriate and relevant to upgrade local service standard for ADHD in the private sectors and at primary care levels. During the same period, we also hosted our Joint Meeting on Developmental Paediatrics on ADHD with invited experts from the Mainland of China (Beijing, Shanghai, Guangzhou, Chengdu and Chongqing), Hong Kong, Macau, Singapore and Taiwan to share experiences for our children with ADHD within the Chinese speaking community. The goal was to study the incidence, morphology, genetics and management of children within our region and to identify any special features in children with ADHD which might be different from our Caucasian counterparts. It is obvious that with all these efforts, we were able to provide optimal management to our children with ADHD in Hong Kong and within our Region which all child health professionals should strive to achieve!

The Monumental Milestone on the brilliant work of all professionals in Hong Kong was our ability to successfully convince the Rehabilitation Advisory Council of Hong Kong to include ADHD into the Rehabilitation Planning Programme (RPP) and henceforth ADHD is officially taken as a disability in Hong Kong. On behalf of our children with this disability, I would like to pay tribute to all members of RPP under the capable of leadership of Dr. York YN Chow, Secretary for Food, Welfare and Health

of the Hong Kong SAR Government, for realizing our missions and dreams. Such recognition enables individuals with ADHD to have access to accommodation, remediation, compensation, and resources provisions at health, medical, education, transport, housing, social (community) and other sectors heavily involved in the care of such individuals.

Encouraged by this success of our work at the RPP and in order to fulfill our promise to the Hong Kong professionals, we successfully published the Position Paper on ADHD in July 2007, We also witnessed the inauguration of the "Hong Kong Association for ADHD" (a powerful parent group as advocate for children with this disability) on 23rd November 2007 and the First Collaborative Project for ADHD between Paediatricians, Developmental Paediatricians and Child Psychiatrists at the New Territories East Cluster launched in 2007. This sets a good prototype for collaboration and coordination between professional exemplifying interdisciplinary approach to this disability. At the same time, we are pleased to continually receiving reports and updates on the productive work of the HKCNDP Working Group on ADHD covering domains of service, training, research and advocacy in Hong Kong. The battle is won and the future work for ADHD is promising!

The current issue of Brainchild is devoted to two important documents for ADHD work in Hong Kong: the "Hong Kong 2007 Position Paper on ADHD" and the expert annotation on "Current Concepts of Attention Deficit Disorder with or without Hyperactivity" by Professor Drake Duane from USA subsequent to his visit to Hong Kong in 2006. The paper was written at the special request of our Society Council of HKCNDP and contains lots of the most up-to-date data and current concept for management of ADHD. It is included here to provide an opportunity for professionals to share the expert views and innovative ideas from the world expert on the subject. We indeed are very grateful for the immense contribution from Professor Duane on our work in ADHD and SLD over the past decade and we look forward to his continual guidance in the years to come.

This Position Paper was launched by the Hong Kong Society of Child Neurology and Developmental Paediatrics (HKCNDP) consequent to the successful inclusion of ADHD into the RPP. It is the fruit of an Open Forum hosted in Queen Elizabeth Hospital on 28th July 2005 which was attended by more than sixty transdisciplinary and transectoral professionals from institutions, professional bodies, non-governmental organizations as well as individual paediatricians, educators, school teachers and principals, frontline workers, parents and many others who all converged with one dedicated mission: to set directions for future management of children with ADHD in Hong Kong. The summary of opinion and comments collected from the Forum formed nidus with inputs from participants and experts eventfully crystallize into the First Draft of this Paper which was further amended eight times by circulation. Final Draft of the Position Paper which was officially adopted by all professionals in February 2006 and widely circulated to government bureaus and departments, policy makers, professional bodies, institutions, NGO's, parent groups and others for comments and endorsements. It is encouraging to witness its being favourably received and positively supported by the various policy bureaus and departments of the Hong Kong SAR Government. Some of the feedbacks are included at the end of the Paper for reader's reference. It is envisaged that the Paper is going to be utilized as an important document by the HKSAR Government and professionals in Hong Kong for policy making, healthcare finance planning, programmes setting, technical formatting, project implementing and outcome measuring in the future. The Paper sets a good prototype for all child health workers to amalgamate effort of all professionals to achieve powerful advocacy for our children with special needs. It is a worthwhile paper for all readers to scrutinize and to resonate effort for the care of our children!

With the upcoming inclusion of ADHD as an official disability category in RPP, many of the challenges such as public awareness, professional readiness (medical, social and educational interventions), social justice, resources availability and government endorsement, may be given an opportunity for significant breakthrough. Given the multidisciplinary and mult-sectoral nature of official rehabilitation programmes, there is a need for all concerned to rapidly arrive at a consensus on the prevention, early identification, effective and timely intervention, and management of potential adverse social outcomes. Organized leadership is needed for developing roadmaps to achieve objectives of different stakeholders, not least those of public offices responsible for much of the work and funding. Listing of ADHD in the official document will provide an immediate impact on public awareness on the subject, spanning numerous government departments, service providers and interest groups. Official resource support will doubtless provide the much needed incentive for cooperation among key-players.

This is thus a prime opportunity to plan for a coherent and comprehensive schedule for developments in ADHD work as outlined in Hong Kong's rehabilitation policy with the view of maximizing life goals and participation of affected individuals. With ADHD individuals' innately adequate intelligence and frequent areas of strength as well as the availability of effective interventions, the spirit of Hong Kong's rehabilitation policy can hope to witness full rewards in this population.

Finally do accept our deepest appreiciaition for the good work of all responsible professionals and key player for child health in Hong Kong in achieving the top level management and for striving for the welfare and rights for our children with ADHD. I wish you all reading pleasure and best of health!

Dr. Chok-wan CHAN
Editor-in-Chief, The Brainchild
President, The HK Society of Child Neurology & Developmental Paediatrics
5th May 2008

BRAINCHILD
The Official Publication of HKCNDP

Current Concepts of Attention Deficit Disorder with or without Hyperactivity

Drake D. Duane, M.D.
Adjunct Professor, Arizona State University
Director, Institute for Developmental Behavioral Neurology, Scottsdale, Arizona, USA

Concerns about the nature of attention as a cognitive state, as well as its neuroanatomic neurophysiologic correlates, dates back to the mid 19th century. Through the course of the 20th century, increasing precision as to the mechanisms and characteristics of attention in animals and man evolved. These reached a peak in the 1990's with the Mirsky et al (1) neuroanatomic model of attention based on studies in adults and children of acquired disease states and complemented by studies in animals. This model confirmed a locus in the upper brain stem with connections to the diencephalon. Additionally, systems involved with focus were localized through the parietal cortex, superior temporal cortex with mechanisms of execution localized to the basal ganglia. Furthermore, characteristics referred to as shift and related to the concept of executive function were localized to the pre frontal cortex and cingulate cortex.

Independent of the neuroanatomic model, Barkley (2) emphasized the importance of the role of inhibition in attention. The advantage of inhibition was, as had been suggested previously, that added time added accuracy and efficiency, preventing overloading of the system and improving the probabilities of retention or memory function.

With these two concepts having evolved through the 19th and 20th centuries, it was in the early 20th century that Still (3) described children who were driven in their behavior, whom he described as defective in moral control. In this early observation, he indicated the phenomenon seemed to be more prevalent in boys than in girls, that there was co-existent hyperactivity, as well as difficulty in learning. As to the locus and mechanism of production, he speculated that not only the central nervous system was involved but that there were environmental factors, if not causal, that were aggravating to the phenomena.

Subsequent studies involved children who had been affected by encephalitis lethargica. These "driven" children were speculated to have brain stem damage and so the sense was there was minimal brain damage. It was within these children that Bradley (4) observed that Benzedrine, a dextral/levo combination of amphetamine, produced a paradoxic quieting of these hyperactive children.

In that same decade, Strauss and Werner (5) speculated that intrauterine or perinatal factors played a role in this syndrome with characteristics quite similar to that described by Still thirty years before. Nonetheless, Clements and Peters in the 1960's (6) pointed out that this condition might well be constitutional and that one must take into account a spectrum of causality, beginning with the unique genetic combination, the effects of gestation and birth, interaction with others after birth, stresses and emotional traumata that would occur in later life.

Within the United States, the American Psychiatric Association, in its 1968 Diagnostic and Statistical Manual of Mental Disorders (DSM-II), codified this syndrome as a hyperkinetic reaction of childhood with symptoms of hyperactivity, short attention span, poor communication, variability in academic and social performance, impulsivity, inability to delay gratification, irritability, explosiveness and poor academic performance (7).

In 1980 and in 1987, followed by 1994, edition III-R and edition IV expanded on this syndrome, referring to it as attention deficit disorder with or without hyperactivity, followed by attention deficit hyperactivity disorder and in the fourth edition of 1994 ADHD, in which the phenomena was described as a persistent pattern of inattention and/or hyperactivity-impulsivity, more frequent and severe than typical of others at the same level of development with symptoms that had persisted for at least six months and were maladaptive to a degree inconsistent with the child's developmental level.

In the most recent edition of the Diagnostic and Statistical Manual, IV-TR (2000), a set of criteria involving inattentiveness, hyperactivity and impulsivity are offered by which diagnostic criteria have been established and may be used quantitatively to determine whether criteria are or are not met.

Despite the fact that there is evidence of a constitutional disorder, with only speculated but unproven perinatal stressors as a factor in its genesis, animal models in acquired brain disorders clearly demonstrate that lesions within the neuroanatomic model of Mirsky in any one or more of these sites may lead to clinical phenomena and neuropsychological characteristics of inattentiveness.

The consequence of the above parallel observations through the 20th century, extending into the 21st century, is a definition of mechanisms of attention and disorders of those mechanisms including those that may be innate to the individual and present from very early in life which constitute organically based behavioral syndromes.

A variety of central nervous system investigations have confirmed characteristics that differentiate those with attentional disorders from those who do not have such conditions. Beginning with the work of Hynd et al (8) and reconfirmed by Mataro et al (9), a reversal of the usual asymmetry observed by MRI scan of the caudate nucleus of the basal ganglia has been confirmed as a characteristic of those with developmental disorders of attention through the lifespan.

Castellanos (10) evaluated 57 males with ADHD and contrasted the MRI findings with 55 controls. His volumetric analysis showed the following: a smaller cerebral volume, a decreased right more than left caudate pattern of asymmetry; a smaller right anterior frontal region; a smaller cerebellum; reversal of the normal lateral ventricular asymmetry and caudate volume which did not decrease with age, as had been observed in the control subjects.

This reversal of caudate asymmetry was reconfirmed by Semrud-Clikeman (11) but, in addition, the pattern observed was associated with a clinical performance on measures of inhibition that was impaired versus controls. In a similar manner, Casey (12) showed that response inhibition was associated with abnormal volumes in the prefrontal cortex, caudate, and globus pallidus. From the above studies it can be concluded that the right prefrontal cortex is apt to act as a suppressant to responses to salient events being observed and that the basal ganglia executes the behavioral response, as had been suggested by the Mirsky et al model above(1).

Acquired forms of attentional disorder were observed by Herskovits (13) in which post head injury there was a positive correlation between lesions in the right putamen of the basal ganglia and symptoms and signs of attentional disorder.

Functional anatomic studies have shown hypoperfusion of the frontal lobes, which often was increased with the administration of methylphenidate (Lou et al -14). Zametkin et al (15) in adult males with ADHD using positron emission tomography (PET) demonstrated a diffuse reduction in

cortical glucose metabolism maximal in the premotor and superior prefrontal cortex. Attempts to replicate these observations in adolescents showed this to be the case in girls, but not adolescent ADHD boys. This interesting observation in relation to anatomic models of the two genders raises a possible explanation as to why there is a difference in the time course of attentional symptoms in males versus females.

Using more sophisticated PET studies, Schweitzer (16) showed on working memory tasks there was not the normal localization in the prefrontal and temporal cortex as occurred in adult controls but rather a diffuse and primarily occipital response. Using fMRI, Bush (17) showed that during the Stroop tasks there was no activation of the anterior cingulate gyrus, as was the case in control subjects. Rubia (18), also using fMRI studies, showed a hypoperfusion of the right medial prefrontal cortex and left caudate during tasks requiring motor inhibition. Vidya (19) by fMRI, demonstrated a reduction in striatal activation on tasks of attention in those with attention deficit disorder. Interestingly, as was the case in the Lou study above, methylphenidate increased striatal activation in ADHD subjects but decreased activation in controls.

Studies have also proceeded with respect to the neurochemistry involved in attentional disorders. Dougherty (20) showed a 70% increase in dopamine transporter density in those with attention deficit disorder. Krause (21) showed by SPECT increased findings of dopamine transporter and that this was reduced after four weeks of exposure to methylphenidate treatment. Ernst (22), using DOPA PET, demonstrated a 50% reduction in DOPA decarboxylase in the prefrontal cortex of adults with attention deficit disorder. Interestingly, in children, the localization was in the mid brain (23).

A variety of attempts at replicating attentional disorders in animals, beginning with Shaywitz et al (24), have confirmed that factors involved with dopamine metabolism, and to a lesser extent noradrenergic systems, have a role in attention models in animals.

These neuroanatomic/neurophysiologic observations suggest the following with regard to disorders of attention in humans.

A. There is a discrete time course in which early childhood onset is a characteristic and its symptoms have a tendency to stabilize or be reduced by adolescence or early adulthood.
B. ADHD symptoms in males are more prominent than females in childhood but are less apt to abate in girls through adolescence and adulthood.
C. Effective pharmacotherapy has an effect either on dopamine or norepinephrine.
D. Imaging studies suggest a disturbance in structures involving the cortex and striata.
E. Reversed asymmetry is observed in the brain structure and in its function versus control subjects.
F. The above may induce an imbalance between functions localized to the left versus right hemisphere and a model predicated on this asymmetry and its neurochemistry has been proposed.
G. Finally, there may be a role involving the cerebellar vermis which may modulate activities in the striatal cortical network for attention (25).

These facts suggest an over-production of striatal dopamine receptors in childhood, which normally is pruned by adulthood, but this in the general population is more prominent in males than in females. This observation may explain the apparent shrinkage of the caudate nucleus over time in boys who do not have ADHD but not in girls without ADHD symptoms. The over-expression of dopamine receptors may explain the increased prevalence in boys, as well as the persistence in girls, because of

a reduction in the pruning of neurons which is differential between the two genders. Additionally, by adulthood, D2 receptor density is equal, as is gender effect in ADHD between males and females. Most recently, Pliszka (26) has shown that methylphenidate treatment reduces the shrinkage of the right anterior cingulate cortex in contrast to those who have not been treated with methylphenidate. This surprising observation suggests that medicinal management has a physical anatomic effect in those with attentional disorders of constitutional origin.

As to clinical physiology, our studies have suggested a high rate of occurrence of significant EEG abnormalities. The frequency was 22% in a population of 200 students with developmental disorders, 83% of which had met criteria for a diagnosis of attention deficit disorder with or without hyperactivity (27). In 6% of the 200 school-age pre-puberal subjects significant EEG discharges, classified under the Mayo Clinic system as dysrhythmia grade III, a type not uncommonly associated with clinical seizure disorders was recorded in the absence of a history of head trauma or seizure disorder. An independent observation from Germany in a population of students with attention deficit disorder confirmed a frequency of 5% of epileptiform central spike discharges (28). The origin of these physiological phenomena is unclear but may reflect the effect of cortical anomalies that have been observed in students with developmental disorders of reading as well as in epilepsy (29).

There is an overlap between disorders of reading and attention, with one-third of those with attentional disorders demonstrating difficulties in the acquisition of decoding written language. Our studies suggest that at times, when EEG abnormalities of a significant nature are observed and more traditional forms of treatment of attentional disorders are ineffective, or when symptoms widely fluctuate without apparent explanation in the face of these EEG abnormalities, antiepileptic medications may be an appropriate intervention. In a small study we performed with an N of 12, using levetiracetam, a significant beneficial effect on both EEG and cognitive function was observed in students with cognitive difficulties including those of attention (30). Focal EEG abnormalities in children with developmental disorders strongly correlates with slow internal processing speed as assessed by the N-100/P-300 auditory evoked response (31).

If there is disturbance of function in the brain stem, as well as right hemisphere, there may be an increased probability of difficulties with wakefulness, which may correlate with difficulties in cognitive alertness. Studies in our laboratory have suggested daytime drowsiness, cause indeterminate, as they could represent sleep disturbance at night as opposed to primary non-alertness, showed that using pupillometry as a measure of wakefulness, one could normalize pupillometry and at the same time, following acute dosages of psychostimulants, which are active within one hour of administration, determine if alertness had been achieved and at the same determine if there was cognitive improvement on re-administration of alternate forms of cognitive tasks failed at baseline (32). However, even without evidence of non-alertness, medication trials with quick acting agents allows one to make a determination quickly if a specific psychostimulant, methylphenidate in its variety of formulations, d-amphetamine or mixed dextro/levoamphetamine provide differential levels of effectiveness, as the three drugs are not identical in structure or action, and differential responses between them may be observed within an individual patient.

In parallel to the observations of structural and neurochemical characteristics, differentiating those with attention disorders from those without, recent genetic studies have suggested that there may be a genetic link to the occurrence of disorders of attention. This previously had been suggested on the basis of familial aggregation, in which 84% of adults with attention deficit disorder have at least one affected offspring. Furthermore, monozygotic twin studies have shown an 80% concordance

rate. More specific investigation of genetic factors includes the work of Cook (33) who demonstrated polymorphism of dopamine transporter reuptake gene (DAT1). Giros (34), using knockout deletion of dopamine transporter gene, demonstrated incessant hyperactivity in animal models. Winsberg and Comings (35) showed that homozygosity of ten repeat allele was associated with non-response to methylphenidate. La Hoste (36) showed that the dopamine D-4 receptor gene was associated with attentional disorder. This receptor is linked to novelty seeking behavior. High levels of this trait are linked to impulsive, over-excitable and quick-tempered behavior. Sunahara (37) showed that D-4 receptor is located primarily in the frontal and prefrontal cortex, regions already implicated in the mechanisms underlying inattentiveness. This gene is associated with functional differences in the response to dopamine and this allele, a seven repeat allele of the D-4 receptor gene, was observed in 49% of ADHD subjects versus 21% of a control group. Together these studies suggest a polygenetic mechanism. At this writing, the candidate genes include DRD4, DAT, D2 receptor, D4 receptor, DXS7 on the X chromosome and others on sites on chromosomes 3, 5 and 11.

Since social factors play a role in the genesis of inattentiveness, it is possible that specific social environments induce or aggravate attentional disorders. As well, there might be populations scattered throughout the world in which gene preference might be higher or lower than the general population of the planet. However, several studies from Canada (38), United Kingdom (39) and China (40) confirm the existence of attentional disorders with an overall average of 7%. This rate was shown clearly in the Olmsted County study from Mayo Clinic, Rochester, Minnesota, where the prevalence was observed in school age individuals of 7.5% and a sex ratio of 3:1 in favor of males (41). Interestingly, long term studies of those diagnosed showed that symptoms were associated with an increased frequency of other medical diagnoses and higher costs for medical care unrelated to psychiatric, pharmacotherapy, or psychological treatments.

A variety of neuropsychological as well as psychoeducational measures may be employed clinically to establish diagnosis. For a review of specific tests see Lezak (42). Rating scales based on the DSM-IV TR criteria can be established and cutoff points normalized for populations throughout the world, reflective of the norms for that social group. Among the studies appropriate are intelligence studies, which are factor analyzed for verbal processing, perceptual organization, freedom from distractibility, and processing speed. It is especially freedom from distractibility which is commonly lowered in students with attentional disorders. Psychoeducation assessment, such as that performed by the Woodcock-Johnson psychoeducational battery provides accurate estimates of skill levels in reading, spelling, written expression, math computation and correlated sub-skills.

Neuropsychological measures that we have employed, many of which were involved in the development of the Mirsky et al model (1), include the Rey-Osterrieth Complex Figure, which measures visual perception and visual motor skills, as well as short and long term visual spatial memory; the Rey Auditory Verbal Learning Test, which measures verbal learning and delayed recall. The Letter Cancellation Test, the number of letters or symbols to be identified varying with the age and development of the subject, measures visual attention proofreading. Digit span offers a measure on digits forward of numeric auditory attention and in reverse of numeric auditory memory. Kagan's Matching Familiar Figures Test involves a measure of visual discrimination, but slow performance is correlated with obsessive personality structure and too rapid performance suggests impulsivity. Three computer generated studies useful in assessing attention include: the Test of Variables of Attention, the Conners' Continuous Performance Test and the Wisconsin Card Sorting Test, the last especially assesses disorders of executive function. It is not the place of this review to go into the specifics of these instruments, but they should be employed in whole or in part, as is appropriate to the clinical presentation, by a school-based educational psychologist or neuropsychologist.

Among the issues in attenuating the symptoms of attention deficit disorder is the high rate of occurrence of comorbid psychiatric phenomena (27). In our study, published in 2002, of 200 consecutive children with developmental disorders, 57% had a comorbid psychiatric diagnosis; depression, anxiety, obsessive personality traits, conduct disorder, and oppositional defiant disorder.

The Multimodal Treatment of ADHD (MTA) study which outlined and differentiated the effectiveness of three forms of intervention for attentional disorders, identified a 40% occurrence of oppositional defiant disorder, a 34% occurrence of anxiety disorder, a 14% occurrence of conduct disorder, and a 4% occurrence of depression (43, 44). Our observations suggest a correlation between right hemispheric dysfunction and psychiatric-affective symptoms. Within that group are those students with Asperger syndrome, as well as the so-called nonverbal learning disorders. Attentional symptoms are common, but in addition to problems with math calculation, unusually flat prosody of speech and difficulty interpreting accurately social and emotional cues in the social environment, is a very high rate of comorbid symptoms of anxiety and depression that we observed in the adult population who in retrospect suffered with a condition involving a developmental disorder of attention (45).

Follow-up studies, such as those by Hechtman, Weiss and Perlman (46) confirm that a later in life consequence of childhood onset attention deficit disorder is low self esteem which adversely affects employability, sinking the affected person into lower socioeconomic levels which then increases the risk for emotional disorder and substance abuse.

Therefore, it is appropriate to look at the means by which individuals with these disorders may be most effectively treated so as to prevent their long term negative social-emotional effects. From a medical perspective, a variety of medications, including stimulants, methylphenidate and amphetamines, pemoline, modafinil, atomoxetine, and the serotonergic SSRI agents with activating properties such as fluoxetine and sertraline or the dopaminergic antidepressant buprion may be employed with careful supervision to complement social and educational interventions.

A variety of less typical agents that may be useful to behavioral symptoms including tricyclic antidepressants with prominent effects on noradrenaline, as well as the alpha-1 blockers, clonidine and guanfacine. The stimulants run the risk of agitation; sleep disturbance, weight loss, tic aggravation and an increment in obsessive worry. The other agents have a higher rate of occurrence of drowsiness, and in the case of the tricyclics high doses run the risk of cardiac arrhythmia. It is important that, in any child being treated with prescription medications, height and weight be monitored on a regular basis by the treating physician and that periodic laboratory investigations of liver function and blood forming elements be routinely carried out.

In those uncommon cases of significant EEG abnormalities, a wide spectrum of antiepileptic agents used with caution may be helpful to both behavioral and cognitive symptoms. When aggression is a major problem or when the psychostimulants are effective for the cognitive handicap but are associated with adverse side effects, these side effects may be blunted with the concomitant introduction of an atypical neuroleptic. Risperdone has been shown to be effective in autism (47) and our recent studies of aripiprazole, another atypical neuroleptic, suggest it is an effective suppressant of tic manifestations in Tourette syndrome (48).

The multimodal treatment study of children with ADHD (MTA) funded by the National Institutes of Mental Health in the United States confirms that a combination of behavioral with pharmacologic therapy offers the best results and that if, for one reason or another, medicinal therapy can not be

carried out behavioral management in a structured manner, as outlined in the study, provides adequate support of symptoms but involves a close collaboration between school, home and the community (43, 44).

This review confirms that there is a biological disorder not rare in the general population having implications for educational achievement and social advancement which has implications for the society in which such persons exist. Thus, it is incumbent upon professionals in healthcare and education as well as societies to actively identify the students at risk for developmental disorders of attention and learning and to promptly provide effective intervention to optimize their individual and society's outcome.

Correspondence to:

Drake D. Duane, M.D.
Adjunct Professor, Arizona State University
Director, Institute for Developmental Behavioral Neurology
10210 N. 92nd Street, Ste. 300
Scottsdale, Arizona 85258, USA
dduane@arizonaneurology.com
Fax: 480-860-0029

References

1. Mirsky AF, Anthony EJ, Duncan CC, et al. Analysis of the elements of attention: A neuropsychological approach. Neuropsychology Review, 1991; 2:109-145.
2. Barkley RA. Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment. New York: Guilford Press, 1990.
3. Still GF. The Coulstonian Lectures on Some Abnormal Physical Conditions in Children. Lancet, 1902: 1:1008-1012, 1077-1082, 1163-1168.
4. Bradley C. The Behavior of Children Receiving Benzedrine. Am J Psychiatry, 1937; 94:577-585.
5. Strauss AA, Kephart NC. Psychopathology and Education of the Brain-Injured Child (vols 1 & 2). New York: Grune & Stratton, 1955.
6. Clements SD, Peters JE. Minimal brain dysfunctions in the school aged child. Arch Gen Psychiatry, 1962; 6:85-197.
7. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 2nd ed; DSM-II. Washington, DC: APA, 1968.
8. Hynd GW, Hearn KL, Novey ES, et al. Attention-deficit hyperactivity disorder and asymmetry of the caudate nucleus. J Child Neurol, 1993; 8: 339-347.
9. Mataro M, Garcia-Sanchez C, Junque C, et al. Magnetic resonance imaging measurement of the caudate nucleus in adolescents with attention-deficit hyperactivity disorder and its relationship with neuropsychological and behavioral measures. Arch Neurol, 1997; 54:963-968.
10. Castellanos FX, Giedd JN, Marsh WL, et al. Quantitative brain magnetic resonance imaging in attention-deficit hyperactivity disorder. Arch Gen Psychiatry, 1996; 53:607-616.
11. Semrud-Clikeman M, Steingard RJ, Filipek P, et al. Using MRI to examine brain-behavior relationships in males with attention deficit disorder with hyperactivity. J Am Acad Child Adolesc Psychiatry, 2000; 39:477-484.
12. Casey BJ, Castellanos FX, Giedd JN, et al. Implication of right frontostriatal circuitry in response inhibition and attention-deficit/hyperactivity disorder. J Am Acad Child Adolesc Psychiatry, 1997; 36:374-383.
13. Herskovits EH, Megalooikonomou V, Vavatzikos C, et al. Is the spatial distribution of brain lesions associated with closed-head injury predictive of subsequent development of attention-deficit/hyperactivity disorder? Analysis with brain image database.Radiology, 1999; 213:389-394.
14. Lou HC, Henriksen L, Bruhn P, et al. Striatal dysfunction in attention deficit and hyperkinetic disorder. Arch Neurol, 1990; 46:48-52.
15. Zametkin AJ, Nordahl TE, Gross M, et al. Cerebral glucose metabolism in adults with hyperactivity of childhood onset. N Engl J Med, 1990; 323:1361-1366.
16. Schweitzer JB, Faber TL, Grafton ST, et al. Alterations in the functional anatomy of working memory in adult attention deficit hyperactivity disorder. Am J Psychiatry, 2000; 157:278-280.
17. Bush G, Frazier JA, Rauch SL, et al. Anterior cingulate cortex dysfunction in attention-deficit hyperactivity disorder revealed by fMRI and the counting Stroop. Biol Psychiatry, 1999; 45:1542-1552.
18. Rubia K, Overmeyer S, Taylor E, et al. Hypofrontality in attention deficit hyperactivity disorder during higher-order motor control: A study with functional MRI. Am J Psychiatry, 1999; 196:891-896.
19. Vidya CJ, Austin G, Kirkorian G, et al. Selective effects of methylphenidate in attention deficit hyperactivity disorder: A functional magnetic resonance study. Proc Natl Acad Sci USA, 1998; 95:14494-14499.
20. Dougherty DD, Bonab AA, Spencer TJ, et al. Dopamine transporter density in patients with attention deficit hyperactivity disorder. Lancet, 1999; 354:2132-2133.
21. Krause AH, Dresel SH, Krause J, et al. Increased striatal dopamine transporter in adult patients with attention deficit hyperactivity disorder: Effects of methylphenidate as measured by single photon emission computed tomography. Neurosci Lett, 2000; 285:107-110.
22. Ernst M, Zametkin AJ, Matochik JA, et al. DOPA decarboxylase activity in attention deficit hyperactivity disorder adults. A [fluorine-18] fluorodopa positron emission tomographic study. J Neurosci, 1998; 18:5901-5907.
23. Ernst M, Zametkin AJ, Matochik JA, et al. High midbrain [18 f] DOPA accumulation in children with attention deficit hyperactivity disorder. Am J Psychiatry, 1999; 157:1209-1215.
24. Shaywitz BA, Yager RD, Klopper JH. Selective brain dopamine depletion in developing rats: An experimental model of minimal brain dysfunction. Science, 1976; 191:305-308.
25. Teicher MH, Andersen SL, Navalta CT, et al. Neuropsychiatric disorders of childhood and adolescence. In: The American Psychiatric Publishing Textbook of Neuropsychiatry and Clinical Neurosciences. Yudofsky SC, Hales RE (eds) Washington DC: American Psychiatric Association, 2002, pp. 1069-1119.
26. Pliszka SR, Lancaster J, Liotti M, et al. Volumetric MRI differences in treatment-naïve vs chronically treated children with ADHD. Neurology, 2006; 67:1023-1027.

