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SINGAPORE'S FIRST INTEGRATED SERVICE FOR VULNERABLE MOTHERS AND KIDS 0-3

For the first time in Singapore, mothers from vulnerable backgrounds and their children will be provided a comprehensive spectrum of healthcare, education and social support in one integrated service through the Temasek Cares Kids Integrated Development Service (KIDS 0-3) programme.

Led by KK Women's and Children's Hospital (KKH) with partner AMKFSC Community Services Ltd, and supported by Temasek Cares, the KIDS 0-3 programme is an integrated system of care that aims to optimise the developmental potential of children from vulnerable families. The pilot programme is expected to reach 300 expectant mothers from diverse backgrounds in Ang Mo Kio over a three-year period, and continue the follow-up until their children are three years of age.

"Providing support, care and education to the mother from pregnancy enhances the healthy development and early stimulation of the baby, and facilitates optimal development of the child's learning skills," says Professor Chay Oh Moh, Senior Consultant, Department of Paediatrics and Campus Director, Education Office, KKH, who is also Programme Director of the KIDS 0-3 programme. "The home visits that are a part of the programme will allow the mother and baby access to these benefits in their own home."

Neuroscience shows that a child's early years are the critical stage for the development of the nerve network for future learning. Throughout the duration of the programme – starting from pregnancy, up to the child reaching the age of three years – both mother and child will be supported by a multidisciplinary network of paediatricians, obstetricians, therapists, nurses, social workers, community health visitors, and other professional agencies. They will work closely with the mother and family to optimise the child's development.

Over the long term, the pilot aims to validate and establish a sustainable model of care for vulnerable mothers and children that is scalable to a national level. The vision is to strengthen community capabilities to support vulnerable families and optimise healthy growth and development for every child.

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TEMASEK CARES KIDS 0-3 CARE MODEL

KIDS SOCIAL WORKERS

- Identify eligible programme participants*
- Encourage attendance for medical appointments, and timely immunisation for the child
- Conduct home visits, and provide counselling and psychosocial support for family issues
- Conduct needs and risk assessments to identify areas in which the family requires support and assistance
- Provide assistance to address needs and risks identified
- Work with external agencies to facilitate support and resources for the family (e.g. financial, housing, healthcare and childcare)

KIDS NURSES

- Encourage attendance for medical appointments, and timely immunisation for the child
- Provide antenatal and postnatal care, education and counselling on family planning, nutrition, self and baby care and breastfeeding, and home visits

KIDS COMMUNITY HEALTH VISITORS

- Conduct home visits after pregnancy
- Encourage attendance for medical appointments, and timely immunisation for the child
- Provide counselling and education on parent-child bonding and adequate early stimulation for the child
- Identify areas in which the family may require assistance from a KIDS social worker

This holistic support system for the mother and baby is facilitated by a close-knit network of community partners. These include government and health agencies, child development and education centres, voluntary welfare organisations, family service centres and neighbourhood organisations. A Temasek Cares KIDS 0-3 Centre will also be set up at Ang Mo Kio to complement the programme's home-based support. The centre will provide parent education classes and training to benefit mothers and their children. Managed by AMKFSC, the centre will be supported by visiting healthcare professionals from KKH.

RESEARCH AND EVIDENCE-BASED CARE

The KIDS 0-3 programme was developed based on evidence from early childhood learning and intervention programmes, and successful models of support in other countries. It also draws on findings of a study on families in Singapore with challenging socio-economic backgrounds. An overall assessment found that:

Effective support for vulnerable families should adopt a systematic approach to include the involvement of multiple community-based agencies.

A significant number of children from challenging socio-economic backgrounds have developmental delays.

An integration of medical, health, social and community services using scientific and evidence-based approaches is required to support the optimal growth and development of children from vulnerable families, who have complex and varied needs.

Support for the mother and child should begin from pregnancy and should continue for the child up to the age of three years, covering the critical formative years.