27. Duane, DD, Vermillion K, White, R. EEG abnormalities in developmental learning/attention disorders: Frequency, characteristics and relationship to behavior. Ann Neurol, 2002; 52 (suppl 1): 520.
28. Holtmann M, Becker K, Kentner-Figura B, et al. Increased frequency of Rolandic spikes in ADHD children. Epilepsia, 2003; 44:1241-1244.
29. Galaburda AM, Sherman GF, Rosen GD, et al. Developmental dyslexia: Four consecutive patients with cortical anomalies. Ann Neurol, 1985; 18:222-233.
30. Duane, DD, Heimburger G, Duane DC, White R. Cognitive, behavioral and EEG effects of levetiracetam in pediatric developmental disorders of attention and learning. J Neuropsychiatry Clin Neurosci, 2004; 16:228-229.
31. Duane, DD. Vigilance and wakefulness in developmental disorders of reading and attention. Ann NY Acad Sci, 1993; 682:333-334.
32. Duane, DD, Johnson CM, Clark M. Acute improvement in alertness and cognition following methylphenidate predicts chronic cognitive improvement. J Neuropsychiatry Clin Neurosci, 1997; 9:141-142.
33. Cook, EH, Jr., Stein MA, Krasnowski MD, et al. Association of attention-deficit disorder and the dopamine transmitter gene. Am J Hum Genet, 1995; 56:993-998.
34. Giros M, Jaber M, Jones SR, et al. Hyperlocomotion and indifference to cocaine and amphetamine in mice lacking the dopamine transporter. Nature, 1996; 379:606-612.
35. Winsberg B, Comings DE. Association of the dopamine transporter gene (DAT1) with poor methylphenidate response. J Am Acad Child Adolesc Psychiatry, 1999; 38:1474-1477.
36. LaHoste GJ, Swanson JM, Wigel SB, et al. Dopamine D4 receptor gene polymorphism is associated with attention deficit hyperactivity disorder. Mol Psychiatry, 1996; 1:121-124.
37. Sunahara RK, Seeman P, Van Tol HH, et al. Dopamine receptors and antipsychotic drug response. Br J Psychiatry, 1993; suppl 22:31-38.
38. Szatmari P, Offord DR, Boyle MH. Ontario Child Health Study: Prevalence of attention deficit disorder with hyperactivity. J Child Psychol Psychiatry, 1989; 30:219-230.
39. Popper CW, Steingard RJ. Disorders usually first diagnosed in infancy, childhood, or adolescence. In: American Psychiatric Press Textbook of Psychiatry, 2nd Ed. Hayes RE, Yudofsky CS, Talbott JA (Eds), Washington, D.C.: American Psychiatric Press, 1995, pp. 729-832.
40. Tao KT. Commentary on Attention Deficit Hyperactivity Disorder in China. Am J Psychiatry, 1992; 149:1539-1542.
41. Leibson CL, Katusic SK, Barbaresi WJ, et al. Use and costs of medical care for children and adolescents with and without attention-deficit/hyperactivity disorder. JAMA, 2001; 285:60-66.
42. Lezak MD. Neuropsychological Assessment. 3rd ed. New York: Oxford University Press, 1995.
43. MTA Cooperative Group. A fourteen-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. Arch Gen Psychiatry, 1999; 56:1073-1086.
44. MTA Cooperative Group. 24-Month outcomes of treatment strategies for attention-deficit/hyperactivity disorder. Pediatrics, 2004; 113:754-761.
45. Duane DD, Clark M, Brennan ME, Bryan D. Later life neuropsychiatric concomitants of developmental right hemispheric dysfunction. Neurology, 1994; 44 (suppl 2): 376.
46. Hechtman L, Weiss G, Perlman T. Young adult outcome in hyperactive children who receive long-term stimulant treatment. J Am Acad Child Psychiatry, 1984; 23:261-269.
47. McCracken JT, McGough J, et al. Risperdone in children with autism and serious behavior problems. N Engl J Med, 2002; 347:314-321.
48. Duane DD, Heimburger GH, Fleckey SA, et al. Open-label flexible dosing eight-week trial of aripiprazole in Tourette syndrome, childhood through young adulthood. J Neuropsychiatry Clin Neurosci, 2006; 18:278.

The Hong Kong Society of
Child Neurology and Developmental Paediatrics
香港兒童腦科及體智發展學會

The Hong Kong Society of Child Neurology and Developmental Paediatrics Working Party on AD/HD

Members

Dr. Chan Chok Wan	President, The Hong Kong Society of Child Neurology & Developmental Paediatrics
Dr. Catherine Lam	Council Member, The Hong Kong Society of Child Neurology & Developmental Paediatrics
Mr. Joseph Lau	Senior Clinical Psychologist, Child Assessment Service, Department of Health
Professor Tatia Lee	Professor and Academic Director of Clinical Psychology Programme, Department of Psychology, The University of Hong Kong
Professor Patrick Leung	Professor and Director of Graduate Studies in Clinical Psychology, Department of Psychology, The Chinese University of Hong Kong
Dr. Stephenie Liu	Senior Medical Officer, Child Assessment Service, Department of Health
Professor Shiu Ling Po	Associate Professor, Department of Educational Psychology, The Chinese University of Hong Kong

This paper was prepared in consultation with

Hong Kong Hospital Authority Child Psychiatry Service Working Group

Dr. Luk Siu Luen	Adjunct Professor, Department of Psychiatry, The Chinese University of Hong Kong; Past Associate Professor, Department of Psychiatry, University of Melbourne & Monash University, Australia
Professor Ho Lok Sang	President of the Hong Kong Economic Association; Professor, Department of Economics & Director, Centre for Public Policy Studies, Lingnan University, Hong Kong
Professor Daniel Shek	Professor, Department of Social Work & Director, Quality of Life Centre, Hong Kong Institute of Asia-Pacific Studies, The Chinese University of Hong Kong
Dr. Lee Chi Chiu	Consultant Psychiatrist, Kwai Chung Hospital, Hospital Authority, Hong Kong
Professor Cheng Pui Wan	Assistant Professor, Department of Educational Psychology, The Chinese University of Hong Kong

21 March 2007 Draft Paper Consultation Forum Participants

Mrs Daphne Blomfield	Executive Councilor, The Pathways Foundation Ltd
Dr Chan Chok Wan	President, The Hong Kong Society of Child Neurology & Developmental Paediatrics
Ms Eva Chan	Educational Psychologist, Assistant Education Services Secretary (Student Guidance & Counselling), Tung Wah Group of Hospitals
Dr Chan Kwok Chiu	COS, Department of Paediatrics, Alice Ho Miu Ling Nethersole Hospital
Ms May Chan	Educational Psychologist, Society of Boys' Centres
Dr Cheng Pui Wan	Assistant Professor, Department of Educational Psychology, The Chinese University of Hong Kong
Dr Hon Cheung Chiu Hung	Legislative Council Member
Ms Daisy Cheung	Consultant, Hong Kong Association of Specific Learning Disabilities
Dr Chow Chun Bong	COS, Department of Paediatrics, Caritas Medical Centre
Principal Natalie Chow Luk	Principal, Hui Chung Shing Memorial School
Mr Ferrick Chu	Chief Equal Opportunities Officer, Equal Opportunities Commission
Professor Ho Lok Sang	Professor, Department of Economics, Lingnan University
Mr. Hung Chi Hong	Executive Council Member, Hong Kong Association of Specific Learning Disabilities
Dr Hung Se Fong	Hospital Chief Executive, Kwai Chung Hospital
Mrs Hung Wong Lai Ping	Principal, Caritas St. Joseph Secondary School
Ms Iris Keung	Chairman, HK Association of Specific Learning Disabilities
Principal Carol Kwong	Principal, HMW Secondary School
Dr Kelly Lai	COS, Dept of Psychiatry (Child Psychiatry Service), Alice Ho Miu Ling Nethersole Hospital

BRAINCHILD
The Official Publication of HKCNDP

Attention Deficit/Hyperactivity Disorder in Children 2007 Position Paper - Executive summary

Background

Despite a vast body of research, knowledge and practice experience on AD/HD in many countries over the past decades, Hong Kong's awareness and support systems for persons with AD/HD have been mainly limited to the medical sector. More recently, students with behavioural problems are increasingly recognized as having in-child factors such as AD/HD that require specific identification and help. In Hong Kong's 2005 Rehabilitation Programme Plan Review, AD/HD was brought up as a distinct entity requiring multisectoral attention and resources, and was admitted into the Plan as a formal category of disability.

In response to a need to develop policies that provide effective and integrated systems of support, a Working Party on AD/HD was formed within HKCNDP (appendix 1) in November 2005 to lead deliberations on the subject. The group performed literature review, stock taking of local service systems and professional readiness, and drafted proposals to meet identified challenges. In-depth consultative input to the paper was obtained including from the field of child psychiatry, social work and health economics (appendix 2), and an open Forum was held with key-players and stake-holders on the draft paper (page 3). This final position paper will be issued to academic, professional, and practicing communities for reference, and to policy makers and administrators for further actions.

What is AD/HD?

Definition

AD/HD is a condition with neurobiological origin that interferes with a person's ability to focus and sustain attention on a task, or inhibit impulsive behaviour. It is characterized by developmentally inappropriate attention skills and/or impulsivity and hyperactivity that are maladaptive, persistent and present across different settings, with onset of symptoms occurring before 7 years of age. AD/HD is not a type of specific learning disability although these may occur in the same individual.

Etiology

AD/HD is considered a generalized disorder of impulse control and performance monitoring. Converging neuropsychological neuroimaging and neurochemical studies have implicated fronto-striatal network abnormalities. Behavioural genetic studies support the view that AD/HD is at least partially familial and genetically mediated. Molecular genetic studies show evidence for dopamine D4 receptor (D4DR) gene, dopamine transporter (DAT1) gene, serotonin transporter (5-HTT) gene and dopamine D5 receptor (DRD5) gene to be strongly associated with AD/HD. A meta-analysis by Faraone, Doyle, & Mick et al. (2001) showed the association between DRD4 and ADHD is real but small in magnitude. In addition, environmental factors may play a role through biological compromising events during development of the nervous system or negative psychological factors. It is of note that negative parenting may conversely arise as a reaction to the difficult child as well as parents' own AD/HD and other emotional disorders. Emergence of oppositional defiant disorder (ODD) or conduct disorder (CD) may in part be a result of parental malpractices, but also of partly shared genetic liability of ODD/CD with AD/HD.

How common is AD/HD?

Epidemiological reports on AD/HD vary with variations in diagnostic criteria. Prevalence rates for children are reported as around 3-7% in USA, 3% in China and 3-9% in other countries. Male to female ratio ranges from 2:1 to 9:1.

Management of AD/HD

Diagnosis

Symptoms of AD/HD are dimensional in nature, and the diagnosis of AD/HD hinges on careful developmental history taking that address the full range of symptomatology and current functioning over situational contexts in key domains of family functioning, peer relationships and academic function, and observation of behaviours as reported by adults or measured in home and clinic settings. Common comorbidities such as dyslexia and ODD have to be looked out for.

Management

Current practice guidelines in management involve a multidisciplinary approach including medication and behavioural interventions. Stimulant medication has been shown to significantly improve symptoms of AD/HD. Behavioural modification programmes involve children, parents and teachers. Specific skills are used, and problematic behaviours are identified for intervention. Education programmes for parents are helpful for assisting them to develop appropriate skills for managing disruptive behaviours of their children. The Multimodal Treatment Study showed that children who received medical treatment alone or combined medical and behavioural treatment demonstrated a significantly greater improvement than those who just received behavioural treatment or routine community care.

The core symptoms of AD/HD may be the underlying causes of persistent academic problems such as failed grades and expulsions. Educational interventions include academic instructional strategies, behavioural interventions and classroom accommodations. Positive results occur with effective home and school collaboration.

Overall, an approach involving pharmacological, behavioural, educational, and social interventions in partnership with the family is currently the most efficacious and preferred treatment.

Costs to society

The developmental impact of AD/HD ranges from short-term impairments to long-term sequelae to the individual and severe costs to the family and society. For the individual, there may be serious issues in social interactions and relationships, self-esteem, academic problems and failure, occupational difficulties, injury and accidents and substance abuse. In addition to higher direct medical costs for treatment of AD/HD, there are increased costs for treating comorbidities such as conduct and mood disorders, and costs related to accidents including those as a result of poor driving habits of persons with poor attention and impulse control. Economic burden is also incurred to schools because of increased need for school-based supportive or special education services, to the parents because of missed work for managing the child and its consequent implications to the parents' employers, to the society because of higher association of adults with AD/HD and criminality, and work loss in adults with AD/HD due to poor performance, and absence from work. Medication treatment of AD/HD has been shown to be cost effective, as it is likely to reduce the overall economic burden of AD/HD by improving the child's function and reducing the direct and indirect costs to families and other third parties.

How does the condition apply to the Chinese population and Hong Kong?

Local prevalence rate

A prevalence rate of 6.1% was found in a large sample of local school boys (Leung 1996). In young adolescents, prevalence estimates are 5.7% for boys and 3.2% for girls. From the records of the Child Assessment Service of the Hong Kong Department of Health, the boys to girls ratio was 6-8 to 1 during the period 2003-2006.

Local Studies

Validity of AD/HD disorder in the Chinese population (versus AD/HD being a culture-bound disorder of the Western culture) was studied. Factor analysis of teacher and parent questionnaires confirmed the presence of AD/HD behaviours separable from anti-social or neurotic/emotional factors, and positive association with external correlates including observed clinical features, higher exposure to biological risks during pre-, peri- and post-natal periods, history of other developmental delays and greater abnormal neurological findings. These correlations were not demonstrated in Chinese children with conduct disorder in whom social adversity was associated instead (Leung et al., 1996).

Genetic studies of Chinese children showed an association between the 2R allele of the DRD4 gene and AD/HD in Han Chinese children, where the 2R allele may be derived from the 7R allele and functions similarly to 7R. In the study, there was a biased transmission of the 2R allele from the parents to their AD/HD children (Leung et al., 2005).

Neuroimaging studies of Chinese children in Hong Kong using a voxel based MRI study showed restricted structural brain abnormalities localized to brain systems known to be necessary for attention and executive function (McAlonan G.M., 2007).

Assessment tools including the Conner' Teacher Rating Scale (1989) and the Child Behaviour Checklist (CBCL) with its Teacher Report Form and Youth Self-Report were re-validated for use in Hong Kong (Leung et al., 2006).

Intervention studies include an Enhancement of Learning Behaviour Project through cooperation between schools, families and community in helping children with AD/HD (So, Leung & Hung, 2004), and a multi-modal intervention project consisting of medication, clinic based parent training, child training and consultation and liaison work with schools (Heung & Ho, 2003, Heung V., 2004).

What is the service situation in Hong Kong?

Local Services

Governmental policies

Local services have been managed largely separately within the medical, education and social sectors, although some liaison efforts have been made in some serious cases. AD/HD is recognized by the Education and Manpower Bureau in recent years as a category of special needs, while the Health & Welfare Bureau's rehabilitation programme incorporated AD/HD as a category of disability in 2007.

Medical services

Child assessment centres of DH and HA provide diagnostic and interim support services, while child and adolescent psychiatric services of HA provide diagnosis, treatment, long-term follow up and consultative support to other medical and educational settings. A proportion of children receive support from the private sector.

Educational support in mainstream schools may be provided with additional resources and professional backend support for students identified with AD/HD. Support for learning and behavioural management varies widely in nature and intensity between schools.

Community programmes on parent skills training for managing children with AD/HD are available. However the nature and effectiveness of these programmes have generally not been validated.

What are Hong Kong's challenges and proposals for future development?

Medical Services

Challenges

Waiting time for Child & Adolescent Psychiatry services have reached 1-3 years recently. Manpower deficiencies, including child psychiatrists and paediatricians trained to manage children with AD/HD, are serious.

Proposals

A 4-tier service model for division of labour among medical professionals is proposed.
Tier One: Non-mental health professionals.
Tier Two: Specialized teams with expertise in AD/HD management.
Tier Three: Child Psychiatry multidisciplinary teams.
Tier Four: In-patient psychiatric care teams.
These teams should work together through triage and mutual referrals as a coordinated network of support in the community and medical settings. In-service training for workers at respective level and opening of posts in public service are needed urgently.

Educational Services

Challenges

Large class size limits the amount of individualized support that teachers could provide to students with AD/HD. Manpower issues include the lack of trained teachers and paraprofessionals (or teaching assistants) for helping students with AD/HD, and the lack of good-quality training provided to them.

Proposals

Reduction of class size is a priority. Specific training should be organized systematically for teachers of AD/HD students. Paraprofessionals (teaching assistants) with adequate knowledge and skills about AD/HD should be employed in schools, and in-service training and support to school social workers and school guidance personnel on this subject should also be provided.

Coordinated services between teachers, paraprofessionals, social workers, educational psychologists, medical doctors, clinical psychologists and families are essential for supporting effective learning and behavioural management in schools. A senior member of the school should be designated to head the support team and coordinate various parties involved. School social workers and school guidance personnel could provide case work follow through within this system.

Social services

Challenges

It is argued that a family-based approach should be adopted (Shek & Tsang, 1993), and objective as well as subjective burdens borne by the parents or caregivers of these children should be seriously taken into account. Unfortunately, even with the implementation of integrated family services in Hong Kong, the gap between rehabilitation and family service is still very wide. Parenting training programmes and family supportive services geared towards the needs of parents and family members remain grossly inadequate.

Proposals

Resources should be directed to respective operators including community service providers and integrated family service centers. Pre-service, postgraduate and in-service social work training programmes needs to be enriched with respect to coverage of AD/HD management. Evidence based social work practices have to be developed and promoted for these children and families. Peer support and advocacy groups should be guided by professionals who understand their needs and by social workers familiar with peer support group work.

Service Coordination

Multidisciplinary and multi-sectoral collaborations are vital to the treatment and rehabilitation of children with AD/HD. Affected children may be receiving medication by doctors, behavioural and emotional intervention progammes by psychologists and social workers, effective school management by teachers, teachers' aids and educational psychologists, while families may be receiving counseling and social group work attention. All parties should be familiar with the systems in place in order to function and advocate effectively for the needs of these individuals.

Professional training for management of children/students with AD/HD

Recommendations made on pre-service, postgraduate and in-service training programmes for paediatricians and family doctors, child psychiatrists, clinical psychologists, educational psychologists, teachers, para-professionals and social workers are discussed in detail. A time framework of about ten years is envisaged to bring current deficiencies to a reasonable balance.

Public education and Research

Public education is needed for recognition of the presence of children with AD/HD and their families, on accurate understanding of its nature and the community's service needs. Further research on the scientific and cultural aspects of the condition, as well as on effective interventions supported by evidence are critical for guiding policy and service development.

Conclusion

The movement forward will rely on input and cooperation of multiple sectors and levels, with effective triage mechanisms and transitions between levels of care, delivered with understanding of the cultural and ecological context of the children and their families in Hong Kong. The presence of adequately trained professionals, effective programmes supported by available evidence base and partnerships with families in the natural community setting are essential. As for all complex conditions where biological differences, environment and culture interact towards outcome, systems of care have to be developed with parameters that can be followed and monitored.

Attention Deficit/Hyperactivity Disorder in Children 2007 Position Paper

Working Party on Attention Deficit / Hyperactivity Disorder
The Hong Kong Society of Child Neurology and Developmental Paediatrics

I. OVERVIEW OF AD/HD

• DEFINITION AND CLINICAL PROFILE

Attention Deficit/Hyperactivity Disorder (AD/HD) is the most common neurobehavioural childhood disorder and is among the most prevalent of chronic health conditions affecting school-aged children.

AD/HD was first described by physician Heinrich Hoffman in 1845, but it was not until 1902 that the medical community studied the characteristics of this condition. Different operational definitions have been used throughout the decades. Currently, the American Psychiatric Association's Diagnostic and Statistical Manual and the World Health Organisation's International Classification of Diseases and Related Health Problems, in their latest versions, DSM-IV and ICD-10 have come to an almost identical operational definition of AD/HD with a set of 18 core symptoms (Appendix Box 1 & Box 2).

AD/HD is characterized by persistent symptoms of inattention, hyperactivity and impulsivity across situations. Onset of symptoms occurs before 7 year old although many individuals are diagnosed after the symptoms have been present for a number of years. These symptoms incur significant psychosocial impairment including difficulties in family functioning, peer relationship, and school functioning. The associated behavioural problems are excessive, long term and pervasive. Children with AD/HD are often unable to sit still, plan ahead, finish tasks or follow what is going on around them. They are perceived as disorganized and difficult to look after or to control. They appear to be well behaved at times, but lack consistency in their performance. People around them might not be aware that they have difficulty in controlling their own behaviours. A significant proportion of children with AD/HD (40 – 50%) also suffer from co-morbid conditions including Oppositional Defiant Disorder, Conduct Disorder, Bipolar Disorder, Anxiety and Mood Disorders, Tic Disorder and Learning Disorders (Szatmari, Offord and Boyle 1989). In the long term, if AD/HD is not recognized early in its course during childhood, psychosocial problems such as academic difficulties, self-esteem issues, family problems, increased risk of accident and injuries will develop affecting adjustment in adulthood. Studies showed that as many as 80% of diagnosed hyperactive children continue to have features of AD/HD persisting into adolescence, and up to 65% into adulthood (Dulcan & Benson 1997). Some of the most common symptoms displayed by individuals with AD/HD in adulthood include losing and quitting jobs frequently, history of academic and/or career underachievement, poor ability to manage day-to-day responsibilities (e.g., completing household chores or maintenance tasks, paying bills, organizing things), relationship problems due to forgetting important matters or getting easily upset over minor ones, chronic stress and worry due to failure to accomplish goals and bad driving record due to inferior impulse control. Some very bright and talented individuals, however, are able to compensate for their AD/HD symptoms and do not experience significant problems until high school, college, or during pursuit of their careers. The difference between adults with and without AD/HD is one of degree. "These symptoms occur among these people far more frequently than they do among the rest of us and the duration of the symptoms are so severe that they impede their progress in life," R.A. Barkley said. The results of prospective follow-up studies of children with AD/HD into adolescence and adulthood indicate significantly higher rates of grade retention, placement in special education classrooms, and dropping out of school relative to their peers (Barkley and Fischer et al., 1990). It is believed that those cases receiving timely treatment will develop fewer primary and secondary difficulties later in life.

- **ETIOLOGY**

The aetiology of AD/HD is still to be fully elucidated, but findings are consistent with a multi-factorial hypothesis.

Neurological factors

AD/HD has been considered to be a generalized impulsivity disorder that presents with deficits in multiple domains of functioning. Impulse control and performance monitoring are executive functions of the human brain (Menon et al., 2001), abilities considered critical for intelligent behaviours. Efficient impulse inhibition requires a cognitive system that is capable of inhibiting habitual responses, in order to orchestrate behavioural outputs in accordance with intentions and situational demands (Miller, 2000). The neural correlates of impulse control have been extensively studied by functional imaging technology, e.g. functional magnetic resonance imaging (fMRI) (Huettel et al., 2004) and positron emission tomography (PET) (Wong et al., 1986). The technology allows researchers unique avenues for viewing the activities of the brain regions associated with cognitive inhibition. The frontal regions, particularly the prefrontal cortex (PFC) and the anterior cingulate cortex (ACC) are found to work closely together for impulse control. Activation of the ACC is probably related to the selection among competing response alternatives (Carter et al., 1998; Pardo et al., 1990), as well as to the inhibition of previously learned rules and the self-monitoring of random errors (Amos, 2000), which is essential to the inhibition of habitual responses. Furthermore, the ACC appears to monitor signals that serve to up-regulate the processes within the PFC and to process tasks that a non-habitual response is required. Such a circuit may also exercise top-down influence for the functioning of voluntary control of behaviour and thought, self-regulation, and consciousness (Posner & Digirolamo, 1998; Posner & Rothbart, 1998). Lee et al. (2001) in their fMRI study of the neural correlates of impulse control and behavioural regulation observed that both lateral PFC and ACC were associated with the cognitive process of inhibition and response regulation. The imaging data reported thus far are consistent with evidence of the role of the prefrontal cortex (PFC) in inhibitory mechanisms comes from a number of animal and human studies (e.g. Buchkremer-Ratzmann and Witte, 1996; Malloy et al., 1993; Collette et al., 2001). They also match closely with the speculations laid by previous behavioural studies (e.g. McCarthy et al., 1997; Kirino et al., 2000). Lesion studies further confirmed that damage to the lateral PFC is associated with impaired selection of plans for behaviour. Such cases are unable to choose between possible alternatives, preferring well-practiced behaviours regardless of context (Lhermitte, 1986a, 1986b; Mesulam, 2002; Petrides and Pandya, 2002). In studies on children with AD/HD, they were found to have abnormal activation patterns during attention and inhibition tasks in the right prefrontal region, the basal ganglia (striatum and putamen), and the cerebellum (Rubia et al., 1999; Teicher et al., 2000).

Anatomically, in the largest neuroimaging study of AD/HD to date, Castellanos and colleagues (2002) reported that people with AD/HD have a reduction in volume of total brain white and grey matter, and in the caudate, frontal, temporal and cerebellar regions from an early age. Study using newer techniques such in which every volume-element of whole brain is assessed (voxel-based) has reported predominantly right hemispheric grey matter deficits in basal ganglia, superior frontal gyrus and posterior cingulate (Overmeyer et al., 2001).

Neurotransmitter dysfunction or imbalance (principally among the monoamines, including dopamine and norepinephrine) has also been postulated to occur in individuals with AD/HD based on the observations of the beneficial effects of stimulants on hyperactive (Bymaster et al., 2002; Kirley et al., 2002).

Converging neuropsychological, neuroimaging and neurochemical studies have generally implicated fronto-striatal network abnormalities as the likely cause of AD/HD.

Genetic factors

Increasing evidence also supports the view that AD/HD is at least partially familial and in part genetically mediated. Twin studies reported concordance rates for AD/HD ranged from 51% to 80% for monozygotic twins versus 29% to 33% for dizygotic twins (Gilger, Pennington, & Defries, 1992; Goodman & Stevenson, 1989; Sherman, Iacono, & McGue, 1997). Heritability estimates for individual symptom domains (hyperactivity and inattention) obtained from twin studies show a high degree of support for the influence of genes. The heritability of hyperactivity has been calculated to be between 64% and 77%, and that of attention-related behaviours to be between 76% and 98% (Goodman & Stevenson, 1989).

Newly added molecular genetic materials

Given such high heritability estimates, AD/HD is a sure target for molecular genetic studies. Since it is considered to be a complex disorder, multiple genes of mild-to-moderate effects are likely to be involved. Since 1991, there have been over 100 genetic studies, including three genome-wide scans and over 30 candidate genes studied (Bobb, Castellanos, Addington & Rapoport, 2006). Most of the candidate genes studied have been implicated through psychopharmacological, neurobiological, or animal models.

So far, relatively stronger evidence for association exists for four genes in AD/HD: *the dopamine D4 and D5 receptors, and the dopamine and serotonin transporters. Dopamine receptor D4 (DRD4) gene is the most replicated gene in the field* - its 7-repeat allele in exon 3 being found to be associated with AD/HD. The association of the 10-repeat allele in exon 15 of dopamine transporter *(DAT1)* gene with AD/HD comes second as the most replicated findings in studies. The finding that the long allele of the 44-bp insertion/deletion in the promoter region of the *serotonin transporter (5-HTT)* gene confers risk for AD/HD comes third in its replication in the field. Finally, there are also some associations found between different polymorphisms/alleles of *dopamine receptor D5 (DRD5) gene* and AD/HD, e.g., the (CA)n repeat in the 5' UTR. Meta-analyses have reported respective odds ratios of 1.9, 1.2, 1.3, and 1.2 for the four genes in association with AD/HD (Bobb et al., 2006). Other genes which show promise but require more replication are the *dopamine D2 (DRD2)* and *serotonin 2A receptors (5-HT2A)*. A meta-analysis by Faraone, Doyle, & Mick et al. (2001) showed the association between DRD4 and ADHD is real but small in magnitude.

Thus, besides high heritability estimates obtained from behavioural genetic studies with twins, there is growing evidence from molecular genetic studies that pinpoint certain genes, indicating AD/HD as a disorder with a significant genetic component.

Environmental factors

As the twin and quantitative genetic studies suggest, the environment may play some role in individual differences in symptoms of AD/HD; however, these may involve biological events as well as psychological factors.

Biological events may include prenatal, perinatal and postnatal complications and malnutrition, as well as diseases, trauma, and other neurologically compromising events that may occur during the

development of the nervous system before and after birth. Pregnancy complications, especially maternal smoking and alcohol abuse, low birth weight and associated minor brain haemorrhaging were found to have long-lasting effects on cognition and behaviour of a child, although the relative mechanisms mediating the effects of these events remain undetermined (Linnet et al. 2003; Milberger, Biederman, Faraone, Chen and Jones (1996)); However, the contribution of maternal stress and anxiety during pregnancy are arguable.

Elevated body lead burden during the first 2-3 years of child development has been shown to have a small but consistent and statistically significant relationship to the symptoms constituting AD/HD. However, even at high levels of lead, fewer than 38% of children are rated as having the behaviour of hyperactivity on a teacher rating scale (Needleman et al 1979), implying that most lead-poisoned children do not develop symptoms of AD/HD. And most children with AD/HD, likewise, do not have significantly elevated lead burdens. Studies have found the associated between body lead and symptoms of AD/HD to be 0.10 – 0.19 (Fergusson 1988, Silva 1988, Thomson 1989). These studies suggested that their lead levels explain no more than 4% of the variance in the expression of these symptoms in children with elevated lead.

Psychological factors and some environmental theories have been proposed to be the cause of AD/HD before. They included poor parental management of the children resulting in poor stimulus control and poor regulation of behaviour (Willis and Lovaas 1977); difficulties in parents' overstimulation approach to caring for and managing children as well as from parental psychological problems (Carlson 1995). However numerous twin studies conducted today have failed to show a significant contribution of rearing or common environment to the behaviours that constitute AD/HD. However, despite the large role heredity seems to play in AD/HD symptoms, they remain malleable to unique environmental influences and non-shared social learning. The actual severity of the symptoms, their continuity over development, the types of secondary symptoms and the outcome of the disorder are related in varying degrees to environmental factors (Biederman 1996, Milberger 1997, van den Oord 1997, Weiss 1993). Yet, care must be taken in interpreting these findings as evidence of a pure environmental contribution to AD/HD. It is because the genetic contribution to the family environment, the presence of symptoms and disorders in the parents similar to those evident in their children, are facts that often go overlooked. Studies on parent child interaction also showed that much of the negative behaviour of the mothers appeared to be in response to the difficult behaviour of these children, and that medication resulted in significant improvement in children's hyperactivity and compliance, followed by improvement of parenting behaviour (Barkley 1979, 1984, 1985). Taken together, these findings suggested that the overly critical, commanding and negative behaviour of mothers of hyperactive children is most likely a reaction to the difficult, disruptive, and noncompliant behaviour of these children rather than a cause of it. The disrupted parenting many also arise from the parents' own AD/HD and other psychological disorders, such as depression, anxiety, and antisocial behaviours/ personality. Studies also showed that the continuation of hyperactive behaviour over the years, especially oppositional behaviour in these children, are related in part to parents' use of commands, criticism, and an over-controlling and intrusive style of management. All these tell us that comorbid ODD/CD in children with AD/HD may in part be a result of parental management practices, it does not mean that a child's AD/HD is a result of those practices. Indeed, recent twin studies suggest that the high association of AD/HD with ODD/CD is likely to be the result of a shared genetic liability for these two disorders, with ODD/CD also being influenced by additional genetic factors (Nadder 2002). Theories of the causation of AD/HD can no longer be based solely or even primarily on social factors, such as parental characteristics, caregiving abilities, child management or other family environmental factors (Barkeley 2006).

Other environmental factors such as cultural contribution and TV viewing during early childhood contributing to symptoms of AD/HD have not been well established.

- **PREVALENCE RATE**

Over the past decades, the prevalence rates of AD/HD have increased, but they vary substantially with the changing diagnostic criteria over time. In the USA, the prevalence rate is reported to be around 3-7% in school age children (Barkley, Fischer, Edelbrock, & Smallish, 1990). Prevalence rates in other countries have been reported to be between 3% and 9.5%, roughly analogous to U.S. data (Gingerich et al., 1998). Studies of Chinese school children have reported prevalence rates of AD/HD ranging from 1.3 to 13.6% depending on the assessment instrument utilized. Based on the DSM-III diagnostic requirements, 3% of primary school children in China were said to meet the diagnosis (Tao, 1992). The disorder is more frequent in males than in females, with male-to-female ratio ranging from 2:1 to 9:1, depending on the subtype and setting.

- **DIAGNOSIS**

Early diagnosis and intervention of children with AD/HD is key to the success of management of this group of children. As AD/HD symptoms are clearly dimensional in nature, the clinician is concerned with a constellation of excessive and inappropriate symptoms that significantly interferes with child's ability to function at home, in school or with friends. Thorough diagnostic assessment and comprehensive treatment are needed to address its full range of symptomatology and associated problems. To facilitate diagnostic formulation, thorough clinical assessment is needed to gather information not only for ascertainment of the diagnosis of AD/HD, but also for differentiation of the presenting problems from other psychiatric disorders, presence/absence of other co-occurring psychiatric disorders, and identification of risk and protective factors for the child and the family. Because the definition of AD/HD is currently a behavioural one based on the individual's functioning in daily life, assessment procedures must focus on the observable behaviours as reported by adults or otherwise measured in natural (home and classroom) and clinic settings. Three areas of psychosocial impairments common in children with AD/HD—difficulties in family functioning, peer relationships and academic functioning—are predictive of negative long-term outcome and they should be treated as key assessment domains. There is as yet no single test or measure for the disorder. Screening for AD/HD is most efficiently accomplished with parent and teacher rating scales. A clinical interview is essential to assess the development and current functioning of the child. Also the assessment should obtain information about onset and rule out co-morbidities, such as dyslexia, oppositional defiant disorder, anxiety disorder and tics. The clinician should evaluate the child's functioning in key domains of peer, parent and teacher relationships, academic progress, the classroom and the family. Clinicians are likely to miss out "inattentiveness' as the primary symptom in AD/HD children. They are not "hyper" but are often sluggish and lethargic, have serious difficulties in sustaining, focusing and shifting their attention to tasks. We should recognize that some children suffer from chronic problems of inattention without any significant hyperactivity.

In sum, the diagnostic process of AD/HD is complicated in several ways. The manifestations of the symptoms vary with age of the child, situational contexts, co-occurring disorders and associated impairment. Such variability will affect the accuracy of the description of the child's behaviour by different informants. Data gathered from the diagnostic interview and behaviour rating scales are also subject to bias or error arising from the informant's mental state or beliefs about the disorder. It is important to weigh symptoms by their severity and significance, not just counting them, when

assessing impairment. The constructs of executive dysfunction and frontal lobe functioning have played prominent roles in discussions of the core deficit in AD/HD. However, reliable markers of AD/HD are yet to be demonstrated.

- **MANAGEMENT**

Aside from supporting diagnostic formulation, thorough clinical assessment can facilitate the formulation of a comprehensive treatment plan by addressing the impacts of AD/HD on a child's life (e.g., cognitive and social development, family circumstances), the child's and parent's belief about the disorder and attitude toward the treatment options, and previous treatment responses if applied. Current practice guidelines suggest a multidisciplinary approach (Hill & Taylor, 2001) in which stimulant medication is an integral part. Intervention involves the individual, family, parent and teachers. Remediation of social skills to improve interpersonal interactions, and coaching to improve organization and study skills, are also useful adjuncts to treatment. The needs of children with AD/HD are typically not addressed within one setting. One of the most crucial aspects of treatment planning is to establish alliance with the parents, the patient, and in some cases, the school, sufficiently to permit consistent implementation of specific treatment interventions across settings. Psycho- educational interventions are also of paramount importance.

Medical treatment

Medical treatment with stimulants is now considered the first-line treatment for children and adults with AD/HD based on the extensive efficacy and safety data of the stimulants (Greenhill & Osman, 1999, and the MTA cooperate group 2004). According to an American Medical Association Report, more than 170 studies involving more than 6000 children using stimulant medications for AD/HD show that stimulant medications significantly improve symptoms of AD/HD for up to 75 % of those who are treated (Swanson et al., 1993; Spencer et al, 1996).

Stimulants are sympathomimetic drugs that increase intrasynaptic catecholamines (mainly dopamine) by inhibiting the presynaptic reuptake mechanism and releasing presynaptic catecholamines. The most commonly used stimulants include methylphenidate (Ritalin, Concerta) and amphetamine (Dexedrine, Adderall). Common unwanted effects of stimulants include appetite suppression (which may lead to weight loss), mild sleep disturbance, and irritability. Long acting stimulant medication is preferred. As a result, the child only needs to take the medication once a day, which will remove the trouble of giving medications at school and reduce the stigma attached to taking medication. Children often refuse to take the medication at school because they feel being singled out.

Selective norepinephrine reuptake inhibitor (Atomoxetine) is the medication to be considered for those cases who do not response well to stimulants. Other indications include unacceptable side effects from first line drugs, presence of significant tics, severe oppositional behaviour, and the risk of substance abuse. Other medications include Tricyclic antidepressants (Imipramine, Amitriptyline, Desipramine) and α-adrenergic agonists (Clonidine, Guanfacine).

Despite the effectiveness of stimulant medications, local parents usually display a great resistance to their use. It may be due to a lack of understanding how the medication works, unrealistic fears of the side effects of medication including poor growth and drug dependence, and unfavorable reactions from other family members or other people who are providing care to the child. Hence, an important aspect of treatment for AD/HD is education of the patient, family, the school and the community about the nature of the disorder and how it can be treated.

Behavioural and emotional intervention

In behavioural modification programmes, parents, teachers and children need to learn specific skills from professionals who are experienced with the approach that can improve these children's behaviour. Intervention programmes for both parents and children should be carried out at the same time for best results. Parent training can be conducted either in groups or with individual families. Individual sessions are often implemented when a group is not available or when the family would benefit from a tailored approach that includes the child in sessions. The number of sessions varies depending on the severity of the problems (typically ranging from 6 to 16 sessions).

Typically, a mental health professional, often a psychologist, begins with a complete evaluation of the child's problems in daily life, including home, school and social settings. The evaluation would result in a list of target behaviours, i.e. behaviours in which change is desired. Target behaviours can be either negative behaviours that need to stop or new skills that need to be developed. This means that areas targeted for treatment will often not be the symptoms of AD/HD – overactivity, inattention and impulsivity – but rather specific problems that those symptoms may cause in daily life. Common target behaviours in the classroom include 'completes assigned work with 80 percent accuracy' and 'turns in an assignment on time'. At home, 'plays well with siblings (no fights)' and 'obeys parent's commands on request' are common target behaviours. After target behaviours are identified, similar behavioural interventions are implemented both at home and at school. Parents and teachers learn and establish programmes in which the environmental antecedents and consequences are modified to change the child's targeted behaviours. Treatment response is constantly monitored through careful recording and observation, and the interventions are modified when they fail to be helpful or are no longer needed. Clinical or educational psychologists, by training, are well versed in the principles and skills of behaviour modification in changing human behaviour.

Parent training programmes are important in assisting parents to develop appropriate skills to manage disruptive behaviours of their children with AD/HD. Some general principles of parenting have shown to be useful. They include provision of more frequent and immediate reinforcement, setting up of more structured guidelines in anticipation of potentially problematic situations, and provision of greater supervision and encouragement to children in relatively unrewarding or tedious situations. Studies involving preschool children with AD/HD and their families have shown that parent training can lead to increased child compliance and improvements in observed parenting skills (Anastopoulos, DuPaul, & Barkley, 1991; Pisterman, McGrath, Firestone, & Goodman, 1989).

On emotional aspects of these children, Braaten and Rosen (2000) felt that children with AD/HD appear to be less empathic than those without AD/HD. In addition, children with AD/HD appear to show more negative emotion, particularly depression, anger, and guilt, than do children without AD/HD. Since negative affects are more socially unacceptable and thereby produce more salient, long-term negative social consequences for the individual relative to the positive emotions, it is inevitable that children with AD/HD are at a particular disadvantage in their academic, emotional, and psychosocial development. Indeed, Sukhodolsky et al. (2005) suggested that impairments of school, social, and emotional functioning might be associated with AD/HD. Barkley (1990) commented that children with AD/HD constitute the greatest number of referrals to child guidance clinics in the US. Proactive services for addressing the emotional needs of AD/HD children should thus be in place.

In 2002, the World Psychiatric Association (WPA) Presidential Programme on Child Mental Health was launched to develop a comprehensive set of tools to address countries' needs for a

systematic, evidence-based approach to address child and adolescent mental health problems. An Integrated Services Programme (ISP) was set up under this Programme and developed by a task force of international experts. A treatment manual for externalizing disorders (i.e., Attention-Deficit/ Hyperactivity Disorder, Oppositional Defiant Disorder, Conduct Disorder) was developed and implemented in various countries (So et al., 2005). The manual, adapted from previous evidence-based manuals, was purposely intended to be brief, 8-12 sessions, and involve both the child and parents in treatment activities. The manual was drawn from the current literature of evidence-based interventions (Arnold et al., 1997; Barkley, 1997; So et al., 2004).

Scientific data from the last four decades indicate that stimulant medication, behaviour therapy (for the child and parents), and behaviour modification in classroom settings are evidence-based treatments for AD/HD. However, treatment effectiveness for each child is greatly impeded or facilitated by various factors including the quality of medical/psychosocial management, treatment adherence, collaboration between different professionals, and variations in the life of each child and the family. Consequently, highly specialized professionals are required to conduct thorough clinical assessment, formulate a comprehensive treatment plan, provide evidence-based treatments, and monitor treatment progress.

Educational intervention

Studies found that students with AD/HD often had persistent academic problems such as low average marks, failed grades, expulsions or dropout from school, and a low rate of graduation from college (Weiss & Hechtman as cited in Johnston, 2002; Ingersoll, 1988). A study by Barkley and colleagues (1990b) found that 46 percent of their students with AD/HD had been suspended and 11 percent had been expelled. Each of AD/HD's core symptoms—inattention, hyperactivity, and impulsivity—may be the cause of failures in school. Difficulty sustaining attention to a task may result in missing important details in assignments, daydreaming during lectures and other activities, and difficulty organizing assignments. Hyperactivity may be expressed in either verbal or physical disruptions in class. Impulsivity may lead to careless errors, responding to questions without fully formulating the answers, and only attending to activities that are entertaining or novel (Zentall, 1993). Overall, students with AD/HD experience more problems with school performance than their non-affected peers.

As a result, the classroom should be a major context in which treatment of AD/HD problem behaviours takes place. It has often been found that treatment effects established in the clinic do not transfer to other contexts, including the school. According to Barkley (2004), "treatments for AD/HD will be most helpful when they assist with the performance of a particular behaviour at the point (place and time) of performance in the natural environments where and when such behaviour should be performed." Therefore, it is only reasonable that children with AD/HD also receive treatments in their schools.

Educational interventions consist of three components: academic instruction; behavioural interventions; and classroom accommodations.

Academic instruction. Research in the past thirty years has identified a number of effective evidence-based instructional practices for helping children with AD/HD. They include both general instructional strategies and individualized instructional practices. Students with AD/HD learn best with carefully structured lessons. Effective teachers preview their expectations about what students will learn and how they should behave during the lesson. Children with AD/HD may have different ways of learning than traditional reading and listening. Effective teachers first identify areas in which

each child requires extra assistance and then use special strategies to provide structured opportunities for the child to review and master an academic lesson that was previously presented to the entire class. Strategies that may help facilitate this goal include the following: reducing noise levels, structuring classrooms formally as opposed to informally, seating students with AD/HD in front seats, and providing frequent breaks between learning tasks. Providing written instructions, breaking tasks into smaller steps, and using visual aids can be helpful. Brief directions given in a firm, calm manner with teacher proximity also maximize the extent to which students with AD/HD respond positively to the teacher. Many AD/HD students are easily distracted and have difficulty focusing attention on the tasks at hand. They need to be trained to use organization skills in managing homework and other daily assignments. Students with AD/HD often have difficulty finishing their assignments on time and need to be assisted with practice on time management skills.

Behavioural interventions. The second major component of effective educational interventions for chilren with AD/HD involves the use of *behavioural interventions.* Children with AD/HD often act immaturely and have difficulty learning how to control their impulsivity and hyperactivity. They may have difficulty thinking through the social consequences of their actions and may have problems forming friendships with other children in the class. Behavioural interventions may be used to assist students to produce behaviours that are conducive to their own learning and that of their classmates. Providing behaviour consequences, setting clear goal structures and task elements, altering antecedent task and environmental conditions, and providing modeling and additional practice have been found very useful for this purpose (Zentall, 2005). The optimal classroom is one with moderate but consistent discipline, clear expectations, frequent rewards for progress, and positive reinforcement for positive behaviour and impulse control.

Classroom accommodations. The third component of effective educational interventions for children with AD/HD involves physical *classroom accommodations.* Children with AD/HD often have difficulty adjusting to the structured environment of a classroom, determining what is important, and focusing on their assigned work. They are easily distracted by other children or by nearby activities in the classroom. As a result, many children with AD/HD benefit from accommodations that reduce distractions in the classroom environment and help them to stay on task and learn. Simple accommodations within the physical and learning environments of the classroom such as sitting close to the teacher or a role model can benefit children with AD/HD. Skilled teachers also use special instructional tools to modify the classroom learning environment and accommodate the special needs of their students with AD/HD.

Co-operation between school and home

Numerous studies have found that positive results occur when the major stakeholders in a student's education collaborate to address a child's problems (Blazer, 1999; Bos, 1999; Bos, Nahmias, & Urban, 1999; Nahmias, 1995; Williams & Carteledge, 1997). Effective collaboration and communication between home and school provide structure across the two major settings in the child's life. Common rewards, reinforcement strategies, and language help to promote consistency across settings.

Bos et al. (1999) reported that collaborative partnerships between home and school were especially important during the initial assessment of the child's disability and educational needs, the development of behaviour modification plans, the evaluations of medication, and the coordination of assignments. Parents and teachers can share information with one another if they work together to plan behavioural and academic strategies for the student. Parents can offer information about the

child—including the child's medical history, hobbies and interests, reinforcers that are effective for this child, and behaviour in other settings—that may inform the decisions made by the teacher and other members of the individualized educational planning (IEP) team. The teacher can keep parents informed about their child's progress, performance, and behaviour in school. If the child is taking medication, the teacher can offer feedback to parents on how the medication affects the student's performance and the duration of the medicine's effectiveness. This information also can be used to help medical professionals make more informed decisions about the child with AD/HD.

Multimodal treatment

The multimodal treatment of AD/HD often involves all the above medical, behavioural and educational interventions. This comprehensive approach consists of parent and child education about diagnosis and treatment, behaviour management techniques, medication, and school programming and supports. The severity and type of AD/HD may be factors in deciding which components are necessary.

The Multimodal Treatment study of children with AD/HD (MTA Cooperative Group, 1999a) was a collaboration of six independent research teams in North America. It studied 579 children (80% males), age 7 to 9.9 years in the United States and Canada, receiving treatment for 14 months. It showed that children who received medical treatment alone or combined medical and behavioural treatment demonstrated a significantly greater improvement in most AD/HD symptoms than those who just received behavioural treatment and routine community care. The behavioural component of combined treatment improved non-AD/HD symptoms such as social skills and parent-child relations, and is associated with positive functioning outcomes. Similarly, parent training (which includes positive parental attention and rewards for the child's appropriate behaviour) when combined with medication, decreased oppositional behaviour and enhanced parent-child relations more than medications alone. Overall, it seems that an approach involving pharmacological, behavioural and educational interventions with home-school partnership is currently the most efficacious and preferred treatment for the child with AD/HD. A related issue is that due to the chronic nature of AD/HD, children with AD/HD might need repeated episodes of multi-component treatment over the course of their life and that their progress should be monitored (Barkley, 1998). Whether all or some of the components of treatment will be used for a child and the family will depend on their needs at the time. A follow up of the MTA study showed that the MTA medication strategy showed persisting superiority over behavioural treatment and community care in AD/HD and ODD symptoms at 24 months follow up, although not as great as 14 months. Significant additional benefits of combined management over medication management, however, was not found (MTA Cooperate Group, 2004).

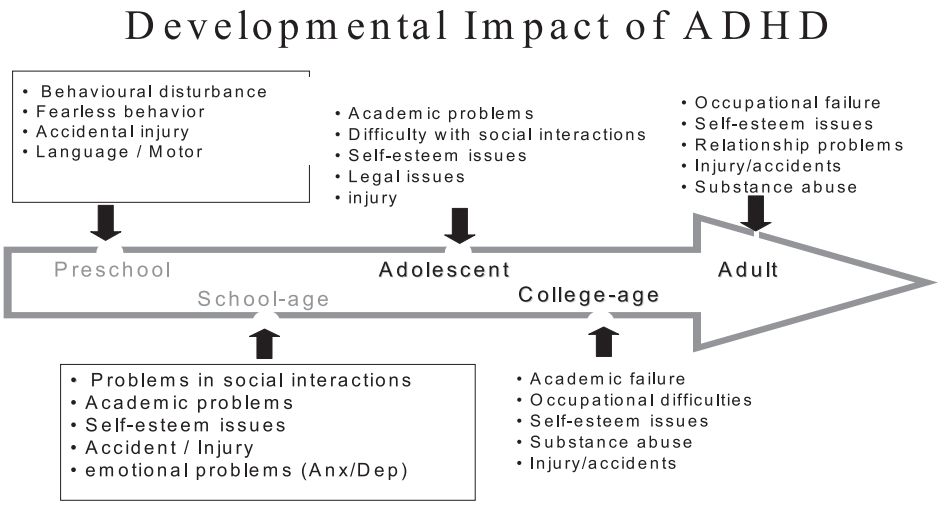
Complementary and alternative medicine

Other treatment options claim to alleviate impairments of AD/HD. In certain cases, the claim for efficacy has not received endorsement according to standards held by the scientific community. These include EEG biofeedback, megavitamins and other nutritional supplements, dietary intervention, sensory integration training, and exercise treatment. Dietary treatments include eliminating one or more foods in a patient's diet (e.g., sugar, candy and food with red dye). The concept involves sensitivity to certain foods, which in turn causes symptoms of AD/HD. Despite a few positive reports, most controlled studies do not support this hypothesis (Arnold, 2002). Nutritional supplements and large doses of vitamins, believed to be deficient in the diet, are recommended to be added to the child's intake. Scientists have yet to find support for these recommendations. Sensory integration (SI)

training is not recognized as a treatment for AD/HD. Some pediatricians and occupational therapists feel that SI dysfunction is a possible associated finding in some children with AD/HD. However, further studies have to be done to ascertain the relationship between SI dysfunction and symptoms of AD/HD. EEG biofeedback is a suggested intervention for AD/HD, based on findings that individuals with AD/HD may show low levels of arousal in frontal brain areas. In biofeedback treatment, individuals with AD/HD are taught to increase arousal levels in these regions to levels more similar to those found in those without AD/HD. Well-controlled large groups studies have yet to be done to support the effectiveness of this treatment. A programme of individualized exercises purported to improve "cerebella developmental delay" is claiming to alleviate dyslexia and attention deficit disorder. There is as yet no scientifically recognized and peer reviewed evidence to support these claims for treatment of AD/HD.

- **OUTCOME AND COSTS TO SOCIETY**

AD/HD is a complex psychiatric disorder caused by heterogeneous factors (i.e., genetic, biological, psychosocial) and complicated by various co-occurring psychiatric disorders and a range of short-term impairments and long-term sequel resulting in personal sufferings and severe cost to the society (see Figure below).



A growing body of literature, primarily published in the United States, has demonstrated that AD/HD places a substantial economic burden on cases, families, and third party payers. The economic implications included direct treatment costs, increased rates of co-morbid psychiatric disorders, high accident rates, work loss, criminality, and cost to the family (Appendix Box 3)

Results on the medical cost studies consistently indicated that children with AD/HD had higher annual medical costs than either matched controls (difference ranged from US$ 503 to $1,343) or non-matched controls (difference ranged from US$ 207 to $1,560) without AD/HD (Matza, Paramore & Prasad, 2005). The costs of AD/HD to families include financial cost of medical treatment of child, indirect costs of parents include efforts to manage the child, strain to parent child interaction and marital relationships, high parental stress (physical and mental), missed work and the implication to parents' employer. Costs of criminality include the fact that childhood AD/HD is associated with criminality in adolescence and adulthood. Children with AD/HD were found to have higher juvenile and adult arrest rates, and adolescents with AD/HD were more likely to be on probation, in jail or

assigned to a social worker by the court. The mean total criminal costs were dramatically greater for AD/HD cases than for controls ($12,868 versus $498). The costs of co-morbidities are due to the fact that children with AD/HD tend to have elevated rates of other psychiatric conditions such as oppositional defiant disorder, conduct disorder, anxiety disorder, depression and bipolar disorder, and learning disabilities. These co-morbid disorders substantially increase the costs of treating children with AD/HD. The costs of accidents are due to the fact the cases with AD/HD are more accident prone and more likely to experience injuries as a result. Among adults, the accident-specific direct medical costs were significantly higher among individuals with AD/HD than among the control group ($642 versus $ 194). In a study comparing persons with and without AD/HD, those with AD/HD were more likely to have diagnoses in multiple categories including major injuries. The proportion with any hospital inpatient, hospital outpatient, or emergency department admission was higher for persons with AD/HD, and the 9-year costs for persons with AD/HD compared with those without AD/HD were more than double ($4,306 vs $1,944) (Leibson C.L., Katusic, S.K., Barbaresi W.J., Ransom J. and O'Brien P.C. 2001). The costs of work loss in adult with AD/HD is due to poor job performance, lower occupational status, less job stability, and increased absence days when compared to control. The excess costs related to work loss (i.e. difference between adult AD/HD cases and matched controls) were $1.20 billion for women with AD/HD and $ 2.26 million for men with AD/HD (Matza, Paramore & Prasad, 2005).

In addition to the above, there are many other well-documented outcomes of AD/HD with economic implications. One example is the detrimental effects of AD/HD on a child's academic performance and behaviour in school, which place additional economic burden on the school. There may be increased need for school based supportive services, special education services, child and parent counseling, efforts to address disruptive behaviours, and efforts to develop individual educational programme. Another example involves poor driving habits of adults with AD/HD causing high rates of traffic accidents. All these economic burdens to third parties are serious and need close examination.

The research on cost effectiveness of treatment of AD/HD, primarily focused on the use of stimulant (methylphenidate), generally indicated that treatment of AD/HD is cost effective. The cost effectiveness ratios ranged from US$ 15,509 to $27,766 per quality adjusted life year (QALY) gained, an outcome measure that incorporates quality of life benefits and time (Matza, Paramore & Prasad, 2005). It indicates that effective treatments, while possibly increasing direct medical costs, are likely to reduce the overall burden of AD/HD by controlling symptoms, improving children's functioning, and substantially reduce indirect costs to families and other third parties.

II. HONG KONG SCENARIO

• PREVALENCE RATE

The prevalence rate of AD/HD in a sample of more than 3,000 schoolboys of age 6-7 years in Hong Kong was 6.1% according to DSM-III-R criteria (Leung et al 1996b). A recent survey with young adolescents in Hong Kong found largely similar prevalence estimates of 5.7% for boys and 3.2% for girls according to DSM-IV criteria. (unpublished data from Leung). These figures are generally compatible to those of Western studies using DSM diagnostic criteria of 5-10% (Swanson et al. 1998). According to statistics from the Child Assessment Service (CAS) of the Department of Health, the number of new cases diagnosed with AD/HD in years 2003 to 2006 was 186, 277, 361 and 450 respectively. Among these children, there were 6 to 8 times more boys than girls. There were a sizable number of preschool children (17-18 % of all new cases). As Hong Kong children begin attending kindergarten from around 3 years, preschool cases are often identified as being disruptive or having difficulty following classroom activities while they are in kindergarten. Around 70% of the cases have average or higher intelligence. The most common co-morbid condition was dyslexia (around 30% of cases), followed by specific language impairment (around 10%) and developmental coordination disorder (around 7%). In addition, 397, 431, 500 and 671 children were found to have attention and/or hyperactive conditions at problem level in these four years respectively. These children exhibit difficulty attending to tasks, exhibit fidgety behaviour, while not fully meeting the diagnostic criteria of AD/HD according to DSM-IV or ICD-10. About a third of these children were younger than 6 years old. Among these children, there were 3 to 4 times more boys than girls.

• LOCAL STUDIES

Validity of AD/HD in Chinese population

The following is a series of local studies in Hong Kong aiming at establishing the validity of the disorder of AD/HD in Chinese population. Is it a culture-bound disorder specific to the "permissiveness" of the Western culture? Or is it a more universal disorder with a strong biological basis? At least three criteria are required to establish the validity of a disorder: (1) a clustering of relevant symptomatic behaviours; (2) association with significant external correlates, e.g., deficits or risk factors; and (3) differentiation from other disorders, e.g., conduct disorder (CD).

A preliminary local questionnaire survey with teachers found that they complained as much inattention, hyperactivity and impulsivity in their Chinese students as their Western counterparts (Luk et al., 1988). A second large-scale epidemiological study in Hong Kong with more than 3,000 Chinese schoolboys of age 6-7 years provides more answers to the above requirements (Ho et al., 1996 a & b; Leung & Connolly, 1994, 1996, 1997, 1998; Leung et al., 1996 a & b).

First, factor analysis of the teacher and parent questionnaires confirmed the existence of an AD/HD factor, including those relevant overactive and inattentive behaviours. It was separable from an anti-social factor and a neurotic/emotional factor. This finding meets the requirement regarding the clustering of relevant symptomatic behaviours. Second, the AD/HD children, as compared to conduct-disordered and normal control children, were found to be associated with the following external correlates (i.e., deficits or risk factors): (1) a higher level of activities measured objectively by actometers or direct observation of gross body movement and gaze aversion; (2) more exposure to biological risks during pre-, peri-, and post-natal periods; (3) more histories of motor and language delays; (4) greater neurological abnormality (mainly soft signs); (5) greater impulsivity, e.g., jumping to

conclusion and disinhibition; (6) greater inattention, e.g., fewer correct target hits and longer reaction-time; (7) greater distractibility, e.g., longer reaction-time in a Stroop test; (8) a lower reading score in a standardized reading test; (9) more teacher-rated academic backwardness; and (10) in short-term half-yearly follow-ups, AD/HD found to lead to CD, but not vice versa, i.e., AD/HD being a risk factor for the development of CD, but the reverse not being true. The above pattern of deficits and associated risk factors in Chinese AD/HD children is largely similar to that of Caucasian AD/HD children. In contrast, with few exceptions, Chinese CD children failed to exhibit the above deficits and associated risk factors of AD/HD. Instead, CD in the sample of Chinese children was more associated with family disharmony and social adversity.

In sum, AD/HD as a disorder in the Chinese population meets the three criteria required for establishing it as a valid diagnostic construct. It exhibits similar deficits, associated risk factors, and differentiation from CD as in the case of AD/HD in the Western population. A commissioned commentary in *The Lancet* wrote that "Leung and colleagues have made an important contribution, by showing that one disorder, AD/HD, is not 'culture bound' and that changing our 'Western permissiveness' will not make it go away" (Anderson, 1996).

Genetic studies

To explore the biological etiology of AD/HD, a pilot genetic study was conducted with a small sample of local Chinese AD/HD children (Leung et al., 2005). In European-ancestry AD/HD children, a positive association was found between AD/HD and increased prevalence of the 7-repeat (7R) allele of a 48-bp variable number of tandem repeats (VNTR) in the exon III of the dopamine receptor D4 (*DRD4*) gene located on chromosome 11p15.5. The frequency of the 7R allele varied greatly across ethnicity and was very low in the general population of Han Chinese (0-2%). Results of this local study found that none of the Chinese AD/HD children had 7R allele. This finding matched that of a Beijing study that preceded this study and a Taiwanese study that followed it. However, our local study discovered a unique finding of an increased prevalence of 2R allele among our Han Chinese AD/HD children. A recent study on sequences of individual motifs of the *DRD4* alleles and their linkage disequilibrium (LD) with two adjacent intronic SNPs (single nucleotide polymorphism) (G/A-G/C) found in general strong LD between the A-C SNP pair and the 7R allele. However, in the Asian subsample of this study, all Asian 2R alleles examined were linked to the A-C SNP, suggesting that the 2R allele in Asians might be originated from recombinations involving the 7R allele. Biochemical analysis also demonstrated that the 7R and 2R proteins had similar biochemical functions, though the latter having somewhat a more subdued potency, in the contrast to the 4R protein. Thus, the absence of the 7R allele in our Han Chinese AD/HD children did not necessarily reject the *DRD4* hypothesis of AD/HD. Instead, the haplotype of the particular 2R allele in our Chinese AD/HD children might be derived from the 7R allele and functioned to some extent similarly as the latter. This revived a variant of the 7R allele hypothesis of AD/HD in Han Chinese. Once again, it appears that the Hong Kong Chinese AD/HD children share a genetic vulnerability that may be compatible to that of their European-ancestry counterparts.

The above genetic study (Leung et al., 2005) is based upon a case-control design, i.e., the genotypes of AD/HD probands compared to those of the population control. However methodologically, researchers are always concerned with issues of population stratification. An alternative methodologically more vigorous design is a family-based study in which the genotypes of the parents of the AD/HD probands are examined in order to identify biased transmission of the candidate allele to the probands, using the analytic procedure of Haplotype Relative Risk (HRR). The same group of AD/HD probands, recruited

in the above-noted 2005 study, was re-examined using these family-based design and HRR analytic procedure. The result re-confirmed the association between the 2R allele of the *DRD4* and AD/HD in the Han Chinese children. There was a biased transmission of the 2R allele from the parents to the AD/HD probands (Leung et al., unpublished data).

Investigation was also conducted with the dopamine transporter gene (*DAT*). No association was found between *DAT* and AD/HD in Han Chinese children (Leung et al., unpublished data).

Neuroimaging studies

A local study has been done to map brain structure in children with AD/HD using a voxel-based MRI study of regional grey and white matter volume. Twenty-eight male Hong Kong children age 6-13 years old with AD/HD and 31 closely matched controls were studied. Significant regional deficits in AD/HD were observed within a predominantly right-sided frontal-pallidal-parietal grey matter network and bilateral white matter tracts. Post-hoc comparisons suggested that comorbid ODD or CD did not greatly alter the extent of regional pathology in AD/HD. The exceptions being cerebella and striatal volume deficits, which were significantly greater in this subgroup, compared to controls. Overall, restricted structural brain abnormalities caused by AD/HD were localized to brain systems known to be necessary for attention and executive function (McAlonan, G.M., 2007).

Studies on Assessment tools

The Conners' Teacher Rating Scale (CTRS), a popular and well-established questionnaire for AD/HD, was re-validated for use in Hong Kong to screen local Chinese AD/HD children (Luk & Leung, 1989). A local norm table was also published (Luk, Leung & Lee, 1988).

Recently, the Child Behaviour Checklist (CBCL) and its two parallel offshoots, Teacher Report Form (TRF) and Youth Self-Report (YSR), had also been re-validated for use in Hong Kong for Chinese children and adolescents. However, it appeared that the parent-informant CBCL and teacher-informant TRF were better assessment tools to screen AD/HD than the self-report YSR (Leung et al., 2006).

Intervention studies

Behaviour therapy for the AD/HD children themselves and of parent training for the parents of AD/HD children were found to be effective in reducing the disruptive behaviours of Chinese AD/HD children in Hong Kong, including those AD/HD and ODD (oppositional defiant disorder) symptoms (So, 2005). These beneficial effects of psychological intervention were obtained on top of the medication treatment for AD/HD.

In support of management in the school, an enhancement of learning behaviour project for cooperation between schools, families, and community was done by the Kwai Chung Hospital and Department of Psychology of the Chinese University of Hong Kong (So, Leung and Hung 2004). Around the same time, a two-year multi-modal intervention programme and study of generalization of clinically trained behaviour of children with AD/HD to their school setting was carried out by the Hong Kong Institute of Education and Department of Psychiatry of the Queen Mary Hospital (Heung V., 2004; Heung, V.W.K., & Ho, T.P. (2003). This programme consisted of medication, clinic based parent training, child training, and consultation and liaison work with schools. Because of the

difficulties of these children have in following classroom routines, a major portion of child training in the clinic focused on developing adaptive classroom behaviour in a group format. To help children sustain and generalized learnt classroom behaviour, they were taught self-monitoring and generalization skills. The programme went further to provide training to their teachers in schools. Evaluation by the children, parents and teachers was very positive. The multi-modal programme greatly enhanced the efficacy of treatment. The skills that teachers and parents learnt have resulted in improved teaching skills and parenting skills.

In 2002-2005, Cheryl YC So of Hong Kong participated as member of the Integrated Services Programme within World Psychiatric Association (WPA) Presidential Global Programme on Child Mental Health, with World Health Organization and International Association for Child & Adolescent Psychiatry and Allied Professions. The goal was to apply research-supported treatments to routine clinical settings. Treatment manuals were developed, covering internalizing and externalizing conditions including AD/HD. Cultural adaptations to respective communities were made, and ongoing in Hong Kong (So, Bauermeister & Hung, 2005). Training modules within this programme cover stimulant medication, behavioural parent training (BPT), child training to enhance the effect of BPT, teacher training and combinations thereof.

• LOCAL SERVICES FOR CHILDREN WITH AD/HD

Related Government policies

All along AD/HD has been managed separately in medical, education and other sectors with little integration or overlap. Under the Health & Welfare Bureau's Rehabilitation Programme Plan (RPP), AD/HD is still not included as a specific category that is addressed by RPP, although its potential inclusion is a subject of intense discussion in the current 2005 RPP Review exercise. As a result, programmes to address issues that may arise over the life span of an individual with AD/HD have not been developed through shared vision and cross-sectoral efforts that have the government's participation and support. In recent years, the Education & Manpower Bureau added AD/HD to the list of special education needs (SEN) categories whereby additional funding and support may be provided to the school for identified students with AD/HD. These students' difficulties are largely managed, as general behavioural and classroom issues, and collaboration with physicians taking care of these children are uncommon. The Hong Kong Examination and Assessment Authority may provide students with AD/HD with specific accommodations in open examinations if documentation of the condition and needs are demonstrated.

Medical Services

Traditionally children and adolescents suffering from AD/HD may receive treatment from the Child and Adolescent Psychiatric settings. At present there are five regional Child and Adolescent Psychiatric teams under the Hospital Authority. The services span through tiers two to four (see 4-tier system in section on "Proposals for medical service delivery"), although the majority lies in tiers two and three. The source of new referral range widely, including physicians, psychologists, social workers, school personnel, as well as some walk-in cases in certain centres. Child and Adolescent Psychiatric teams provide tailored made multi-modal and multi-disciplinary intervention management for AD/HD cases starting off with comprehensive assessment, diagnostic formulation, followed by short- and long-term follow up treatment, support to family, care-takers & school, as well as crises intervention during the course of the illness. Consultation services to other medical professions and

the Education Manpower Bureau in the management for selected cases are also provided. The existing service also includes running of training programmes for other professionals and front-line child care workers (e.g. doctors, nurses, social workers, teachers), as well as organizing educational activities to the general public. The multi-disciplinary composition of staff includes child psychiatrists, clinical psychologists, specialized psychiatric nurses, occupational therapists, physiotherapists, medical social workers, dietitians and teachers.

The Child Assessment Service of Department of Health provides comprehensive assessment service to children with developmental problems, including issues in attention, hyperactivity, behaviour and learning. Developmental paediatricians and clinical psychologists evaluate these children. For those diagnosed with AD/HD, psycho-education will be provided and interim support in form of parenting training and medication will be provided as indicated. Liaison with the school personnel, provision of detail assessment summary to the school and advice for teacher on child handling strategies may be provided. The patient will be referred to the regional child psychiatric service for follow up, medication, training and counseling and long term management.

A significant portion of children presenting with features of AD/HD is currently managed by general paediatricians, family physicians and private psychiatrists.

Educational Services

The current policy of the government encourages students with special educational needs (SEN) to study in ordinary schools if they can benefit from the ordinary school setting. The goal of inclusive or integrated education is to help SEN students to reap the benefits of education from mixing and interacting with ordinary children in an ordinary environment.

At present, the Education and Manpower Bureau (EMB) includes AD/HD as one of the Special Educational Need (SEN) categories in the primary school service. The government will provide additional resources to the school on pro rata basis. The student guidance personnel, plus or minus the student support team, will formulate their individual plan of support to the students in their school. The supportive services could include special classroom arrangement and instruction, intensive remedial service, peer support, and behavioural management, etc. But their nature and quality are highly variable across different schools, depending on the experience of the school personnel and many other factors. The quality of these supportive services is also difficult to judge and lacks adequate monitoring. Educational psychological service provided by EMB or other outsourced agencies may give necessary support to the student guidance personnel, but these services are notorious as being very limited.

Community services and family support

Effectiveness of parenting skills is a strong predictor of how well a child with AD/HD will fare in adulthood. Behavioural parent training programmes have been used for many years and have been found to be very effective (Brestan, 1998). Although many of the ideas and techniques taught in behavioural parent training are common sense parenting techniques, most parents need careful teaching and support to learn parenting skills and use them consistently. Parental training programmes on child management skills aiming to establish consistent positive parenting practices and to eliminate harsh, excessively permissive, and inconsistent behaviour management practices have been demonstrated to be effective in increasing children's compliance with parents and improving their relationships.

In Hong Kong, they are available both in the community as provided by non-government organizations, such as the Boys' and Girls' Clubs Association of Hong Kong, the Supportive Learning Project of the Heep Hong Club and by child psychiatric services in the Hospital Authority. However, many parents may not be able to attend such training due to lack of time or determination. Since a number of these parents may also themselves have attention issues, effective implementation of learnt parenting techniques might not be possible. Research data on the effectiveness of these local programmes is sparse and much needed.

• CHALLENGES & PROPOSALS

Medical Services

Challenges

Access to service

Despite the recognized need for specialist treatment of this group of children, resources for assessment and child psychiatric services far fall behind demand. The waiting time of Child Assessment Service (CAS) ranges from 3–6 months, and that of the Child Psychiatric Services range from 9 months to 3 years for the first assessment, with a further wait of 1-2 years for subsequent treatment highly undesirable from perspective of early intervention. Around 10–12 groups of behavioural group training were held each year by all the child psychiatric services under Hospital Authority, which can only serve around 100 – 150 children with AD/HD. This must be very inadequate, with local prevalence at around 5% as cited. A significant portion of these children is treated with medication by the general community paediatricians or family physicians who may or may not have received focused training on management of cases with AD/HD. Most private practices do not have the time to implement behavioural or parenting training, nor to coordinate educational remedial services for their clients with AD/HD. In addition, communication among physicians, as well as their communication with other childcare professionals, is very limited.

Manpower

1. Paediatricians

a. Hong Kong requires a total of about 850 paediatricians (Hospital Paediatricians 220, General Paediatricians 350 and Community Paediatricians 280 (HK College of Paediatricians data). These paediatricians as quoted comprise of general senior paediatricians (70), Student Health Services (40), Family Health Services (80), child assessment and rehabilitation (80) and Clinical Genetic Service (10). There are currently 463 qualified paediatricians, with a projected deficiency of 387. **Child Neurologists:** Of a total projected requirement of 28 Child Neurologists for Hong Kong up to 2010, there are 24 trained medical doctors in this subspecialty

b. **Developmental Paediatricians:** Of a total projected requirement of 30 Developmental Paediatricians up to 2010, here are 19 trained medical doctors in this subspecialty.

2. Child psychiatrists

Manpower needs for child psychiatrists vary with the scale of service and service pledge. Hong Kong's child psychiatrists recommend the following parameters to serve as a guideline of a reasonable service for AD/HD cases, for which corresponding manpower should be planned and provided:

(a) all new referrals to child psychiatry centers should go through a triage process
(b) waiting time for urgent cases should be within 2 weeks
(c) waiting time for less urgent cases within 8 weeks
(d) waiting time for non-urgent cases within 4 months
(e) a new case interviewing session needs at least 2 hours
(f) the first 2 follow up sessions (immediately following the new case interviewing session) should be at least 45 minutes
(g) the subsequent follow up sessions should be at least 20 minutes
(h) Treatment should be multi-modal, integrating pharmacological, behavioural and school management in various combinations depending on the individual needs & the unique family environment of that particular patient
(i) Behavioural treatment programme should consist of weekly session for 6 months for both the patient and the parents/care takers, either in individual or group format plus a few phone consultations to class teachers
(j) Waiting time for behavioural treatment programme should be less than 1 month

These parameters, particularly those on waiting time upon referral, often could not be met under the current manpower situation. In many instances as described in the above section on access to services, the wait could be up to years. Many fold increase in child psychiatrists will be needed to achieve the proposed pledge, and there are few options to achieve this in the near future. With limited alternatives for many parents at this time, the wait could mean aggravation of problems for affected children at home and school, and for families, and often long term detrimental complications and negative outcomes.

3. Clinical psychologists

Based on the local prevalence rate of 3- 6 % in school aged (6 – 18 years) children, the number of children affected with AD/HD is estimated to range from 16,000 to 32,000. At present, there are about 40 clinical psychologists (from the public service and non-government organizations) who provide diagnosis and intervention for children and adolescents with a variety of mental health and developmental problems. The recommended ratio of psychologist per capita in developed countries is 1 psychologist to 3,500 child population and the projected number of psychologists required for the child population in Hong Kong is 154. Thus, the existing number of clinical psychologists who work with children falls far short of projected demand. In order to provide much needed behavioural therapy group treatment and parent training for AD/HD children, the number of clinical psychologist positions in the public service should be substantially increased.

Need for evidence based programmes

In order that services delivered are valid and cost effective, medical service providers need to gather evidence on what works for children with AD/HD and their families in Hong Kong's settings. These then will have to be disseminated to fellow service providers and trainees, such that an accountable care system can be assured.

Proposals

Service delivery and medical manpower

In response to observed inadequacies described above, a Task Force on Mental Health Services for Children in Hong Kong was established under the Joint Committee on Child Health of the Hong Kong Paediatric Society, the Department of Health of the HKSAR Government and the Hospital

Authority of Hong Kong. The Hong Kong Society of Child Neurology & Developmental Paediatrics Working Group on AD/HD was also set up in response to perceived urgent needs of affected children and families. The purposes were threefold: to ensure evidence based practices, logical and efficient division of labour among different medical personnel, and to determine manpower needs and how they might be met. An adaptation of the UK 4-Tier Service Model for Hong Kong's reference. This model was further modified by current key-players during negotiations at the forum for this position paper.

Tier One ***Non-Mental Health Professionals***

(e.g., Paediatricians, General Physicians, Nurses, Teachers, Social Workers)

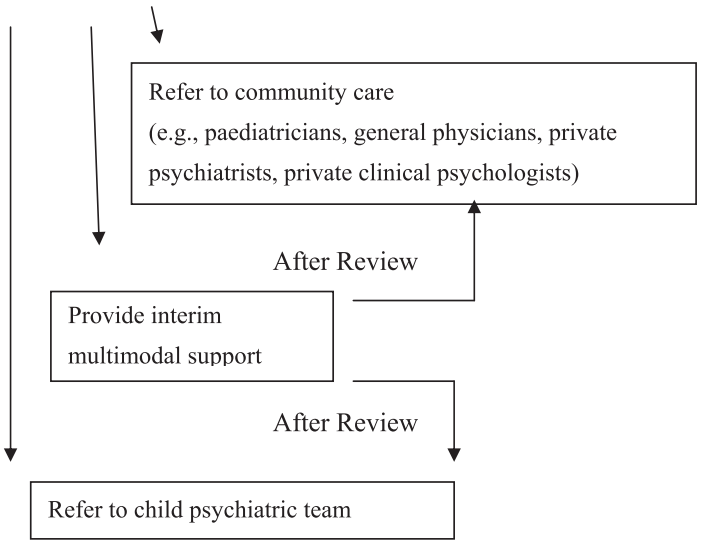
- Identify at risk children
- Rule out underlying medical conditions
- Provide parent guidance and health education
- Initiate referral to Tier Two professionals

Tier Two ***Specialized Team with AD/HD Experts***

(including Child Psychiatrists, Clinical Psychologists, Child Neurologists / Developmental Paediatricians / Paediatricians with specialized training in AD/HD)

- Conduct thorough diagnostic assessment
- Formulate a comprehensive treatment plan
- Provide public education on AD/HD
- Provide consultation and training to Tier One professionals
- Initiate management pathway as follows:

Management Pathway



Tier Three ***Child Psychiatric Team***

(including Child Psychiatrists, Clinical Psychologists, Psychiatric Nurses, Occupational Therapists, Physiotherapists, Dieticians, Teachers with training in special education, Medical Social Workers)

- Provide intensive, multi-modal treatment
- Conduct on-going assessment
- Provide consultation to Tier Two professionals
- Review progress and initiate step-down care if appropriate
- Coordinate long term care with Tier One professionals and other community care professionals

Tier Four In-patient Psychiatric Care

- Provide intensive, multi-modal management to very severe, complicated AD/HD cases

Early identification of the disorder is an important but unfulfilled step currently. Non-mental health professionals (Tier One) can play an important role in identifying at risk children and referring them to receive diagnostic assessment. A specialized team with AD/HD experts (Tier Two) should be set up to conduct proper, thorough diagnostic assessment and to formulate a comprehensive treatment plan. Considering the nature and severity of the disorder and parent's preference, children with a confirmed diagnosis of AD/HD could receive interim support (e.g., psychoeducation on AD/HD and a trial of medication) from the specialized team or they could choose to receive pertinent treatment in community settings. To address the stigmatization of the disorder and facilitate the help-seeking pathway, Tier Two professionals can play an important role in public education on AD/HD and provide training to Tier One professionals. For those AD/HD children with co-occurring psychiatric disorders, complicated psychosocial circumstances or medication resistance, they need to receive intensive, multimodal treatment which is provided by the child psychiatric teams with multidiscipline professionals (Tier Three and Tier Four). In view of its chronic/persistent nature, AD/HD requires consistent long-term case management and which could only be achieved by having seamless collaboration between different professionals.

Through this structure, it is hoped that clear indications are provided on when and where to refer children for different levels of professional care, with minimal delay in management and maintaining of seamless care. Provision of manpower in this system through training of respective professionals in the structure is essential for effective implementation of the proposal. These may be achieved through in-service strengthening of skills via continued medical education and formal postgraduate courses. Opening of necessary posts in public service (especially in child psychiatry) should be advocated for, to encourage young doctors and psychologists to go into respective fields. Through this system of shared care, it is hoped that unnecessary waiting time at bottlenecks may be alleviated, and evidence based services ensured.

Educational support

Challenges

Integrated Education

At present, AD/HD children are identified as one category of Special Educational Needs students, and receive integrated education. Although integrated education is "aimed at helping students with a disability to integrate into the mainstream as far as possible, so that they can receive an appropriate education alongside their peers," in reality AD/HD students often do not receive the full benefits of their education experience. There are several major problems.

Class size

With the present class size of 30 or more students in primary schools, many AD/HD students do not receive sufficient attention or instructional support from their teachers. AD/HD children often learn best with multi-modal instruction involving visual and audio stimulation, and motor activities, with interactive activities involving teachers and the peers, with well-structured tasks, and with frequent and specific feedback. These modes of instruction require not only an individualized

curriculum but also a lot of support from the teacher (e.g., special teaching strategies, preferential seating, and supportive technology). A big class size imposes severe constraints on what teachers can do to help AD/HD students.

Manpower

Teachers in the inclusive schools in Hong Kong are not supported by teaching assistants or paraprofessionals. The No Child Left Behind Act of the US recognizes that "properly trained paraprofessionals (teaching assistants) can play important roles in improving student achievement in Title 1 [inclusive] schools by reinforcing and augmenting a teacher's effort in the classroom." It specifies that all paraprofessionals must have "(1) completed two years of study at an institution of higher education; (2) obtained an associate's (or higher) degree; or (3) met a rigorous standard of quality and be able to demonstrate, through a formal State or local academic assessment, knowledge of and the ability to assist in instructing reading, writing, and mathematics (or, as appropriate, reading readiness, writing readiness, and mathematics readiness)." It is unfortunate that there are hardly any properly trained paraprofessionals in the staff of the schools in Hong Kong.

Insufficient teacher training

At present, teachers do not have systematic training in helping AD/HD students. Although there are some professional development opportunities available, each of these opportunities has its own shortcomings. Firstly, initial teacher education programmes do not require student teachers to take courses related to AD/HD. As a result, beginning teachers may have completed teacher training with hardly any knowledge of AD/HD. Secondly, although in-service teachers can learn about AD/HD by taking continuing professional development (CPD) courses organized by EMB or NGOs, CPD courses often lack bridging between theory and practice. Thirdly, in advanced programmes (e.g., masters programmes), there is little opportunity for supervised practice (e.g. practicum) because of cost consideration.

As a result of inadequate training, many teachers are unable to manage the disruptive behaviour or to elicit learning behaviour of AD/HD students, making the outcomes of integrated education questionable.

Proposals

Small Class Size

At present, EMB is implementing a pilot scheme of small-class teaching at the junior levels of a few primary schools. The rationale for the scheme is that small-class teaching may be most beneficial to disadvantaged students. The definition of disadvantaged students includes students of lower socio-economic status and with weak family support, but not students with special education needs in general, nor AHDH students in particular. Given that AD/HD students often produce disruptive behaviour in class, and that they could be helped with individualized instruction and specific feedback, it is only reasonable that they could also benefit from greater teacher attention afforded in small-class teaching environment.

Paraprofessionals in schools

To help teachers meet the complex demands of inclusive learning environments, the supporting roles of paraprofessionals or teaching assistants are very important (Giangreco, Edelman, Broer, & Doyle, 2001). Paraprofessionals should be trained in programmes that prepare them with knowledge

and skills directly related to the six roles of paraprofessionals identified by Pickett, Likins and Wallace (2003), which are: (1) assisting teachers with organizing learning activities and maintaining supportive environments, (2) engaging individual and small groups of learners in instructional activities developed by teachers, (3) supporting teachers in functional assessment activities, (4) documenting data about learner behaviour and performance, (5) implementing teacher-developed management and disciplinary plans, and (6) assisting teachers with involving parents in their child's education. Likins (2002) has also identified several core components of training paraprofessionals working with students of various kinds of special needs. Among these components, six areas are of particular relevance to the education of AD/HD students: (1) roles and responsibilities of paraprofessionals, (2) ethical issues for paraprofessionals, (3) behaviour management practices, (4) providing instructional support, (5) observing and recording student performance, and (6) teaming and communication skills.

Social workers in schools

Students with AD/HD may come to the attention of a school social worker first for misbehaviour in the classroom. It is very important that the school social worker has enough knowledge about AD/HD children to make referrals for medical services. Since the school social worker often serves as case manager in helping AD/HD children, he or she must be able to provide supportive services to the families of the children with AD/HD.

Beginning school social workers should be able to consider AD/HD as an underlying cause for school failures and dropouts, and to provide needy services for these children or adolescents accordingly. Experienced school social workers should be provided with continuing professional development opportunities in order to specialize in helping AD/HD children and adolescents, and their families.

Training of teachers (see section on Professional Training)

Coordinated services in schools

The services provided by teachers, paraprofessionals, educational psychologists and school social workers should be coordinated within the school and outside with the medical professionals and clinical psychologists in order to give AD/HD students the best services. A senior teacher heading the school's learning support team should be assigned by the school for such liaisons of concerned parties. Within this system, school social workers could serve as case managers to call for discussions between school, families of AD/HD students, education or clinical psychologists and medical doctors. Teachers could work with educational psychologists to develop behavioural and academic treatment plans for the AD/HD students, and provide feedback to medical professionals regarding the effects of medication and to the clinical psychologists regarding the effects of clinic-based behavioural treatments. The senior teacher coordinator could oversee smoothness and effectiveness of the collaboration, decide when case conferences are indicated, and initiate and convene such conferences. Teachers should be assisted by paraprofessionals in implementation of daily routines (e.g., taking medicine) required to take care of AD/HD students.

Support in the community

Challenges

In devising policies and services for children suffering from AD/HD, it is noteworthy that these children do not live in a vacuum. A survey of the literature shows that these children need the support

of the parents and their families. In addition, the objective as well as subjective burdens borne by the parents or caregivers of these children should also be seriously taken into account. Therefore, it is argued that a family-based approach in helping children with AD/HD and their families should be adopted (Shek & Tsang, 1993a, 1993b). Unfortunately, even with the implementation of integrated family services in Hong Kong, the gap between rehabilitation and family service is still very wide.

Relative to comparison groups, parents of children with AD/HD report more frequent and severe inter-parental discords and child-rearing disagreements, more negative parenting practices, greater parental stress and caregiver strain, and more psychopathology in them. Parenting training programmes and family supportive services gear to the needs of these parents and their family members, such as the siblings are deeply insufficient, and resources should be directed to the appropriate service providers (e.g. community service providers, integrated family service centers, child psychiatric services). According to a recent survey conducted by the Child Assessment Service on the service needs of a group of parents (93 in number) whose children have been diagnosed to have AD/HD, they were most concerned about the long waiting time for diagnosis at the regional child psychiatric centers and then the long waiting queues for behavioural group treatment. They also expressed their discontent with the lack of adequate resources and support for their children at the mainstream schools. The Hong Kong Association for AD/HD, a local association for parents of children and young people with AD/HD, has just been formed to advocate and develop necessary services and support for the affected children and their families. Their first priorities focus on setting up a supportive network for local parents of children diagnosed to have AD/HD and advocating for needed services and support for their children in the school setting and in the wider community.

Service coordination

Joint efforts in development of evidence based integrated services

All professional teams delivering support services to these children and their families should base their programmes on theoretically sound models with sound outcome evaluation components. Programmes that have been researched in Hong Kong, including those discussed in the section on "Local Intervention Studies", should be taken forward and disseminated. It is inefficient and costly when efforts are duplicated in different research projects across academic institutions and sectors. Pooling of research data and clinical experience is essential, especially in light of the urgency for needed support.

Multidisciplinary input in service delivery

Management of AD/HD involves a multidisciplinary approach, and coordination among different disciplines is of critical importance. It involves the medical doctors who provide the medication, clinical psychologists or other community childcare/ family workers who provide the child behavioural training and parent training, teachers and educational psychologists who provide the educational remediation, parents of the children, and other personnel who are involved in the care of these children. In Hong Kong, there is a lack of platform for proper communication among these disciplines. Case conferences and liaison meetings have been held between HA Child Psychiatric departments, Child Assessment Service and regional Educational Psychological services of EMB, but they are not regular activity and the number of cases that could be discussed in these meetings is very limited. Only for those very difficult cases will there be an IEP (Individualized Educational Plan) meeting held in the school involving school personnel, parents, plus or minus other professionals who are taking care of the children. Although this kind of IEP meeting is readily held in the schools in developed countries

such as USA, we are just starting to apply it in Hong Kong. Limitation of resources among public service providers such as child psychiatrists and educational psychologists has significantly hindered the time and resource that can be devoted to these coordination works. The psychological barrier of working with different professionals, service boundaries and other political reasons also hindered the communication among different professional, departments and organizations in caring of these children. For those children under the care of private service sectors, the coordination of care is even uncertain.

- **PROFESSIONAL TRAINING**
- **Training of doctors**

Current situation

Medical management of this condition as a specialty is clearly subsumed within psychiatry and developmental paediatrics, while other specialties including family medicine, internal medicine and neurology may also deal with this condition to varying degrees. The training of Hong Kong medical doctors on childhood AD/HD occurs at different stages and level of their career:

Training of Medical Undergraduates (MBBS)

These are trained under the university medical schools within the curriculum of mental health for children and are implemented as part of the integrative medical problems at the pre-clinical years and during the fourth year where undergraduates are exposed to problems of AD/HD in theory within the systemic lectures and in practical via the specialty clerks of Paediatrics and Psychiatry. There are no special modules for AD/HD as such. Exposure to AD/HD cases is very limited.

Training of Paediatricians

AD/HD is trained as part of the basic training under "Community Child Health" (currently known as training on Child Health at the Family Health Service of the Department of Health during Basic Training). Optional module of 6-month training in mental health can also be included during Higher Training period. This part of the training is under the ambit of the Hong Kong College of Paediatricians and mental health is included at the Exit Assessment for final qualifying assessment of paediatricians.

Training of Child Neurologists and Developmental Paediatricians

This is effected via guidelines produced by the Hong Kong Society of Child Neurology and Developmental Paediatrics and implemented via training units (Departments of Paediatrics) under the Hospital Authority of Hong Kong. As there are no official training programmes from the statutory body for training (the Hong Kong College of Paediatricians), training in mental health remains a professional rather than academic education. There is still no good quality control of training on the subject.

In-Service Training for Practising Paediatricians and Family Doctors

This is effected via the examination for Diploma in Child Health conducted by the Hong Kong College of Paediatricians, the courses on Diploma on Child Mental Health by the Psychiatry Department of the two universities, and the Annual Update Series on Child Health jointly organized by the Hong Kong Paediatric Society and the Hong Kong College of Paediatricians. There are also ad-hoc professional meetings on childhood mental health problems including AD/HD organized by

the Hong Kong Society of Child Neurology and Developmental Paediatrics, the Hong Kong Paediatric Society and the Hong Kong College of Paediatricians accredited as Continuing Medical Education (CME) activities. Target recipients are paediatricians and family physicians. Response to these scientific activities has been overwhelming from the professionals. There is no specific course on AD/HD as such on regular basis.

Training of Child Psychiatrist Hong Kong is very short of Child and Adolescent Psychiatrists. There is an urgent need to increase the number of Child and Adolescent Psychiatrists in Hong Kong from the current number of 15 to 25. Child and Adolescent Psychiatrists provide the leadership in the multi-disciplinary approach and provide the care for the more complex cases. By providing support to all the other mental health professionals, the management of children with AD/HD will be much more effective and efficient.

At this stage, the number of trainees for child and adolescent psychiatrists are decreasing because the trainees do not see that there is a future in the development of child and adolescent mental health services.

Summary on of Current Training on AD/HD amongst medical doctors

This is grossly inadequate with lack of comprehensive training programmes, clinical exposure, quality assurance and in-service continuing medical educational activities.

'The 2005 Survey amongst Paediatricians in Hong Kong' conducted by the Joint Committee on Child Health by the Hong Kong Paediatric Society, the Hong Kong College of Paediatricians, and the Department of Health of the HKSAR Government revealed gross deficiency in clinical training, exposure and understanding of childhood mental health problems. There was unanimous out-cry from the paediatricians for more structural training on the subject so that they are ready to face the challenges in providing better services for our children in Hong Kong.

The number of Child and Adolescent Psychiatrist are grossly inadequate in Hong Kong. This cannot be replaced by asking adult psychiatrist to see more children. Without adequate experts in this field, the training, research and services will always fall behind.

It is thus imperative that a better system for training, service, research and resources support is imminently indicated in Hong Kong so as to enable professionals to deliver quality mental health services in alignment with the high standard paediatric services which Hong Kong has always been held in the highest regards by child workers all over the world.

Proposals

Training of Medical Undergraduates

AD/HD should be included as part of the training curriculum under the specialty clerk training on "paediatrics and child health" and "psychiatry". The training should be under the ambit of basic medical training under the supervision of the medical schools.

Training of Paediatricians

AD/HD should be part of the compulsory 6-month module under "Community Child Health" (currently known as training on Child Health at the Family Health Service of the Department of Health during Basic Training). Further module of 6 to 12 months training in mental health can also be included during Higher Training period. This part of the training should be under the ambit of the Hong Kong College of Paediatricians and mental health should be part of the Exit Assessment for final qualifying assessment of paediatricians.

Training of Child Neurologists and Developmental Paediatricians

This is in the process of accreditation by the Hong Kong College of Paediatricians. Mental health should definitively be part of the compulsory module for training in both subspecialties. It should preferably consist of at least six months within the subspecialty trainings.

Training of Child and Adolescent Psychiatrist

There is an urgent need to increase the number of child and adolescent psychiatrists in Hong Kong. To do so, the number of child and adolescent psychiatrist position in the HA child and adolescent mental health services should be substantially increased. The initial target is to increase by 100%.

Training of Adult Psychiatrists

Adults with AD/HD are now recognized as not uncommon and there is an increasing need to provide services for adult with AD/HD. AD/HD often exists as co-existing conditions with other mental health conditions. Adult psychiatrist training programme should include training for the recognition and treatment of adults with AD/HD.

In-Service Training for Practising Doctors (Non psychiatrists)

1. **Training of Family Physicians and Child Health Professionals**
   This can be effected via Diploma and Certificate Courses hosted by qualified professional bodies (Hong Kong Paediatric Society, Hong Kong College of Paediatricians, Hong Kong College of Psychiatrists, Hong Kong Society for Psychiatry and others) with good accreditation, quality assurance and full accountability in training. Mental health problems should be included as part of the syllabus for the Diploma of Child Health training and examination. There should also be regular in-serve training on childhood mental health problems by local and international experts on the subject accreditable for CME/CPD activities.

2. **Training of Paediatricians**
   This can be achieved via Diploma Courses with interactive curriculum on areas of childhood mental health issues at least 40 credit hours per course with small classes (not more than 20 trainees per class), intensive exploration of clinical problems, and with continual surveillance of the training course to ensure good quality control and high standard outcome. There should also be regular CME/CPD activities on the subject to provide update knowledge, information and skills on AD/HD for paediatricians.

3. **Update Training for Child Neurologists (CN) and Developmental Paediatricians (DP)**
   There should be regular day-release course on the subject organized by the Hong Kong Society of Child Neurology and Developmental Paediatrics, the Hong Kong College of Paediatricians, the Hong Kong College of Psychiatrists to bring the most up-to-date knowledge which is essential for

quality service within the subspecialties. The CN and DP subspecialists being goal-keeper at Level Two services are obligatory to take up the mission to update themselves and to educate fellow paediatrician on AD/HD.

- **Training of Clinical psychologists**

Current situation

Training of professional clinical psychologists in Hong Kong is provided by the M.Soc.Sc. in Clinical Psychology programmes offered by both HKU and CUHK. The theoretical and clinical aspects of AD/HD are covered in courses of psychopathology and intervention. Depending on the settings of the clinical placements, some clinical psychologists-in-training have practical experience in diagnosing and treating AD/HD children. However, this is far from adequate from making the graduates having specialist knowledge on AD/HD. In this connection, seminars or workshops on the subject of AD/HD by international experts are available on an irregular basis as a form of continual professional education.

There is no formal in-service training mechanism for practicing clinical psychologists.

Proposals

Diploma or Certified Courses with interactive curricula on the diagnostic and intervention aspects of AD/HD could be jointly hosted by professional or academic bodies, such as the Division of Clinical Psychology of the Hong Kong Psychological Society, the Hong Kong College of Psychiatrists, and the universities.

Specialized attachment training programmes on AD/HD for practicing psychologists may be made available at the various psychiatric units and child assessment settings. Manpower and resources support are indicated to make these programmes viable and benefiting to a large number of interested professionals.

- **Training of Educational Psychologists**

Current situation

Training of Educational Psychologist (Professional Practice) in Hong Kong is provided by the Department of Psychology of the University of Hong Kong. The programme includes both courses and supervised practicum. Three courses in particular include AD/HD in their coverage. (1) **Psycho-Educational Assessment**: which introduces formal and informal techniques and instruments for assessment of students with special educational needs. (2) **Children with Special Needs I & II**: which covers basic concepts, diagnostic and remedial procedures for students with different educational needs. (3) **Psycho-Educational Intervention**: which introduces different approaches of interventions, some of which may be useful for training students with AD/HD. **For fieldwork placement**, some educational psychologists-in-training may have opportunities to learn under the supervision of senior educational psychologist how to provide professional consultations to teachers and parents in helping AD/HD students.

This programme admits only 20 students every two years, which is not sufficient to meet the ever-increasing demand for EP. Recently, EMB has proposed to upgrade the EP-School ratio to 1: 5 or 12 and 1: 12, for the primary and secondary sectors, respectively. But there is no specified date for this target to realize.

Proposals

AD/HD should be a mandatory component of EP programmes. In addition to course work, each student-EP should be placed in a supervised fieldwork related to identifying and helping children with AD/HD.

The EP-School ratio should be set at 1 to 5 for both primary and secondary schools, which means that there need to be more than 200 EPs. To accomplish this objective in a reasonable time frame, the universities in Hong Kong should start new EP programmes or admit more students into the existing programmes. Provision of a senior educational psychologist position should also be given to educational psychologists who specialize in helping AD/HD students.

- **Training of Teachers**

Current Situation

Initial Teacher Education

Beginning teachers in Hong Kong are trained in either Bachelor Degree (BEd or BA) or Postgraduate Diploma in Education (PGDE) programmes. Our survey found more than 50 such programmes, including distance-learning programmes. Among these, 21 have at least one course or module related to AD/HD (see Table 1). However, the course is usually a general course on inclusive education, student diversity, or special education needs, which at best may include AD/HD as one topic in the course syllabus. Furthermore, the course is usually offered as a free elective and not a required course. The implication is that graduates of these teacher education programmes may not be informed about AD/HD.

Currently, there is only one initial teaching education programmes specialized in helping special educational needs students. It is a PGDE (Major: Special Education, 2-year Part-time mode) offered by HKU. Although HKIEd offers a PGDE (Special Needs Strand, 2-year Part-time mode) and an BEd (Special Needs, 3-year Part-time mode) programmes, they are for in-service teachers who already possess a certificate in education or equivalent.

In short, the initial teacher education programmes in Hong Kong provide beginning teachers very little training related to helping AD/HD students.

Continuing Professional Development

For in-service teachers who are interested in knowing more about AD/HD, EMB invites local educational service providers to organize Continuing Professional Development (CPD) courses leading to a certificate. A notable one is organized by HKIEd, entitled "Professional Development Course for Teachers (Catering for Diverse Learning Needs)," which consists of 90 hours of training. However, most of these programmes do not provide much help for teachers to bridge the gap between theory and practice (see Table 2).

Advanced Training

Teachers who are interested in more formal and advanced training may enroll in Advanced PGDE or Masters' programmes with a specialization in Special Education Needs. The notable ones are: (1) CUHK- MA (School Guidance & Counseling) (Specialized in Special needs or Specific learning difficulties); (2) HKIEd - MEd (Specialized in Exceptional Learning Needs); and (3) HKU - MEd (Specialized in Special Education). However, only some of these programmes (e.g., CUHK, MA (School Guidance & Counseling) (Specialized in Special needs or Specific learning difficulties)) offer their students supervised practicum (see Table 2).

Informal Training

From time to time, EMB, NGOs, or extramural units of universities offer workshops or seminars related to helping AD/HD students. However, these workshops or seminars have diverse organizers and audience. To quote from a report by the National Joint Committee on Learning Disabilities of the USA (1999), these "'sit and get' sessions in which relatively passive participants were made aware of the latest ideas regarding teaching and learning from 'experts'" do not support organized and continuing development (see Table 2). The report stated further that "Today professional development must include high-quality, ongoing training that reflects a variety of approaches, with intensive follow-up and support. *NJCLD strongly believes that professional development is an ongoing process of continuous improvement that includes meaningful needs assessment, intensive informational sessions, and long term follow-up and support. It is not an event."* (NJCLD, 1999, pp.2)

Summary of current training on AD/HD amongst educators

Current teacher education programmes in Hong Kong are far from desirable in terms of training teachers to help AD/HD students. This is disappointing because we now know that, based on research evidence, there are effective evidence-based interventions or treatments that can help AD/HD students. But these interventions and treatments consist of multiple components and are not easy to execute. Teachers need be trained in order to implement them skillfully. Research in the areas of teacher professional development and special education shows that evidence-based educational approaches need to be "translated" carefully and systematically into classroom practices (Gersten and Dimino 2001, Goldenberg & Gallimore, 1991). Educational changes need to be implemented, supported and sustained in schools. Teachers are also students when they learn new teaching skills and strategies and they need scaffolding and time for continuous development. It is imperative that they are supported by a coach, or a mentor, who provides ongoing assistance to them at their schools (Gersten, Morvant, & Brengelman, 1995; Little, 1987; Hamilton & McInerny, 2000). In other words, a new model of teacher training is called for.

Proposals

Teachers should be trained to use evidence-based multi-component treatment programmes that are effective for helping AD/HD students (e.g., Miranda et. al., 2002; Barkley, 2004. Teacher training programmes should also include scaffolding support by a mentor who provides ongoing assistance to the student-teachers at their schools (Gersten, Morvant, & Brengelman, 1995; Little, 1987; Hamilton & McInerny, 2000; Shiu & Cheng, 2006). That person needs to be knowledgeable about the instructional problems and the innovative practices, and to provide specific feedback to teachers on implementation issues for an extended period of time (Gersten & Dimino, 2001). Teachers' efforts should be further supported by properly trained paraprofessionals

(i.e., teaching assistants). The current supportive service provided by student guidance personnel and educational psychologist also need further review and improvement in terms of their quality and effectiveness.

- **Training of Social Workers**

Multidisciplinary collaboration is vital to the treatment and rehabilitation of children with AD/HD. As such, different professionals should have adequate training on how to handle children with AD/HD and their families. Unfortunately, with particular reference to social work education, AD/HD is minimally covered in the existing social work training programmes in Hong Kong. In most cases, the "topic" may be covered in courses like "Human Behaviour and the Social Environment" and "Mental Disorders" with very slim coverage. Basically, under the current social work education at the undergraduate and sub-degree levels, it is not likely that the graduates will have an adequate understanding about the nature and intervention related to AD/HD. This inadequacy also applies to the postgraduate social work training programmes in Hong Kong (e.g., MSW programmes for graduates with no social work training). Furthermore, in view of the lack of evidence-based social work practice in Hong Kong (Shek, Lam & Tsoi, 2004), related elements should be injected in the AD/HD training programmes for social workers.

In-service training and certified courses with interactive curriculum jointly organized by education and social work authorities should be offered to practicing school social workers regularly. Attendance should be compulsory or strongly encouraged, with the contents of the course including skills in identification and initial assessment of students with suspected AD/HD, as well as counseling and group work skills for helping these students and their families.

- **Training of Para-professionals**

Likins (2002) points out that paraprofessional training can take many forms such as credit-based courses offered through universities or community colleges, a series of in-service workshops, peer mentoring or apprentice sessions as well as systematic on-the-job training by a supervisor. In view of the rapid development of associate degrees in Hong Kong, it is suggested that paraprofessionals be trained in such programmes. The No Child Left Behind Act of the US (2001) also requires paraprofessionals to have at least an associate degree or two years of college. In addition, workshops and short-term courses should be provided for their continuing professional development,

Time framework for professional development

In order to effect quality service on the subject of AD/HD, training at all levels of care as stipulated above should be implemented simultaneously. The professional individuals involved would include family physicians, paediatricians, child neurologists, developmental paediatricians, health professionals and others while responsible professional bodies should comprise the Hong Kong Paediatric Society, Hong Kong College of Paediatricians, Hong Kong College of Psychiatrists, the two medical schools under the universities and all tertiary institutions responsible for training of health and social work professionals. It is estimated that with dedicated effort an effective service should be ready for Hong Kong in ten years' time.

• PUBLIC EDUCATION

In its rehabilitation policies, the government of Hong Kong has indicated its recognition of the presence and special needs of children and individuals with AD/HD. The next step is to foster an accurate and scientific understanding of the condition by the general public and professionals alike. A well-informed public (including parents, child caretakers, school teachers and family workers) enables earlier detection, diagnosis and treatment of the condition. It also avoids common misunderstandings and stigmatization of AD/HD, which will perpetuate the suffering of affected children, adolescents and adults. Public education through the mass media, professional education in undergraduate as well post-graduate courses and workshop to promote acceptance and effective support are necessary.

Advocacy work is the intrinsic duty of all professionals dedicated to child health in Hong Kong. Success of work on AD/HD depends vitally on evidence-based practice, professional readiness, resource availability, social justice and governmental endorsement and support in the community. All these attributes are ready in Hong Kong and therefore professional training is essential to bring all advocacy work into fruition, and to have all visionary concepts realized into good practice.

• RESEARCH ON AD/HD

To facilitate the development and implementation of policies and services in the prevention and rehabilitation children with AD/HD, further research on the subject is important. Research on AD/HD, be it clinical or epidemiological, should be supported by academic institutions, the Hospital Authority and Department of Health. The neural basis of AD/HD and the neuroplastic/behavioural changes associated with interventions are important for understanding theoretical underpinnings of the condition. Studies for further understanding of the nature of AD/HD in the Chinese culture is necessary for understanding the ecological context within which to help these individuals and their families. Longitudinal studies including those on evolving risk-taking behaviours, antisocial behaviours, organizational and interpersonal skills would help shed light on the prognosis of this condition and relevant services needed for this group of children when they get older. Research on the prevention and early identification and intervention programmes should be funded, and evaluation of intervention programmes conducted. Valid, standardized, local screening and assessment instruments for different age groups also need be developed. Unfortunately, the existing literature suggests that related social research on AD/HD in the Chinese culture is far from satisfactory (Shek, 1995; Shek, 2002, Shek, Chan & Lee, 2005), and further efforts on this are essential to ensure that services could be culturally competent to the populations addressed.

• CONCLUSION

Movement forward hinges on the cooperation and input from multiple sectors and multiple levels, including public services, academic institutes, non-government organizations and natural community support systems. Upon this platform of collaboration there needs to be effective programmes supported by evidence and delivered through partnerships with families and interdisciplinary processes including effective triage mechanisms and transitions between levels of care and services, as well as consultative support between the service providers. All these should furthermore be guided by an understanding of the cultural and ecological context of Hong Kong, by professional and administrative accountability, quality improvement activities and advocacy. It is hoped that the work of this working group on AD/HD will provide a small enhancement to the momentum of work towards serving Hong Kong children with AD/HD.

Reference

1. American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed. Text Revision). Washington, DC: American Psychiatric Association.
2. Amos A. (2000). A computational model of information processing in the frontal cortex and basal ganglia. Journal of Cognitive Neuroscience, 12, 505-519.
3. Anastopoulos, A. D., DuPaul, G. J., & Barkley, R. A. (1991). Stimulant medication and parent training therapies for attention deficit-hyperactivity disorder. Journal of Learning Disabilities, 24(4), 210-218.
4. Anderson, J.C. (1996). Is childhood hyperactivity the product of Western culture? The Lancet, 348, 73-74.
5. Arnold, L.E. (2002). "Treatment Alternatives for Attention Deficit Hyperactivity Disorder." In Attention Deficit Hyperactivity Disorder: State of the Science -- Best Practices, ed. P.S. Jensen and J.R. Cooper. Kingston, N.J.: Civic Research Institute. 13:1-29.
6. Arnold L.E., Abikoff H.B., Cantwell D.P., Conners C.K., Elliott G.R., Greenhill L.L., Hechtman L., Hinshaw S.P., Hoza B., Jensen P.S., Kraemer H.C., March J.S., Newcorn J.H., Pelham W.E., Richters J.E., Schiller E.P., Severe J.B., Swanson J.M., Vereen D., Wells K.C. (1997). National Institute of Mental Health Collaborative Multimodal Treatment Study of Children with AD/HD (the MTA). Design challenges and choices. Archives of General Psychiatry, 54(9), 865-70.
7. Barkley, R. A. (1990b). Comprehensive evaluation of attention deficit disorder with and without hyperactivity as defined by research criteria. Journal of Consulting and Clinical Psychology, 58, 775-789.
8. Barkley, R. A., & Cunningham, C. E. (1979). The effects of methylphenidate on the mother-child interactions of hyperactive children. Archives of General Psychiatry, 36, 201-208.
9. Barkley, R. A., Karlsson, J., Pollard, S. & Murphy, J. V. (1985). Developmental changes in the mother-child interactions of hyperactive boys: Effects of two dose levels of Ritalin. Journal of Child Psychology and psychiatry, 26, 705-715.
10. Barkley, R. A. Karlsson, J., Strzelecki, E., & Murphy, J. (1984). The effects of age and Ritalin dosage on the mother-child interactions of hyperactive children. Journal of Consulting and Clinical Psychology, 52, 750-758.
11. Barkley, R. A., Fischer, M., Edelbrock, C. S., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective study. Journal of the American Academy of Child and Adolescent Psychiatry, 29, 546-557.
12. Barkley R.A. Defiant Children (1997): A Clinician's Manual for Assessment and Parent Training. 2nd Ed. New York: Guilford Publications.
13. Barkley, R.A. (1998). Attention deficit-hyperactivity disorder. In E. J. Mash & R. A. Barkley (Eds.), Treatment of childhood disorders (2nd ed., p. 55-110). New York: Guilford Press.
14. Barkley, R.A. (2004). Adolescents with Attention-Deficit/Hyperactivity Disorder: An overview of empirically based treatments. Journal of Psychiatric Practice, 10, 39-56.
15. Barkley, R.A. (2006). Attention Deficit hyperactivity disorder. A handbook for diagnosis and treatment. 3rd addition. Chapter 5, p. 219 – 247. The Guilford Press. New York. London.
16. Baving, L., Laucht, M., & Schmidt, M. H. (1999). Atypical frontal brain activation in AD/HD: preschool and elementary school boys and girls. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 1363-1371.
17. Biederman, J., Faraone, S., Milberger, S., Curtis, S., Chen, L., Marrs, A., et al. (1996). Predictors of persistence and remission of AD/HD into adolescence: Results from a four-year prospective follow-up study. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 343-351.
18. Blazer, B. (1999). Developing 504 classroom accommodation plans: A collaborative systematic parent-student-teacher approach. Teaching Exceptional Children, 32, 28-33.
19. Bos, C. S. (1999). Home school communication. In C. Jones, H. R. Searight, & M. A. Urban (Eds.), Parent Articles for ADHD. San Antonio, TX: Communication Skill Builders.
20. Bos, C. S., Nahmias, M. L., & Urban, M. A. (1999). Targeting home-school collaboration for students with ADHD. Teaching Exceptional Children, 31, 4-11.
21. Bobb A.J., Castellanos F.X., Addington A.M., Rapoport J.L. (2006). Molecular genetic studies of AD/HD: 1991 to 2004. American Journal of Medical Genetics Part B (Neuropsychiatric Genetics) 141B, 551-565.
22. Braaten E.B., Rosen L.A. (2000). Self-regulation of affect in attention deficit hyperactivity disorder (AD/HD) and non-AD/HD boys: Differences in empathic responding. Journal of Consulting and Clinical Psychology, 68, 313-321.
23. Brestan, E.V., & Eyberg, S.M. (1998). Effective psychosocial treatment of conduct-disordered children and adolescents: 29 years, 82 studies, and 5272 kids. Journal of Clinical Child Psychology, 27, 180-189
24. Buchkremer-Ratzmann I., Witte O.W. (1996) Extended brain disinhibition following small photothrombotic lesions in rat frontal cortex. NeuroReport 8, 519-522.
25. Bymaster, F. P., Katner, J. S., Nelson, D. L., Hemrick-Luecke, S. K., Threlkeld, P. G., Heligenstein, J. H., et al. (2002). Atomoxetine increase extracellular levels of norepinephrine and dopamine in prefrontal cortex of rat: a potential mechanism for efficacy in attention deficit/hyperactivity disorder. Neuropsychopharmacology, 27, 399-711.

26. Carlson, E. A., Jacobvitz, D., & Sroufe, L. A. (1995). A developmental investigation of inattentiveness and hyperactivity. Child Development, 66, 37-54.
27. Carter C.S., Braver T.S., Barch D.M., Botvinick M.M., Noll D.C., Cohen J.D. (1998) Anterior cingulate cortex, error detection, and the online monitoring of performance. Science 280, 747-749.
28. Castellanos, F. X., Lee, P. P., Sharp, W., Jeffries, N. O., Greenstein, D. K., Clasen, L. S., et al. (2002). Developmental trajectories of brain volume abnormalities in children and adolescents with attention-deficit/hyperactivity disorder. Journal of the American Medical Association, 288, 1740-1748.
29. Collette F., Van der Linden M., Delfiore G., Degueldre C., Luxen A., Salmon E. (2001). The functional anatomy of inhibition process investigated with the Haylingtask. NeuroImage 14: 258-267, doi:10.1006/nimg.2001.0846.
30. Dempster F.N. (1992). The rise and fall of the inhibitory mechanism: Toward a unified theory of cognitive development and aging. Dev. Rev. 12, 45-75.
31. Dulcan, M. K., & Benson, R. S. (1997). Summary of the practice parameters for the assessment and treatment of children, adolescents and adults with AD/HD. Journal of the American Academy of Child and Adolescent Psychiatry, 36(9), 1311-1317.
32. EMB-Whole School Approach to Cater for Students' Diverse Learning Needs, http://www.emb.gov.hk/index.aspx?nodeID=181&langno=1
33. Faraone S.V., Doyle A.E., Mick E., & Biederman J. (2001). Meta-analysis of the association between the 7-repeat of the dopamine D(4) receptor gene and attention deficit hyperactivity disorder. American Journal of Psychiatry, 158, 1052-1057.
34. Fergusson, D. M., Fergusson, I. E., Horwood, L., J., & Kinzett, N. G. (1988). A longitudinal; study of dentine lead levels, intelligence, school performance, and behaviour. Journal of Child Psychology and Psychiatry, 29, 811-824.
35. Gersten, R., & Dimino, J. (2001). The realities of translating research into classroom practice. Learning Disabilities Research & Practice, 16, 120-130.
36. Gersten, R., Morvant, M., & Brengelman, S. (1995). Close to the classroom is close to the bone: Coaching as a means to translate research into classroom practice. Exceptional Children, 62, 52-66.
37. Giangreco, M. F., Edelman, S. W., Broer, S. M., & Doyle, M., B. (2001). Paraprofessional support of students with disabilities: Literature from the past decade. Exceptional Children, 68(1), 45-63.
38. Gilger, J. W., Pennington, B. F., & Defries, J. C. (1992). A twin study of the etiology of comorbidity: attention deficit hyperactivity disorder and dyslexia. Journal of the American Academy of Child and Adolescent Psychiatry, 31, 343-348.
39. Gingerich, K. J., Turnock, P., Litfin, J. K., & Rosen, L. A. (1998). Diversity and attention deficit hyperactivity disorder. Journal of Clinical Psychology, 54, 415-426.
40. Goldenberg, C., & Gallimore, R. (1991). Changing teaching takes more than one-shot workshop. Educational Leadership, 49 (3), 69-72.
41. Goldman-Rakic P.S. (1987). Circuitry of primate prefrontal cortex and regulation of behaviour by representational memory. In: Plum F, editor. Handbook of physiology. Section 1, The nervous system. 2nd ed, vol 5 pt. 1–2.
42. Goodman, J. R., & Stevenson, J. (1989). A twin study of hyperactivity: II. the aetiological role of genes, family relationships, and perinatal adversity. Journal of Child Psychology and Psychiatry, 30, 691-709.
43. Greenhill, L., & Osman, B. (1999). Ritalin: Theory and Practice. New York: Mary Ann Liebert.
44. Hamilton, J. L., & McInerny, M. (2000). Reforming schools in an era of increased accountability: A professional development model. Session conducted at the Council for Exceptional Children Annual Convention and Expo. Vancouver, B.C.
45. Heung, V.W.K., & Ho, T.P. (2003). Children with attention deficit hyperactivity disorder. Hong Kong: CSNSIE, HKIEd.
46. Heung, V. (2004). A multi-modal approach for reintegrating students with Attention Deficit Hyperactivity Disorder. In Zaman, S.S., Banu, S., Khan, N.Z., Munir, S.Z., Ferdous, S.(eds). Creating barrier free incusive community and rights based society for children with disability. Proceedings of the Second Regional Seminar on Childhood Disability (pp.110-122). Bangladesh: Bangladesh Protibondhi Foundation.
47. Hill, P., & Taylor, E. (2001). An auditable protocol for treating attention deficit/hyperactivity disorder. Disease in Childhood, 84(5), 404-409.
48. Ho, T.P., Luk, S.L., Leung, P.W.L., Taylor, E., Lieh Mak, F. & Bacon-Shone, J. (1996a). Situational versus pervasive hyperactivity in a community sample. Psychological Medicine, 26, 309-321.
49. Ho, T.P., Leung, P.W.L., Luk, S.L., Taylor, E., Bacon-Shone, J. & Lieh Mak, F. (1996b). Establishing the constructs of childhood behavioural disturbances in a Chinese population. Journal of Abnormal Child Psychology, 24, 417-431
50. Huettel S.A., Misiurek J., Jurkowski A.J., McCarthy G. (2004). Dynamic and strategic aspects of executive processing. Brain Res, 1000, 78-84.

51. ngersoll, B. (1988). Your Hyperactive Child. New York: Doubleday.
52. Johnston, C. (2002). The impact of attention deficit hyperactivity disorder on social and vocational functioning in adults. In P.S. Jensen and J.R. Cooper (Eds.), Attention Deficit Hyperactivity Disorder: State of the Science, Best Practices. (Chapter 6, p 1-21). Kingston, NJ: Civic Research Institute.
53. Kirino E., Belger A., Goldman-Rakic P., McCarthy G. (2000). Prefrontal activation evoked by infrequent target and novel stimuli in a visual target detection task: An event-related functional magnetic resonance imaging study. Journal of Neuroscience. 20: 6612-6618.
54. Kirley, A., Hawi, Z., Daly, G., McCarron, M., Mullins, C., Millar, N., et al. (2002). Dopaminergic system genes in AD/HD: toward a biological hypothesis. Neuropsychopharmacology, 27, 607-619.
55. Lee T.M.C., Liu H.L. Feng C.M., Hou J., Mahankali S., Fox P.T., Gao J.H. (2001). Neural correlates of response inhibition for behavioural regulation in humans assessed by functional magnetic resonance imaging. Neuroscience Letters, 309, 109-112.
56. Leibson C.L., Katusic S.K., Barbaresi W.J., Ransom J., O'Brien P.C. (2001). Use and costs of medical are for children and adolescents with and without attention-deficit/hyperactivity disorder. The Journal of the American Medical Association, 285(1), 60-6, 2001 Jan 3.
57. Leung, P.W.L. & Connolly, K.J. (1994). Attentional difficulties in hyperactive and conduct-disordered children: a processing deficit. Journal of Child Psychology and Psychiatry, 35, 1229-1245.
58. Leung, P.W.L. & Connolly, K.J. (1996). Distractibility in hyperactive and conduct-disordered children. Journal of Child Psychology and Psychiatry, 37, 305-312.
59. Leung, P.W.L. & Connolly, K.J. (1997). Test of two views of impulsivity in hyperactive and conduct-disordered children. Developmental Medicine & Child Neurology, 39, 574-582.
60. Leung, P.W.L. & Connolly, K.J. (1998). Do hyperactive children have motor organization and/or execution deficits? Developmental Medicine & Child Neurology, 40, 600-607.
61. Leung, P.W.L., Ho, T.P., Luk, S.L., Taylor, E., Bacon-Shone, J. & Lieh Mak, F. (1996a). Separation and comorbidity of hyperactivity and conduct disturbance in Chinese Schoolboys. Journal of Child Psychology and Psychiatry, 37, 841-853
62. Leung, P.W.L., Luk, S.L., Ho, T.P., Taylor, E., Lieh Mak, F. & Bacon-Shone, J. (1996b). The diagnosis and prevalence of hyperactivity in Chinese schoolboys. British Journal of Psychiatry, 168, 486-496.
63. Leung, P.W.L., Kwong, S.L., Tang, C.P., Ho, T.P., Hung, S.F., Lee, C.C., Hong, S.L., Chiu, C.M., & Liu, W.S. (2006). Test-retest reliability and criterion validity of the Chinese version of CBCL, TRF, and YSR. Journal of Child Psychology and Psychiatry, 47, 970-973.
64. Leung, P.W.L., Lee, C.C., Hung, S.F., Ho, T.P., Tang, C.P., Kwong, S.L., Leung, S.Y., Yuen, S.T., Lieh-Mak, F., Oosterlaan, J., Grady, D., Harxhi, A., Ding, Y.C., Chi, H.C., Flodman, P., Schuck, S., Spence, M.A., Moyzis, R., & Swanson, J. (2005). The dopamine receptor D4 (DRD4) gene in Han Chinese children with attention-deficit/hyperactivity disorder (AD/HD): Increased prevalence of the 2-repeat allele. American Journal of Medical Genetics (Neuropsychiatric Genetics), 133B, 54-56.
65. Lhermitte F (1986a): Human autonomy and the frontal lobes: Part I. Patient behavior in complex and social situations: The "environmental dependency syndrome". Annals of Neurology; 19, 326-334.
66. Lhermitte F (1986b). Human autonomy and the frontal lobes: Part II. Patient behaviour in complex and social situations: the "environmental dependency syndrome." Annals of Neurology; 19: 335-343.
67. Likins (2002). Effective training for paraprofessionals. Impact: Feature Issue on Paraeducators Supporting Students with Disabilities and At-Risk, 15(2) [online]. Minneapolis: University of Minnesota, Institute on Community Integration. Available from http://ici.umn.edu/products/impact/152.
68. Linnet, K. M., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen, T. B., Rodriquez, A., et al. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviours: Review of the current literature. American Journal of Psychiatry, 160, 1028-1040.
69. Little, J. W., (1987). Teachers as colleagues. In V. Koehler (Ed.), Educator's handbook: Perspective from research. New York: Longman.
70. Luk, S.L. & Leung, P.W.L. (1989). Conners' Teacher Rating Scale - a validity study in Hong Kong. Journal of Child Psychology and Psychiatry, 30, 785-793.
71. Luk, S.L., Leung, P.W.L. & Lee, P.L.M. (1988). Conners' Teacher Rating Scale in Chinese children in Hong Kong. Journal of Child Psychology and Psychiatry, 29, 165-174.
72. Malloy P., Bihrlr A., Duffy J. (1993). The orbitomedial frontal syndrome. Archives of Clinical Neuropsychology 8, 185-201.
73. Martin, G., & Pear, J. (2006). Behaviour modification, 7th Ed. Upper Saddle River, N.J. : Pearson/Prentice Hall.
74. Matza L., Paramore C., and Prasad M. (2005). A review of the economic burden of AD/HD. Cost Effectiveness and Resource Allocation 2005, 3:5 doi:10.1186/1478-7547-3-5
75. McAlonan, G.M., Cheung, V., Cheung, C., Chua, S.E, Murphy, D.G.M., Suckling, J., Tai, K.S., Yip, L.K.C, Leung, P.W.L., & Ho, T.P. (2007). Mapping brain structure in AD/HD: A voxel-based MRI study of regional grey and white matter volume. Psychiatric Research: Neuroimaging, 154, 171-180.
76. McCarthy G., Luby M., Gore J., Goldman-Rakic P. (1997). Infrequent events transiently activate human prefrontal and parietal cortex as measured by functional MRI. Journal of Neurophysiology, 77, 1630-1634.

77. Menon V., Adleman N.E., White C.D., Glover G.H., Reiss A.L. (2001). Error related brain activation during a go/nogo response inhibition task. Human Brain Mapping, 12, 131-143.
78. Mesulam M.M. (2002) The human frontal lobes: transcending the default mode through contingent encoding. In: DT Stuss, Knight RT (eds), Principles of frontal lobe function. New York: Oxford University Press
79. Milberger, S., Biederman, J., Faraone, S. V., Chen, L., & Jones, J. (1996). Is maternal smoking during pregnancy a risk factor for attention deficit hyperactivity disorder in children? American Journal of Psychiatry, 153, 1138-1142.
80. Milberger, S., Biederman, J., Faraone, S. V., Guite, J., & Tsuang, M.T. (1997). Pregnancy, delivery, and infancy complications and attention deficit disorder: Issues of gene-environment interaction. Biological Psychiatry, 41, 65-75.
81. Miller E.K. (2000). The prefrontal cortex and cognitive control. Nature Review Neuroscience, 1, 59-65.
82. Miranda, A., Presentacion, M. J., & Soriano, M. (2002). Effectiveness of a school-based multicomponent programme for the treatment of children of AD/HD. Journal of Learning Disabilities, 35, 546-562.
83. MTA Cooperative Group (1999a). A 14 month randomized clinical trial of treatment strategies for attention deficit hyperactivity disorder: multimodal treatment study of children with AD/HD. Archives of General Psychiatry, 56(12), 1073-1086.
84. MTA Cooperate Group (2004). NIMH Multimodal treatment of AD/HD follow up: 24-month outcome of treatment strategies for AD/HD. Paediatrics, 113, 754 – 761.
85. Nadder, T. S., Rutter, M., Silberg, J. L., Maes, H. H., & Eaves, L. J., (2002). Genetic effects on the variation and covariation of attention-deficit hyperactivity disorder (AD/HD) and oppositional-defiant disorder/conduct disorder (ODD/CD) symptomatologies across informant and occasion of measurement. Psychological Medicine, 32, 39-53.
86. Nahmias, M. L. (1995). Communication and collaboration between home and school for students with ADHD. Intervention in School and Clinic, 30, 241-247.
87. National Joint Committee on Learning Disabilities (1999). Professional development for teachers.
88. Needleman, H. L., Gunnoe, C., Leviton, A., Reed, R., Peresie, H., Maher, C., et al. (1979). Deficits in psychologic and classroom performance of children with elevated dentine lead levels. New England Journal of Medicine, 300, 689-695.
89. No Child Left Behind Act of 2001, PL 107-110, 115 Stat. 1425, 20 U.S.C. §§ 601 et seq.
90. Overmeyer, S., Bullmore, E.T., Suckling, J., Simmons, A., Williams, S.C.R., Santosh, P.J., Taylor, E. (2001). Distributed grey and white matter deficits in hyperkinetic disorder: MRI evidence for anatomical abnormality in an attentional network. Psychological Medicine 31, 1425-1435.
91. Pardo J.V., Pardo P.J., Janer K.W., Raichle M.E. (1990). The anterior cingulated cortex mediates processing selection in the stroop attentional conflict paradigm. Proceeding of National Academy of Science, 87, 256-259.
92. Petrides M., Pandya D.N. (1999) Dorsolateral prefrontal cortex: comparative cytoarchitectonic analysis in the human and the macaque brain and corticocortical connection patterns. European Journal of Neuroscience, 11, 1011-1036.
93. Petrides M., Pandya D.N. (2002): Association pathways of the prefrontal cortex and functional observations. In DT Stuss, RT Knight (Eds.), Principles of frontal lobe function. New York: Oxford University Press, 31-50.
94. Pickett, A. L., Likins, M., & Wallace, T. (2003). The employment and preparation of paraeducators: The state-of-the-art 2003. New York: City University of New York, National Resource Centre for Paraprofessionals in Education and Related Human Services, Centre for Advanced Study in Education. (ERIC document ED473398)
95. Posner M.I., Digirolamo G.J. (1998). Executive attention: conflict, target detection, and cognitive control. In: Parasuraman R (ed), The attentive brain. Cambridge, MA: MIT Press; 401-424.
96. Posner MI, Rothbart MK (1998). Attention, self regulation and consciousness. Philosophical Transactions of the Royal Society of London B; 353: 1915-1927.
97. Pisterman, S., McGrath, P. J., Firestone, P., & Goodman, J. T. (1989). Outcome of parent-mediated treatment of preschoolers with attention deficit disorder with hyperactivity. Journal of Consulting and Clinical Psychology, 57(5), 628-635.
98. Rubia K., Overmeyer S.O., Taylor E., Brammer M., Williams S., Simmons A., et al (1999) Hypofrontality in attention deficit hyperactivity disorder during higher order motor control: a study with fMRI. American Journal of Psychiatry ;156(6), 891–6.
99. Shek, D.T.L. (1995). Mental health of Chinese adolescents in different Chinese societies. International Journal of Adolescent Medicine and Health, 8(2), 117-155.
100. Shek, D.T.L. (Ed.). (2002). Special Issue: Research on social work practice in Chinese communities. Research on Social Work Practice, 12(4), 485-581. London: Sage Publications.
101. Shek, D.T.L., Chan, Y.K., & Lee, P. (Eds.). (2005). Social Indicators Research Series (vol. 25): Quality of life research in Chinese, Western and global contexts. The Netherlands: Springer.
102. Shek, D.T.L., Lam, M.C., & Tsoi, K.W. (2004). Evidence-based social work practice in Hong Kong. In B. Thyer and M. Kazi (Eds.), International perspectives on evidence-based practice in social work (pp.213-222). London: Venture Press.

103. Shek, D.T.L., & Tsang, S.K.M. (1993a). Care-givers of preschool mentally handicapped children in Hong Kong: Their stress, coping resources, and psychological well-being. Hong Kong: Heep Hong Society for Handicapped Children.
104. Shek, D.T.L., & Tsang, S.K.M. (1993b). Coping responses of Chinese parents with preschool mentally handicapped children. Social Behaviour and Personality, 21(4), 303-312.
105. Sherman, D. K., Iacono, W. G., & McGue, M. K. (1997). Attention-deficit hyperactivity disorder dimensions: a twin study of inattention and impulsivity-hyperactivity. Journal of the American Academy of Child and Adolescent Psychiatry, 36, 745-753.
106. Shiu, L. P., & Cheng, P. W. (2006). Towards a model of training teachers of AD/HD students. Paper presented at the Annual Meeting of the Hong Kong Society of Child Neurology and Developmental Paediatrics, November 10-13, Hong Kong.
107. Silva, P. A., Hughes, P., Williams, S., & Faed, J. M. (1988). Blood lead, intelligence, reading attainment, and behaviour in eleven year old children in Dunedin, New Zealand. Journal of Child Psychology and Psychiatry 29, 43-52.
108. So C.Y.C., Bauermeister, J.J., Hung, J.S.F. (2005) The Integrated Services Programme Task Force. Helping Challenging Children: Treatment Manual. World Psychiatric Association.
109. So C.Y.C., Leung, P.W.L., Hung J.S.F. (2004). Enhancement of Learning Behaviour Project: Cooperation Between Schools, Families, and Community. 2nd Ed. Hong Kong: Kwai Chung Hospital and Department of Psychology, The Chinese University of Hong Kong.
110. Spencer, T., Biederman, J., Wilens, T., Harding, M. et al (1996). Pharmacotherapy of attention-deficit hyperactivity disorder across the life cycle. Journal of the American Academy of Child & Adolescent Psychiatry, 35(4), 409-432.
111. Sukhodolsky D.G., do Rosario-Campos M.C., Scahill L., Katsov L. (2005). Adaptive, emotional, and family functioning of children with obsessive-compulsive disorder and comorbid attention deficit hyperactivity disorder. American Journal of Psychiatry, 162, 1125-1132.
112. Swanson, J. M., McBurnett, K., Wigal, T., Pfiffner, L. J., Lerner, M. A., Williams, L., et al. (1993). Effect of stimulant medication on children with attention deficit disorder: a "review of reviews". Exceptional Children, 60, 154-162.
113. Swanson, J., Sergeant, J., Taylor, E., et al. (1998). Attention-deficit hyperactivity disorder and hyperkinetic disorder. The Lancet, 351, 429-433.
114. Szatmari, P., Offord, D. R., & Boyle, M. H. (1989). Ontario Child Health Study: Prevalence of attention deficit hyperactivity disorder with hyperactivity. Journal of Child Psychology and Psychiatry, 30, 219-230.
115. Tao, K. (1992). Hyperactivity and attention deficit disorder syndromes in China. Journal of the American Academy of Child and Adolescent Psychiatry, 31, 1165-1166.
116. Teicher M.H., Anderson C.M., Polcari A., Glod C.A., Maas L.C., Renshaw P.F. (2000): Functional deficits in basal ganglia of children with attention-deficit/hyperactivity disorder shown with functional magnetic resonance imaging relaxometry. Nature Mediciine, 6, 470–473.
117. Thomson, G. O. B., Raab, G. M., Hepburn, W. S., Hunter, R., Fulton, M., & Laxen, D. P. H., (1989). Blood-lead levels and children's behaviour: Results from the Edinburgh lead study. Journal of Child Psychology and Psychiatry, 30, 515-528.
118. Van den Oord, E. J. C., & Rowe, D. C. (1997). Continuity and change in children's social maladjustment: A developmental behaviour genetic study. Developmental Psychology, 33, 319-332.
119. Voygotsky, L. (1978). Mind in society. Cambridge, MA: Harvard University Press.
120. World Health Organization. (1996). Multiaxial classification of child and adolescent psychiatric disorders. Cambridge: Cambridge University Press.
121. Weiss, G., & Hechtman, L., (1993). Hyperactive children grown up (2nd ed.). New York: Guilford Press.
122. Welner, Z., Welner, A., Stewart, M., Palkes, H., & Wish, E.(1997). A controlled study of siblings of hyperactive children. Journal of Nervous and Mental Disease, 165, 110-117.
123. Willis, T. J., & Lovaas, I. (1977). A behavioural approach to treating hyperactive children: The parent's role. In J. B. Millichap (Ed.), Learning disabilities and related disorders (pp. 119-140). Chicago: Year Book Medical.
124. Williams, V. I., & Cartledge, G. (1997). Passing notes to parents. Teaching Exceptional Children, 30, 30-34.
125. Wong D.F., Wagner H.N., Tune L.E., Dannals R.F., et al.(1986): Positron emission tomography revealed elevated D2 receptors in drug-native schizophrenics. Science 234, 1558-1563.
126. Zentall, S. S. (1993). Research on the educational implications of attention deficit hyperactivity disorder. Exceptional Children, 60, 143-153.
127. Zentall, S.S. (2005). Theory- and evidence-based strategies for children with attentional problems. Psychology in the Schools, 42, 821-836.

Other reference provided by Mr. Joseph Lau:

1. Pelham, W. E., Fabiano, G.A. and Massetti, G.M (2005). Evidence-Based Assessment of Attention Deficit Hyperactivity Disorder in Children and Adolescents. Journal of Child and Adolescent Psychology, Vol. 34, No. 3, 449-476.
2. American Academy of Paediatrics (2000) Clinical Practice guideline: Diagnosis and Evaluation of the Child with Attention Deficit Hyperactivity Disorder. Paediatrics, Vol. 105, No.5.
3. Brown, Thomas E. (2005). Attention Deficit Disorder: The Unfocused Mind in Children and Adults. Yale University Press,.
4. Wender, Paul H. (2000). AD/HD: attention-deficit hyperactivity disorder in children and adults. New York: Oxford University Press.

Other Official Documents provided by Dr. CW Chan:

1. MBBS Curriculum, Medical Faculty, the University of Hong Kong 2006
2. MBBS Curriculum, Medical Faculty, the Chinese University of Hong Kong 2006
3. Postgraduate Training in Paediatrics, Hong Kong College of Paediatricians 1993
4. Updated Postgraduate Training in Paediatrics, Hong Kong College of Paediatricians 2006
5. Report on the "Survey of Child Mental Health Services amongst Paediatricians in Hong Kong 2005", Task Force on Childhood Mental Health Services in Hong Kong
6. The "Four-Tier Systems for Management of Childhood Mental Health Services in Hong Kong, Dr. SL Luk and Dr. William Wong, Report from the Task Force on Childhood Mental Health Services in Hong Kong 2007
7. Advisory Report on Establishment of "Community Paediatrics in Hong Kong" by Professor Leon Polnay 2006, commissioned by the Hong Kong College of Paediatricians
8. Manpower Requirement for Paediatricians in Hong Kong, Dr. CB CHOW, Manpower Requirement Projection in Hong Kong, Hong Kong College of Paediatricians 2001
9. Report on "Comprehensive Child Surveillance Services (CCDS) in Hong Kong", Dr. Patrick Ip, Seminar on "Community Child Health" on 18th November 2006, Hong Kong College of Paediatricians.

Appendix 1

Box 1. DSM-IV Diagnostic Criteria for Attention Deficit/Hyperactivity Disorder (APA, 1994)

A. Either (1) or (2):

(1) six (or more) of the following symptoms of inattention have persisted for at least 6 months, to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) often has difficulty sustaining attention in tasks or play activities
(c) often does not seem to listen when spoken to directly
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)
(e) often has difficulty organizing tasks and activities
(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
(h) is often easily distracted by extraneous stimuli
(i) is often forgetful in daily activities

(2) six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands or feet or squirms in seat
(b) often leaves seat in classroom or in other situations in which remaining seated is expected
(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
(d) often has difficulty playing or engaging in leisure activities quietly
(e) is often "on the go" or often acts as if "driven by a motor"
(f) often talks excessively

Impulsivity

(a) often blurts out answers before questions have been completed
(b) often has difficulty awaiting turn
(c) often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia, or other psychotic disorder and are not better accounted for by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorder, or a personality disorder).

Code based on type:

314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: if both Criteria A1 and A2 are met for the past 6 months

314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: if Criterion A1 is met but Criterion A2 is not met for the past 6 months

314.01 Attention-Deficit/ Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: if Criterion A2 is met but Criterion A1 is not met for the past 6 months.

Box 2. ICD-10 Diagnostic Criteria for Hyperkinetic Disorders (WHO, 1996)

A. Inattention: at least six of the following symptoms of inattention have persisted for at least 6 months, to a degree that is maladaptive and inconsistent with the developmental level of the child:
   (1) Often fails to give close attention to details, or makes careless errors in schoolwork, work or other activities;
   (2) Often fails to sustain attention in tasks or play activities;
   (3) Often appears not to listen to what is being said to him or her;
   (4) often fails to follow through on instructions or to finish schoolwork, chores or duties in the workplace (not because of oppositional behaviour or failure to understand instructions);
   (5) is often impaired in organizing tasks and activities;
   (6) often avoids or strongly dislikes tasks, such as housework, that require sustained mental effort;
   (7) often loses things necessary for certain tasks or activities, such as school assignments, pencils, books, toys or tools;
   (8) is often easily distracted by external stimuli'
   (9) is often forgetful in the course of daily activities.

B. Hyperactivity: at least three of the following symptoms of hyperactivity have persisted for at least 6 months, to a degree that is maladaptive and inconsistent with the developmental level of the child:
   (1) often fidgets with hands or feet or squirms on seat;
   (2) leaves seat in classroom or in other situations in which remaining seated is expected;

(3) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, only feelings of restlessness may be present);
(4) is often unduly noisy in playing, or has difficulty in engaging quietly in leisure activities;
(5) exhibits a persistent pattern of excessive motor activity that is not substantially modified by social context or demands.

C. Impulsivity: at least one of the following symptoms of impulsivity has persisted for at least 6 months, to a degree that is maladaptive and inconsistent with the developmental level of the child:
(1) often blurts out answers before questions have been completed;
(2) often fails to wait in lines or await turns in games or group situations;
(3) often interrupts or intrudes on others (e.g., butts into others' conversations or games);
(4) often talks excessively without appropriate response to social constraints.

D. Onset of the disorder is no later than the age of 7 years.

E. Pervasiveness: the criteria should be met for more than a single situation, e.g., the combination of inattention and hyperactivity should be present both at home and at school, or at both school and another setting where children are observed, such as a clinic (evidence for cross-situationality will ordinarily require information from more than one source; parental reports about classroom behaviour, for instance, are unlikely to be sufficient).

F. The symptoms in A-C cause clinically significant distress or impairment in social, academic or occupational functioning.

G. The disorder does not meet the criteria for pervasive developmental disorders, manic episode, depressive episode, or anxiety disorders.

F90.0 : Disturbance of activity and attention
Attention Deficit:
• Disorder with hyperactivity
• Hyperactivity disorder
• Syndrome with hyperactivity
• Excludes: hyperkinetic disorder associated with conduct disorder (F90.1)

F98.8 : Other specified behavioural and emotional disorders with onset usually occurring in childhood and adolescence
• Attention deficit disorder without hyperactivity

Box 3. Outcome and Cost to Society

Nature of Cost / Who Bears Cost	Less effectiveness in acquiring life Skills	Lost income or economic opportunities for gainful employment	Lower quality of social activity	Treatment cost: Drugs, doctors' time, equipment (both direct AD/HD-related costs and indirect AD/HD-prompted costs due to other health problems	Coping Cost in the form of Extra staff and other resources
Patient: current year/Future years	Adverse effects on life skills in general	Adverse effects on employment; greater chance of criminal activities	Adverse effects on building relationships	Both mental and physical problems, including accidents, are more likely, resulting in higher medical costs. The AD/HD group showed a significantly greater prevalence of oppositional, conduct, and substance abuse disorders, and greater illegal substance use than control adults.	Not applicable
Family: Parents/ Siblings Current year Future years	Takes away time and energy from upgrading one's job skills and pursuing own interests	Parents suffer financial loss because of adverse career and employment effects	Adverse effects on social life	Mental stress; more chances for accidents	Serious coping costs
School	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Huge demands on staff to cope, affecting staffing, routines, etc.

Nature of Cost / Who Bears Cost	Less effectiveness in acquiring life Skills	Lost income or economic opportunities for gainful employment	Lower quality of social activity	Treatment cost: Drugs, doctors' time, equipment (both direct AD/HD-related costs and indirect AD/HD-prompted costs due to other health problems	Coping Cost in the form of Extra staff and other resources
Fellow Students	Short term effect as effectiveness of class activity may be affected	Expected to be minor	Expected to be minor	NA	NA
Fellow Workers	Some adverse effect	Some adverse effect if the worker is part of a team and productivity is affected	Some adverse effect on social activity	Chance of some cost	Coping cost varies from individual to individual
Employer	Not applicable	May affect productivity and ability to deliver in time	Generally not applicable	Generally not applicable	Coping cost depends on seriousness of the problem
Community	Not applicable	Not applicable	Disruption to community life may be in the form of crimes involving a degree of violence	Treatment cost included in Column 5	Spending to deal with problem may become greater if intervention is not taken in a timely or appropriate manner re or less costly

Appendix 2

Initial Teacher Education Programmes in Hong Kong

Postgraduate Diploma in Education Programmes

Primary Education

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
CUHK	PGDE (Primary) (FT/1) (PT/2)	22 credits	2 credits	0-9%	• Teaching Students with Special Needs (2E)
HKIED	PGDE (Primary) (FT/1) (PT/2)	35 credits	#	#	• Understanding Students with Special Needs (E) • Teaching and Curriculum for Students with Special Needs (E) • Special Needs and Inclusive Schooling (E) The above courses are available in PT mode only.
HKOU	PGDE (Primary) (Distance Learning)	50 credits	0	0	Nil
HKU	PGDE (Primary) (FT/1) (PT/2)	#	#	#	#

Secondary Education

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
CUHK	PGDE (Secondary) (FT/1) (PT/2)	22 credits	2 credits	0-9%	• Helping secondary school students with special needs (2E)
HKBU	PGDE (FT/1) (PT/2)	26-32 Units	2 Units	6-8%	• Inclusive education
HKIED	PGDE (Secondary) (FT/1)	35 credits	#	#	• Inclusive Education
HKOU	PGDE (Secondary) (Distance Learning)	40 credits	0	0	Nil
HKU	PGDE (Secondary) (FT/1) (PT/2)	#	#	#	#

Special Education

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKU	PGDE (PT/2)	6 modules	3 module	50 %	(Special Education Stream) • Changing student behaviour (C) • Adapting Curriculum and Instruction (C) • Learning and Learning Difficulties (C)

Subject Teaching & Subject Knowledge

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
City U HKIED	PGD (English Language Education) (PT) PGDE Subject knowledge and Pedagogy Strands (PT/2) • Chinese (Primary) (Secondary) • English (Primary) (Secondary) • Liberal Studies (Secondary) • Mathematics (Primary)	30-36 credits	#	#	#
SCE HKBU & HKBU	PGD (Chinese Language Studies for Teachers) (PT/2)	24 credits	0	0	Nil

Others

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	PGDE (Professional & Vocational Education) (PT/2) PGDE (Early Childhood Education) (PT)	35 credits 35 credits	0 #	0 #	Nil • Understanding and Managing Diversity (E)

Bachelor Programmes

Primary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
City U	BA (Hons) (Primary Education) (PT)	N/A	92 credits	8-26 credits	9-27%	• Curriculum, Assessment and Inclusive Education (8C) • Education for Children with Special Needs I (9E) • Education for Children with Special Needs II (9E)
HKIED	BEd (Hons) (Primary) Programme (FT/4) Major in • Visual Arts/ Music • Chinese • English Language • General Studies • Mathematics • Physical Education	319	#	#	#	• Learning Difficulties & Enhancement in the ESL/EFL Classroom • Perspectives on Inclusion in Schools and Classrooms • Supporting Students with Learning & Behavioural Difficulties
	BEd (Hons) (Primary) Programme (Mixed/3)	N/A	60 credits	#	#	• Understanding and Managing Diversity (E)
HKOU	BEd (Hons) Primary Education (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 特殊的教育需要 (10E)
	BEd (Hons) Primary Education (English Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 特殊的教育需要 (10E)
	BEd (Hons) Primary Education (Chinese Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 特殊的教育需要 (10E)
	BLS (English) (Hons) & PGDE (Primary) (FT/4)	N/A	200 credits	10 credits	5%	• 特殊的教育需要 (10C)

Primary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKOU	BLS (English) (Hons) & PGDE (Primary) (Distance learning)	N/A	200 credits	0 credits	0	Nil
SCE HKBU	教育學士(榮譽)學位課程(PT/ Mix/ 3.5 - 4.5 yr)	N/A	62 credits	5 credits	8%	• 特殊教育 (5E) (for 基礎教育 stream)

Secondary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKIED	BEd (Hons) (Secondary) Programme (FT/4) Major in • Chinese Language • English Language Visual Arts/ Music • Business Studies/ Technology & Living • Physical Education	114	#	#	#	• Perspectives on Inclusion inSchools and Classrooms • Inclusive Techniques in the Regular Classroom • Curriculum, Assessment and Technology in Inclusive Setting • Understanding and Managing Diversity
	BEd (Hons) (Secondary) Programme (Mix/3)	N/A	60 credits	#	#	• Understanding and Managing Diversity
HKOU	BEd (Hons) Secondary Education (English Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 有教無類 (10E)
	BEd (Hons) Secondary Education (Chinese Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 有教無類 (10E)

Secondary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKOU	BEd (Hons) Secondary Education (Mathematics Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 有教無類 (10E)
	BLS (English) (Hons) & PGDE (Primary) (Distance learning)	N/A	200 credits	0	0	Nil

Early Childhood Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKIED	BEd (Early Childhood Education) (FT/4)	90	#	#	#	• Helping children with troublesome behaviours (C) • Integrating children with special needs (C)
	BEd (Early Childhood Education) (PT/3) (Teaching & learning in early childhood education)	N/A	60 credits	#	#	• Helping children with troublesome behaviours (C) • Integrating children with special needs (C)
IVE & University of South Australia	BEd (Early Childhood Education) (PT/1.5 yr)	N/A	12-14 modules	1 modules	8%	• Children with special needs (C)
SCE HKBU	BEd(Early Childhood Education) (PT)	#	171-181 credits	#	#	#

Special Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKIED	BEd (Special Needs) (PT)	N/A	60 credits	27 credits	0-45%	• Meeting the Needs of Students with AD/HD (E) • Perspectives in special education (E) • Developmental challenges (E) • School guidance and counseling (E) • Whole school approaches to inclusive practices (E)

Subject Teaching & Subject Knowledge

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
City U	BA (Hons) (Teaching English as a Second Language)	N/A	#	#	#	#
CUHK	BEd (Language education) (FT/4)	46	98-100 credits	2 credits	0.2%	• Teaching students with special needs (2E)
	BEd (Physical Education & Sports Science) (FT/4)	20	92 credits	2 credits	0.2%	• Teaching students with special needs (2E)
CUHK & HKIED	BA (English Studies & Education)	40	141 units	2 units	0.2%	• Teaching students with special needs (2E)
HKU	BA & BEd (Lang Ed-Eng) (FT/4)	50	240 credits	3 credits	1%	• Children with learning difficulties (C)
	BEd (Chin) (FT/4)	15	240 credits	3 credits	1%	• Children with learning difficulties (C)
	BEd (Eng) (FT/4)	32	240 credits	3 credits	1%	• Children with learning difficulties (C)

Subject Teaching & Subject Knowledge

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKBU	BA (Hons) (English Language & Language) & BEd (Hons) (English Language Teaching) (FT/4)	20	133 units	2 units	0-1.5%	• Inclusive education and special educational needs (2E)
	BA (Hons) (History) & BEd (Hons) (Liberal Studies Teaching) (FT/4)	7	131 units	#	#	#
	BSSc (Hons) (Geography) & BEd (Hons) (Liberal Studies Teaching) (FT/4)	7	131 units	#	#	#
	BSc (Hons) (Mathematical Science) & BEd (Hons) (Mathematics Teaching) (FT/4)	20	131 units	#	#	#
	BSSc (Hons) Sociology and BEd (Hons) Liberal Studies Teaching (FT/4)	7	131 units	#	#	#
HKOU	BEd (Hons) & BEng Lang (Hons)	40	180 credits	10 credits	6%	• Inclusive Education (10C)
HKIED	Please refer to the "Initial Teacher Training" programme under the categories of "Primary Education" and "Secondary Education"					
HKIED & Lingnan Collaboration	BA (Hons) Contemporary English and Education (FT/4)	30	117 credits	0	0	Nil
HKIED & UST	BSc (Hons) (Biochemistry & Science Education) (FT/4)	62*	#	#	#	#
	BSc (Hons) (Biology & Science Education) (FT/4)	77*	#	#	#	#
	BSc (Hons) (Chemistry & Science Education) (FT/4)	78*	#	#	#	#
	BSc (Hons) (Physics & Science Education) (FT/4)	57*	#	#	#	#

Subject Teaching & Subject Knowledge

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKIED & UST	BSc (Hons) (Mathematics & IT Education) (FT/4)	20*	#	#	#	#
	BSc Applied Physics & Science Education) (FT/4)	26*	#	#	#	#
PolyU	BA (Hons) English Language Teaching (FT/4)	N/A	#	#	#	#

*UST provide a 3-yr BSc programme. But after their first year of study, student can transfer to the second year of the BSc & Science Education programme, provided they attain satisfactory grade point average.

Diploma and Certificate Programme

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	Certificate in Early Childhood Education Programme	102 credits	Not specify	#	• Children with special educational needs
	Certificate in Kindergarten Education Programme	68 credits	Not specify	#	• Children with special educational needs
HKOU	Certificate in Education • English Strand • Chinese strand • Mathematics strand	20 credits	0	0	Nil
IVE	In-Service Certificate in Early Childhood Education Course (PT/3)	20 modules	1 module	5%	• Theories and application for special education
	HD (Child Care and Education) (FT/3) (PT)	337 credits	3 credits	1%	• Theories and application for special education
SCEHKBU	Certificate in Early Childhood Education (FT/3)	#	#	#	#
	Certificate in Early Childhood Education (PT/3)	60 credits	3 credits	5%	• 特殊教育導論：照顧學習差異

Table 2. Teacher Education Programmes with AD/HD Components

Initial Teacher Training - Postgraduate Diploma in Education Programmes

Primary Education

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
CUHK	PGDE (Primary) (FT/1) (PT/2)	22 credits	2 credits	0-9%	• Teaching Students with Special Needs (2E)
HKIED	PGDE (Primary) (FT/1) (PT/2)	35 credits	#	#	• Understanding Students with Special Needs (E) • Teaching and Curriculum for Students with Special Needs (E) • Special Needs and Inclusive Schooling (E) • The above courses are available in PT mode only.

Secondary Education

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
CUHK	PGDE (Secondary) (FT/1) (PT/2)	22 credits	2 credits	0-9%	• Helping secondary school students with special needs (2E)
HKBU	PGDE (FT/1) (PT/2)	26-32 Units	2 Units	6-8%	• Inclusive education
HKIED	PGDE (Secondary) (FT/1)	35 credits	#	#	• Inclusive Education

Special Education

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKU	PGDE (PT/2)	6 credits	3 module	50%	(Special Education Stream) • Changing student behaviour (C) • Adapting Curriculum and Instruction (C) • Learning and Learning Difficulties (C)

Others

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
	PGDE (Early Childhood Education) (PT)	35 credits	#	#	• Understanding and Managing Diversity (E)

Initial Teacher Training - Bachelor Programmes

Primary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
City U	BA (Hons) (Primary Education) (PT)	N/A	92 credits	8-26 credits	9-27%	• Curriculum, Assessment and Inclusive Education (8C) • Education for Children with Special Needs I (9E) • Education for Children with Special Needs II (9E)

Primary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Course in the Programme	AD/HD-related Courses
HKIED	BEd (Hons) (Primary) Programme (FT/4) Major in • Visual Arts/ Music • Chinese • English Language • General Studies • Mathematics • Physical Education	319	#	#	#	• Learning Difficulties & Enhancement in the ESL/ EFL Classroom • Perspectives on Inclusion in Schools and Classrooms • Supporting Students with Learning & Behavioural Difficulties
	BEd (Hons) (Primary) Programme (Mixed/3)	N/A	60 credits	#	#	• Understanding and Managing Diversity (E)
HKOU	BEd (Hons) Primary Education (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 特殊的教育需要 (10E)
	BEd (Hons) Primary Education (English Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 特殊的教育需要 (10E)
	BEd (Hons) Primary Education (Chinese Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 特殊的教育需要 (10E)
	BLS (English) (Hons) & PGDE (Primary) (FT/4)	N/A	200 credits	10 credits	5%	• 特殊的教育需要 (10C)
SCE HKBU	教育學士(榮譽)學位課程 (PT/ Mix/ 3.5 - 4.5 yr)	N/A	62 credits	5 credits	8%	• 特殊教育(5E) (for 基礎教育 stream)

Secondary Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	BEd (Hons) (Secondary) Programme (FT/4) Major in • Chinese Language • English Language • Visual Arts/ Music • Business Studies/ Technology & Living • Physical Education	114	#	#	#	• Perspectives on Inclusion in Schools and Classrooms • Inclusive Techniques in the Regular Classroom • Curriculum, Assessment and Technology in Inclusive Setting • Understanding and Managing Diversity
	BEd (Hons) (Secondary) Programme (Mix/3)	N/A	60 credits	#	#	• Understanding and Managing Diversity
HKOU	BEd (Hons) Secondary Education (English Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 有教無類 (10E)
	BEd (Hons) Secondary Education (Chinese Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 有教無類 (10E)
	BEd (Hons) Secondary Education (Mathematics Strand) (Distance learning)	N/A	80 credits	10 credits	0-12.5%	• 有教無類 (10E)

Early Childhood Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	BEd (Early Childhood Education) (FT/4)	90	#	#	#	• Helping children with troublesome behaviours (C) • Integrating children with special needs (C)

Early Childhood Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	BEd (Early Childhood Education) (PT/3) (Teaching & learning in early childhood education)	N/A	60 credits	#	#	• Helping children with troublesome behaviours (C) • Integrating children with special needs (C)
IVE & University of South Australia	BEd (Early Childhood Education) (PT/1.5 yr)	N/A	12-14 modules	1 modules	8%	• Children with special needs (C)

Special Education

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	BEd (Special Needs) (PT)	N/A	60 credits	27 credits	0-45%	• Meeting the Needs of Students with AD/HD (E) • Perspectives in special education (E) • Developmental challenges (E) • School guidance and counseling (E) • Whole school approaches to inclusive practices (E)

Subject Teaching

University / Affiliation	Programme	Admission (JUPUS 2007)	Total credit	No of credit for AD/HD (or related) Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
CUHK	BEd (Language education) (FT/4)	46	98-100 credits	2 credits	0-2%	• Teaching students with special needs (2E)
	BEd (Physical Education & Sports Science) (FT/4)	20	92 credits	2 credits	0-2%	• Teaching students with special needs (2E)
CUHK & HKIED	BA (English Studies & Education)	40	141credits	2 credits	0-2%	• Teaching students with special needs (2E)
HKU	BA & BEd (Lang Ed-Eng) (FT/4)	50	240 credits	3 credits	1%	• Children with learning difficulties (C)
	BEd (Chin) (FT/4)	15	240 credits	3 credits	1%	• Children with learning difficulties (C)
	BEd (Eng) (FT/4)	32	240 credits	3 credits	1%	• Children with learning difficulties (C)
HKBU	BA (Hons) (English Language & Language) & BEd (Hons) (English Language Teaching) (FT/4)	20	133 units	2 units	0-1.5%	• Inclusive education and special educational needs (2E)
HKOU	BEd (Hons) & BEng Lang (Hons)	40	180 credits	10 credits	6%	• Inclusive Education (10C)

Initial Teacher Training - Diploma and Certificate Programmes

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKIED	Certificate in Early Childhood Education Programme	102 credits	Not specify	#	• Children with special educational needs
	Certificate in Kindergarten Education Programme	68 credits	Not specify	#	• Children with special educational needs
IVE	In-Service Certificate in Early Childhood Education Course (PT/3)	20 modules	1 module	5%	• Theories and application for special education
	HD (Child Care and Education) (FT/3) (PT)	337 credits	3 credits	1%	• Theories and application for special education
	Certificate in Early Childhood Education (PT/3)	60 credits	3 credits	5%	• 特殊教育導論：照顧學習差異

Advanced Teacher Training – Masters Programmes

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
CUHK	MEd (Specialized in) • Curriculum & Instruction • Educational Leadership & Administration • Education Psychology • Policy Studies in Education • Sports Science & Physical Education	30 credits	0 – 3 credits	0-10%	• Understanding AD/HD and related behaviour disorder (1.5E) • Development variation and learning disabilities (1.5E)
	MA (School Guidance & Counseling) (Specialized in) *Special needs ^ Specific learning difficulties *Compulsory for the Special needs strand ^ Compulsory for the Specific learning difficulties	24 credits	3 - 9.5 credits	10-40%	• Understanding AD/HD and related behaviour disorder*(1.5) • Selected topics in special needs education (1.5) • Counseling students with special needs (1.5) • Project in helping students with special needs (1.5)* • Special-needs education: The whole-school school approach (1.5)* • Project in special learning difficulties (1.5) ^ • Developing educational plans for students with specific learning difficulties (1.5) ^
HKBU	MEd (Specialized in) Children & Adolescent Development Concentration	30 units	3 Units	10%	• Problem behaviour in children & adolescent (3C)
HKIED	MEd (Specialized in) Exceptional Learning Needs	30 credits	15 credits	0-50%	• Students with Emotional and Behavioural Challenges • Advanced studies in special needs (C) • Developing inclusive schools & educational psychology (C)

Advanced Teacher Training – Masters Programmes

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKU	MEd (Specialized in) Special Education	8 Modules	3 Module	37.5%	• Inclusive and special education: theories & practice (C) • Assessment & programming for learner with diverse abilities (C) • Curriculum and instruction for learners with diverse needs (C)

Advanced Teacher Training – Advanced Certificate Programmes

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKU	PCAdvEdStud	3 Modules	1 Module	33%	• Special Education
CUHK	APGDE in Guidance and Counseling (PT/2)	15 credits	1.5 credits	0-10%	• Counseling students with special Need in Regular Classroom (1.5E)

Continuing Professional Development – Workshops, Seminars and Short Courses

University / Affiliation	Programme	Length of Study	No of AD/ HD (or related) Course	Proportion of AD/HD (or related) Courses in the Programme	Theme
EMB	In-service Training Programmes on Special Education	120 hrs	#	#	• Global perspectives on inclusive education
	Professional Development Courses / seminars/ workshops on Special Education	#	#	#	• The social and emotional development of gifted students
HKIED	Professional Development Course for Teachers (Catering for Diverse Learning Needs) Level 2 (PT)	Level 2 90 hrs	30 hrs	0-33%	• Overview of emotional and behavioural challenges (Elective)

Continuing Professional Development – Workshops, Seminars and Short Courses

University / Affiliation	Programme	Total Modules/ Credits	No of Modules / Credits for the AD/HD Related Course	Proportion of AD/HD (or related) Courses in the Programme	AD/HD-related Courses
HKU SPACE	Teaching Distracted Learners	15 hrs	#	#	#
	Workshop on Handling Students with Emotional Behavioural Problems	18 hrs	#		
	Certificate in English Language Teaching (Secondary) (PT)	6 modules	1 modules	17%	• Teaching Distracted Learners (Optional)
	Music Therapy Workshop for Integrated Education	12 hrs	#	#	• 介紹音樂治療對有特殊教育需要學童的應用
SCE HKBU 浸會大學持續教育學院	一年制在職特殊幼兒工作訓練課程 (PT/1)	14 credits	0	0	Nil
	蹦蹦小宇宙 - 過度活躍孩子的處理	10-15 hrs	#	#	• 辨識過度活躍症及注意力缺乏症的症狀分享處理的方法
	異常與變態心理學	30 hrs	3 hrs	10%	• 與兒童及成長有關的失調（如自閉症及過度活躍等）
協康會與香港教育專業人員協會合辦	如何識別及處理注意力不足過度活躍症學童	3hrs	#	#	• 識別注意力不足過度活躍症的學童 • 注意力不足過度活躍學童的治療 • 有效的教學策略
教育統籌局與英國總領事館合辦	英國特殊教育大型會議及工作坊	18 hrs	45 min	4%	• Understanding attention deficit and hyperactive disorder
香港公立醫院、衛生署及大學醫生協會(PHUDA)及香港基層醫護基金(HKPCF)	「是精靈好動還是過度活躍」健康講座	#	#	#	• 過度活躍症的成因、病徵、治療、發病處理等
香港兒科醫學院基金與香港社會服務聯會合辦	認識兒童及青少年身、心健康課程	12 hrs	2 hrs	17%	• 兒童情緒發展與常見的兒童情緒問題 • 情緒教育 • 兒童常見精神病

The Hong Kong Society of
Child Neurology and Developmental Paediatrics
香港兒童腦科及體智發展學會

香港兒童腦科及體智發展學會
專注力失調/過度活躍症 工作小組

成員

陳作耘醫生	香港兒童腦科及體智發展學會主席
藍芷芊醫生	香港兒童腦科及體智發展學會幹事
劉　泰先生	香港衛生署高級臨牀心理學家
李湄珍教授	香港大學臨牀心理學系教授
梁永亮教授	香港中文大學臨牀心理學系教授
廖嘉怡醫生	香港衛生署高級醫生
蕭寧波教授	香港中文大學教育心理學系副教授

諮詢專家

香港醫管局兒童精神科服務工作小組

陸兆鑾醫生	香港中文大學精神科學系教授
何濼生教授	嶺南大學經濟學系教授
石丹理教授	香港中文大學社會工作學系教授
李子超醫生	香港醫管局精神科顧問醫生
鄭佩芸教授	香港中文大學教育心理學助系理教授

2007年3月21日 草擬文件諮詢論壇 參與成員

Mrs Daphne Bloomfield	Executive Councilor, The Pathways Foundation Ltd
Dr Chan Chok Wan	President, The Hong Kong Society of Child Neurology & Developmental Paediatrics
Ms Eva Chan	Educational Psychologist, Assistant Education Services Secretary (Student Guidance & Counselling), Tung Wah Group of Hospitals
Dr Chan Kwok Chiu	COS, Department of Paediatrics, Alice Ho Miu Ling Nethersole Hospital
Ms May Chan	Educational Psychologist, Society of Boys' Centres
Dr Cheng Pui Wan	Assistant Professor, Department of Educational Psychology, The Chinese University of Hong Kong
Dr Hon Cheung Chiu Hung	Legislative Council Member
Ms Daisy Cheung	Consultant, Hong Kong Association of Specific Learning Disabilities
Dr Chow CB	COS, Department of Paediatrics, Caritas Medical Centre
Principal Natalie Chow Luk Ying Pui	Principal, Hui Chung Shing Memorial School
Mr Ferrick Chu	Chief Equal Opportunities Officer, Equal Opportunities Commission
Professor Ho Lok Sang	Professor, Department of Economics, Lingnan University
Mr Rommel Hung Chi Hong	Executive Council Member, Hong Kong Association of Specific Learning Disabilities
Dr Hung Se Fong	Hospital Chief Executive, Kwai Chung Hospital
Mrs Hung Wong Lai Ping	Principal, Caritas St. Joseph Secondary School
Ms Iris Keung	Chairman, HK Association of Specific Learning Disabilities
Principal Carol Kwong	Principal, HMW Secondary School
Dr Kelly Lai	COS, Dept of Psychiatry (Child Psychiatry Service), Alice Ho Miu Ling Nethersole Hospital
Dr Catherine Lam CC	Council Member, The Hong Kong Society of Child Neurology & Developmental Paediatrics
Mr Joseph Lau	Senior Clinical Psychologist, Child Assessment Service, Department of Health
Mr Clement Law	Chairman, The Hong Kong Association for AD/HD
Dr Lee Chi Chiu	Consultant Psychiatrist, Kwai Chung Hospital
Mrs Julie Lee	Chairperson, Parents' Association of Pre-school Handicapped Children

BRAINCHILD
The Official Publication of HKCNDP

兒童專注力失調 / 過度活躍症

2007報告書
行政概要

背景

縱然多國在過去數拾年有大量關於專注力失調/過度活躍症(AD/HD)的研究、知識和處理經驗，香港對患有專注力失調/過度活躍症人士的認識和支援仍然局限於醫療範疇。最近愈來愈多人認識到學童行為問題乃源於一些需要特殊辨識和幫助的孩童內在因素，如專注力失調/過度活躍症。在2005/06年度『香港康復計劃方案』檢討中，專注力不足/過度活躍症被提出為一個需要多部門關顧及資源的獨特實況，同時被納入計劃中成為一個正規的殘疾類別。

香港兒童腦科及體智發展學會(HKCNDP)為回應政策發展的需要，推動有效及綜合支援系統予有關人士，於2005年11月份成立一個專注力不足/過度活躍症的工作小組來商議有關事宜。小組檢視文獻，盤點本土服務系統和專業準備情況，及草擬建議以應付覺察的挑戰。通過各方諮詢及公開論壇，達成共識而撰寫此立場書。此文將分發至各學術、專業、及執業團體作參考，並提交決策者和執政者作跟進。

何謂專注力失調 / 過度活躍症

定義

專注力失調/過度活躍症(AD/HD)乃一來自神經生理差異的情況，會影響個人能力去集中精神、維持專注於工作、或抑制衝動的行為。它的特點在於未能吻合發展情況的專注技巧，及/或衝動魯莽和過度活躍。徵狀多於七歲前開始出現。雖然專注力失調/過度活躍症和特殊學習障礙常出現於同一人士身上，但專注力失調/過度活躍症不屬於特殊學習障礙的一種。

成因

專注力失調/過度活躍症(AD/HD)被視為一種對抑制衝動和監管工作能力的障礙。集合神經心理、神經顯影和神經化學研究結果顯示額紋狀體網絡(fronto-striatal network)出現異常。行為遺傳學研究支持專注力失調/過度活躍症最少會有部份是由家族及遺傳因子所引致。有分子遺傳學研究証據顯示因子 D4DR, DAT1, 5-HTT 和 DRD5 與專注力失調/過度活躍症有強列關連。Faraone, Doyle & Mick et al.(2001)的研究顯示DRD4同專注力失調/過度活躍症確有輕微關連。再者，環境因素和負面的心理因素可能於神經系統發展期間引發異常情況。有資料指出面對問題兒童，或者父母本身患有專注力失調/過度活躍症或其他情緒異常，會引至負面管教方式。對抗性行為障礙(Oppositional Defiant Disorder)或行為障礙(Conduct Disorder)可能部份源於家長的瀆職，但因兩者可能與專注力失調/過度活躍症分負因子遺傳的因素，故它們亦可能部份源於遺傳。

專注力失調 / 過度活躍症有多普遍?

基於診斷準則不同，有關專注力失調/過度活躍症的流行病學研究報告出現差異結果。在美國，兒童病發率約為3-7百份點；中國為3百份點；而其他國家則為3-9百份點。男女比例約從 2比1至9比1之間。

專注力失調 / 過度活躍症的處理

診斷

專注力失調/過度活躍症的徵狀本質涉獵多方面，而診斷此症取决於細心查閱兒童成長發展的歷史，垂詢各種臨床徵狀，透過家長報告於家庭觀察或量度之行為，及在醫療機構所作之行為觀察和評估。同時亦要留意是否有其他普遍並存的病況，如讀寫障礙和對抗性行為障礙等。

治療

目前業界的處理指引是利用一個多專業模式，其中包括藥物治療和行為治療。興奮性藥物已被証實可以顯著地改善專注力失調/過度活躍症的徵狀。行為改造計劃牽涉孩童、家長及教師，通過界定有問題的行為作介入點，運用特別技巧去改善目標行為。家長訓練計劃可幫助他們學習適當技巧來處理孩童的問題行為。有研究多元化治療的文獻顯示孩童單接受藥物治療或藥物配合行為治療比那些單接受行為治療或慣常社區服務的孩童有更大和顯著的改善。

專注力失調/過度活躍症的主要徵狀可能是引致持久學業困難的隱蔽成因，例如不合格或開除學籍等。教育支援包括特別教授策略、行為處理和課堂調適。有效的家校合作會帶出正面的結果。

整體而言，一個包括教育、行為、社會和藥物治療的模式，再加上夥拍家庭參與乃目前最具效能和值得選取的治療方法。

社會的承擔

專注力失調/過度活躍症對個人發展的影響可自短期的困難至長遠後果，形成社會要承擔沉重代價。對患者個人而言，他可能有種種問題，包括社交及人際關係、自尊心、學業失敗、就業困難、受傷、意外和濫用藥物。治療專注力失調/過度活躍症已直接涉及高昂的醫療費用，再加上要處理並存的病況，例如行為障礙和焦慮症及情緒障礙，甚至因患者差勁的專注力或衝動抑制能力而造成交通意外，包括不良駕駛習慣而產生的問題，代價更昂貴。經濟重擔亦加諸其他地方，學校要多撥資源以應付校本支援服務及特別教育服務的支出，僱主要擔負家長因需照顧有問題子女而缺勤的經濟後果，而患者多因工作表現欠佳而失業，或容易沾上犯罪行徑。因藥物治療有改善孩童的功能，間接減低家庭及其他人士的負擔，故藥物治療被視為物有所值。

專注力失調 / 過度活躍症如何應用於華藉人口及香港?

本土流行率

1996年研究報告在一大群本土男生樣本中發現6.1百份點的流行率。年青人當中，估計男孩的流行率為5.7百份點而女孩則為3.2百份點。根據香港衛生署兒童體能智力測驗服務於2003-2006年的紀錄，男女比例為6-8比1。

本地研究報告

專注力失調 / 過度活躍症於華人口認可性(相對專注力失調 / 過度活躍症為一種西方文化獨有的異常)的研究中，把教師和家長的調查問卷作統計學上的因素分析(factor analysis)，確證專注力失調 / 過度活躍症行為與反社會或情緒化的因素分別隔開；同時亦發現與臨床徵狀、於產前、產中及產後的生理危險、發展遲緩的歷史、及更多神經系統異常跡象有正性的關連系數。這種關連系數並未出現在行為障礙的華人兒童的研究上，代之，他們卻與社會逆境拉上關係(Leung et al., 1996)。

*華人兒童的基因研究*發現在漢族兒童中DRD4基因的2R對偶基因與專注力失調 / 過度活躍症有關連；而2R對偶基因可能由7R對偶基因演變過來，同時功能又類似7R對偶基因。研究又發現2R對偶基因會由父母傳遞至其患有專注力失調 / 過度活躍症的子女(Leung et al., 2005).

香港華人兒童神經顯影研究，用磁力共震掃描，顯示腦部認為負責專注力及執行工作的地方出現結構性異常(McAlonan G.M., 2007)。

*評估工具*包括有Conners' Teacher Rating Scale及Child Behaviour Checklist (CBCL)『兒童及青少年行為調查問卷』；CBCL連同內附之Teacher report Form及Youth Self-Report曾於香港重建問卷效度，以作本土之用(Leung et al., 2006)。

*治療研究報告*包括一個透過家庭、學校和社區合作去幫助專注力失調 / 過度活躍症兒童的『加強學習行為計劃』(Enhancement of Learning Behaviour Project, So, Leung, & Hung, 2004)，及一個包含藥物治療、親職訓練、兒童訓練和聯絡諮詢學校的多元化治療計劃(Heung & Ho, 2003; Heung V., 2004)。

香港有何服務?

本地服務

政府政策

縱使各有關部門會在一些嚴重個案中聯絡磋商，惟本地服務大多是由醫療、教育及社會服務機構分別處理。近年來教育及人力統籌局已視專注力失調/過度活躍症為一個有特殊教學與需要的類別，同時衛生及福利局亦於2007年在復康計劃把專注力失調/過度活躍症包括在殘疾類別之中。

醫療服務

衛生署和醫院管理局屬下各兒童評估中心提供診斷及中期支援服務，而醫院管理局屬下的兒童及青少年精神科服務則提供診斷、治療、長期跟進及支援性專業諮詢予其他醫療及教育機構。部份兒童則接受私人執業服務。

教育支援

主流學校可獲取額外資源及專業幫助以提供支援予教育專注力失調/過度活躍症兒童。支援學習及行為處理的服務本質和深度則因校而異，差別甚大。

社區服務

現時社區有提供處理專注力失調/過度活躍症兒童的親職訓練計劃，然而有關計劃的專業基礎及成效尚未確證。

香港面臨何種挑戰 及 對將來發展有何建議?

醫療服務

挑戰

兒童及青少年精神科新症輪候時間最近已推延到壹至叁年才獲接見。曾接受專業訓練處理專注力失調/過度活躍症兒童的兒童精神科醫生及兒科醫生嚴重短缺人手。

建議

我們倡議一個四層的醫療分工服務模式：

第一層：非精神科醫療專業人士
第二層：具處理專注力失調/過度活躍症兒童專門知識的專業團隊，包括接受有關培訓的兒科和精神料醫生等
第三層：兒童精神科的多專業團隊
第四層：精神科住院服務團隊

上述團隊應在社區和各醫療機構，透過分流及互相轉介，建立一個具協調性的支援網絡。政府應迫切地增加公共服務人手及增強在職培訓各層工作人員。

教育服務

挑戰

大班教學局限了教師向患有專注力失調/過度活躍症兒童提供個別支援服務的範疇。人力資源問題包括缺乏能幫助專注力失調/過度活躍症兒童的專業教師和輔助人員(教師助理)，與及缺乏給予他們具良好素質的訓練。

建議

首要是減少每班學生的人數。當局應系統地編排那些教導專注力失調/過度活躍症兒童的教師接受特殊訓練。學校應聘請具足夠處理專注力失調/過度活躍症兒童知識及技能的輔助人員(教師助理)。學校社工及輔導人員則應獲有關支持和在職訓練。

學校要有效地處理學習和行為問題，定必要有教師、輔助人員、社會工作者、醫生、臨床心理學家、教育心理學家和家庭各方面的協調與合作。學校應委任一位資深人員統領這個支援團隊，及協調各部門工作。而學校社工及輔導人員則於此制度下提供個案跟進服務。

社會服務

挑戰

有學者(Shek & Tsang, 1993)論證社會服務應以家庭為本，同時應嚴謹考慮照顧此等兒童的家長及人員所肩負的客觀和主觀重擔。縱然香港已推行綜合性家庭服務，惟復康服務與家庭服務之間仍不幸地存着廣濶的空隙。專為家長及家庭成員的需要而設的親職教育訓練計劃和家庭支援服務大致仍然不足。

建議

資源應發放至有關的工作單位，包括提供社區服務的機構及綜合家庭服務中心。社會工作的職前、研究院及在職訓練計劃需改善以覆蓋專注力失調/過度活躍症的處理。發展具證效的社會工作模式並予以推廣至有關兒童及家庭。自助及倡導工作組織應獲專業人士和有關社工的引導和支特。

服務協調配合

專注力失調/過度活躍症兒童的治療及復康工作端賴多專業及多部門的協調合作。受影響的兒童需接受醫生的處方；心理學家和社會工作者的行為及情緒治療；教育心理學家、教師們和教師輔助人員提供之有效學校支援；同時家庭可能又接受心理輔導和社交小組訓練。各部門人士需熟識系統情況以便有效地運作和幫助此等人士的需要。

專業訓練用以處理專注力失調/過度活躍症兒童

關乎兒科醫生、家庭醫生、兒童精神科醫生、臨床心理學家、教育心理學家、教師、輔助醫療人員及社會工作者於入職前、研究院和在職期間諸般培訓計劃的建議，在本報告作詳細討論。預計約需十年時限才能將目前不足之處提升至合理水平。

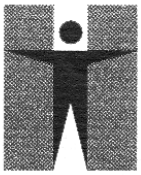
公眾教育及研究

我們需要公眾教育讓社會人士認識專注力失調/過度活躍症兒童及其家庭，正確了解此症的情況及社會支援服務的需要，深入探討其科學及文化因素，以及研究證實治療方法的效能。結果可用作未來政策釐定及服務發展的依據。

結論

通過認識香港兒童及其家庭之文化及生態發展，憑藉各界及多層面的合作和貢獻，再加上有效分流機制及順利分層過渡，復康服務才能向前邁進。社會培訓足量專業人士，發展證實具療效之服務計劃及夥拍家庭參與皆十分重要。一如其他複雜情況，生理差異、環境和文化會互相磨合影響結果，故發展復康制度需設定界限指標、以便跟進和監察。

Feedback Received on the Position Paper



Our ref. 本署檔號： (9) in DHHQ/1060/11/6 Pt.4
Your ref. 來函檔號：

4 September 2007

Dr CHAN Chok-wan
Chairman of Working Party on Attention Deficit (AD)/
Hyperactivity Disorder (HD) cum
President, Hong Kong Society of Child Neurology
& Developmental Paediatrics
c/o Central Kowloon Child Assessment Centre
2/F, 147L Argyle Street
Kowloon

Dear Dr. Chan,

HONG KONG SOCIETY OF CHILD NEUROLOGY & DEVELOPMENTAL PAEDIATRICS – WORKING PARTY'S 2007 POSITION PAPER ON AD/HD IN CHILDREN

Thank you for the copy of the above Paper which arrived on 30 July and wish to congratulate the Working Party for your devotion to child neurology and developmental paediatrics. Your efforts are well appreciated.

As safeguarding the health of our children is the common goal of our two organizations, we stand ready to work towards that end together with your Society and other stakeholders.

Yours Sincerely,

(Dr P Y LAM)
Director of Health

Department of Health
Wu Chung House, 21st Floor,
213 Queen's Road East,
Wan Chai, Hong Kong.
Telephone: 2961 8888
Fax: 2836 0071

衞生署
香港灣仔皇后大道東 213 號胡忠大廈 21 樓
電話： 2961 8888
圖文傳真： 2836 0071

We are committed to providing quality client-oriented service

中華人民共和國香港特別行政區政府總部食物及衞生局
Food and Health Bureau, Government Secretariat
The Government of the Hong Kong Special Administrative Region
The People's Republic of China

Our ref.: HWF/H/L/M/57/04

Tel.: 2973 8208
Fax: 2840 0467

3 August 2007

Dr CHAN Chok Wan
Chairman of Working Party on ADHD, HKCNDP
President, Hong Kong Society of
Child Neurology and Developmental Paediatrics
c/o Central Kowloon Child Assessment Centre
2/F, 147L Argyle Street
Kowloon

Dear Dr Chan,

Thank you for your letter of 20 July 2007, enclosing the "Attention Deficit/Hyperactivity Disorder in Children 2007 Position Paper" of the Working Party on AD/HD. I have read the paper with interest. I share your view that timely and effective support is important for children with AD/HD. We, together with colleagues in relevant policy bureaux, will take into account your proposals when deliberating over the strategies for supporting these children.

Yours sincerely

(Ms Sandra LEE)
Permanent Secretary for Health

香港中環花園道美利大廈閣樓及 18–21 樓　電話：(852) 2189 2748　傳真：(852) 2840 0467
Mezzanine Floor & 18–21/F, Murray Building, Garden Road, Central, Hong Kong　Tel: (852) 2189 2748　Fax: (852) 2840 0467

社會福利署
Social Welfare Department

電話號碼 Tel. No. : 2892 5151
傳真號碼 Fax No. : 2838 0757

31 July 2007

Dr Chan Chok-wan,
President,
The Hong Kong Society of Child Neurology and
Developmental Paediatrics,
c/o Central Kowloon Child Assessment Centre,
2nd Floor,
147L Argyle Street,
Kowloon.

Dear Dr Chan,

Thank you for your letter of 20 July 2007. I shall study your position paper on attention deficit / hyperactivity disorder in children carefully.

Yours sincerely,

(Stephen Fisher)
Director of Social Welfare

香港灣仔皇后大道東 213 號胡忠大廈 8 樓
8/F, Wu Chung House, 213 Queen's Road East, Wan Chai, Hong Kong

政 府 總 部
勞 工 及 福 利 局
香港下亞厘畢道
中區政府合署

LABOUR AND WELFARE BUREAU
GOVERNMENT SECRETARIAT
Central Government Offices
Lower Albert Road
Hong Kong

本函檔號 Our Ref.: LWB 5/3939/05 III

來函檔號 Your Ref.:

電話號碼 Tel No.: 2509 4899

傳真號碼 Fax No.: 2543 0486

1 August 2007

Dr CHAN Chok Wan
Chairman of Working Party on ADHD, HKCNDP
President, Hong Kong Society of Child Neurology
& Developmental Paediatrics
c/o Central Kowloon Child Assessment Centre
2/F, 147L Argyle Street
Kowloon

Dear Dr Chan,

Thank you for your letter of 20 July 2007 enclosing a position paper of the Working Party on AD/HD. We have taken note of the information therein.

Yours sincerely,

(Mrs Mary MA)
Commissioner for Rehabilitation

香港中環花園道三號花旗銀行大廈十樓
10/F., Citibank Tower, 3 Garden Road, Central, Hong Kong

中華人民共和國香港特別行政區政府總部教育局
Education Bureau
Government Secretariat, Government of the Hong Kong Special Administrative Region
The People's Republic of China

本局檔號 Our Ref. : EMB(EPSPS)/COR/65/1/1
來函檔號 Your Ref. :

電話 Telephone : 3698 4309
傳真 Fax Line : 2715 8056
Educational Psychology Service
(Hong Kong and Kowloon) Section
Education Bureau, W201, EDBKTESC
19 Suffolk Rd, Kowloon Tong, Kowloon

3 August 2007

Dr. Chan Chok Wan
President
The Hong Kong Society of Child Neurology and Developmental Paediatrics
Central Kowloon Child Assessment Centre
2/F, 147L Argyle Street
Kowloon City
Kowloon

Dear Dr. Chan,

Thank you for your letter and the position paper sent to our Bureau on 20 July 2007. We are currently processing the information and will return to you in due course.

Yours Sincerely,

(Henry Cheung)
for Secretary for Education

香 港 兒 科 醫 學 會
THE HONG KONG PAEDIATRIC SOCIETY

CORRESPONDENCE ADDRESS:
c/o DEPARTMENT OF PAEDIATRICS
AND ADOLESCENT MEDICINE
QUEEN MARY HOSPITAL
POKFULAM, HONG KONG
TEL: (852) 2855 3485
FAX: (852) 2818 4290

16 September 2007

Dr. Chan Chok Wan
Chairman of Working Party on ADHD, HKCNDP
President, Hong Kong Society of Child Neurology
& Developmental Paediatrics
Central Kowloon Child Assessment Centre
2/F, 147L Argyle Street
Kowloon

97

2008

Dear Dr. Chan,

Thank you for taking the initiative in reviewing the problems of AD/HD children in Hong Kong. The Hong Kong Paediatric Society fully endorse the Position Paper on AD/HD published by the HKCNDP and the continuing effort to improve such needed service in our locality.

If there is anything our Society can contribute, please let us know.

Yours sincerely,

Tsn

Dr. Tsoi Nai Shun
President

THE CHINESE UNIVERSITY OF HONG KONG 香港中文大學

Department of Psychology
心理學系

21 August 2007

Dr Chan Chok Wan,
Chairman of Working Party on ADHD, HKCNDP,
President, Hong Kong Society of Child Neurology
& Developmental Paediatrics
c/o Child Assessment Service,
Central Kowloon Child Assessment Centre,
2/F., 147L Argyle Street,
Kowloon

Dear Dr Chan,

I am writing to thank you for sending us the Position Paper on AD/HD. It is a valuable work showing the dedication of your Working Group. The Paper has been circulated among my colleagues. We support your efforts in promoting public understanding of AD/HD children in Hong Kong.

Sincerely yours,

Fanny M. Cheung, Ph.D.
Professor of Psychology and Chairperson

3rd Floor Sino Building The Chinese University of Hong Kong Shatin NT Hong Kong 香港 新界 沙田 香港中文大學 信和樓 三樓
Tel 電話: (852) 2609 6578 Fax 傳真: (852) 2603 5019 E-mail 電郵: info@psy.cuhk.edu.hk Web site 網址: http://www.psy.cuhk.edu.hk

三東院華
TUNG WAH GROUP OF HOSPITALS
SINCE 1870

TEL: 28597502
FAX: 25597985
OUR REF: (42) in CE 16/5/2007
YOUR REF:

3 August 2007

Dr. Chan Chok Wan
Chairman of Working Party on ADHD, HKCNDP
President, Hong Kong Society of Child Neurology
& Developmental Paediatrics
c/o Central Kowloon Child Assessment Centre
2/F, 147L Argyle Street
Kowloon

Dear Dr. Chan,

Re: Attention Deficit / Hyperactivity Disorder (AD/HD)

Thank you for your letter dated 20 July 2007 and the enclosed position paper on AD/HD. I admire the enormous effort that members of your society had put in to advocate for appropriate societal attention and resources be given to these children and their families. As you are aware, the Tung Wah Group is also very concerned about the opportunities given to children with special learning needs. We look forward towards close partnership with you on such good cause.

Yours sincerely,

Dr. William Ho
Chief Executive

c.c. MSS, ESS, CSS, AES(SGC) w/e

Dr Chan Chok Wan
President
Hong Kong society of Child Neurology and Development Paediatrics
C/o Central Kowloon Child Assessment Centre
2/F 147L Argyle Street,
Kowloon,
Hong Kong

17 August 2007

Dear Dr. Chan,

Thank you very much for your letter of 20 July 2007 and the report on Attention Deficit / Hyperactivity Disorder. I congratulate you and the team on the report. It is most succinct and to the point. I hope you will be able to garner support for a structured and multidisciplinary approach to the issues.

I have just been to the Sates and continue to travel extensively. I hope to see you at some point or at least to bump into you in Central again.

My very best regards,

Anna Wu
Advisor, Shantou University Law School
c/o Friends of Shantou University
2810 Harbour Centre
25 Harbour Rd., Wanchai
Hong Kong