** Expectant mothers who are residents of Ang Mo Kio, hold Singapore citizenship or permanent resident status, are KKH patients for antenatal care and delivery and have a household per capita income of up to $650, are eligible to participate in the KIDS 0-3 programme.*

PARENT-COMPLETED SCREENING TOOL FOR PREMATURE BABIES

A prospective cohort study by researchers at KK Women's and Children's Hospital (KKH) has reported that parent-completed baby and toddler developmental screening tools may be as effective as standard professionally-administered psychometric tools in identifying children with developmental delay and providing information for interventions.

A research team from KKH compared the Ages & Stages Questionnaires®, Third Edition (ASQ-3), a parent-completed developmental screening tool, against the Bayley Scales of Infant and Toddler Development®, Third Edition (BSID-III) – the current gold standard tool for professionally-administered developmental assessment.
Both screening tools were used to assess 140 babies born preterm with very low birth weight (VLBW), at a corrected age of 24 months.

The researchers compared the sensitivity, specificity and predictive value of both tools in the areas of communication, motor skills and cognitive development. The ASQ-3 achieved high negative predictive value, specificity and sensitivity in all three areas of evaluation. It, however, had a low positive predictive value – which is commonly seen in developmental screening tools and partly also reflects the generally low prevalence of significant developmental delay in babies.

In addition, both the ASQ-3 and BSID-III also had statistically significant diagnostic agreement across the three evaluated areas. Their Kappa scores, indicating inter-rater agreement, showed moderate agreement for cognitive development, fair agreement for communication and slight agreement for motor skills.

Premature babies are at significantly increased risk of developmental delay. Close surveillance of their neurodevelopment and early intervention is crucial to aid in optimising their developmental, academic and functional outcomes.

"With its high negative predictive value, the ASQ-3 is a valid screening tool for ruling out developmental delay in VLBW preterm children. As it is a parent-completed tool, it can also enhance parental involvement in the care and management of their child," says Dr Pratibha Agarwal, Senior Consultant, Department of Neonatology, KKH, who led the research team.

The research findings were presented during the 3rd Singapore Paediatric and Perinatal Annual Congress in September 2014 and received the 'Best Free Paper Presentation' Award.

EARLIER SCREENING FOR PREMATURE BABIES

Following its validation, the ASQ-3 has been implemented at KKH for the assessment of children who are born preterm with VLBW. This includes parent-completed assessment of the child, using the ASQ-3, at nine, 12, 18 and 24 months.

The results of the assessments are then reviewed by the paediatrician or neonatologist during follow-up visits to the hospital, and management and intervention is discussed with the parents where required. This strengthens and enhances best practices for the management of children with VLBW, which includes professional assessment with the BSID-III at two years.

"The ASQ-3 empowers parents to self-monitor their child's development from as early as nine months and obtain insight into their child's developmental needs. This enables them to provide early intervention in the home environment to help their child meet age-appropriate developmental targets," added Dr Agarwal, who is also Head of the Special Care Nursery at KKH.

Since the commencement of the study, over 180 children have completed ASQ-3 screening. Parent participation and feedback has been positive.

"The ASQ-3 empowers parents to self-monitor their child's development from as early as nine months and obtain insight into their child's developmental needs."

Dr Pratibha Agarwal
Senior Consultant and Head, Special Care Nursery, Department of Neonatology, KKH

Led by Dr Pratibha Agarwal, the research team also includes: Associate Professor Mary Daniel, Senior Consultant and Head, Clinical Services; Ms Yang Phey Hong, Principal Psychologist; Associate Professor Lim Sok Bee, Senior Consultant and Head, from the Department of Child Development; and Dr Quek Bin Huey, Senior Consultant; Dr Khoo Poh Choo, Senior Consultant and Head, Neonatal Ambulatory Service; Associate Professor Victor Samuel Rajadurai, Senior Consultant and Head, from the Department of Neonatology, KKH.

NOVEL DNA SEQUENCING STRATEGY UNCOVERS HIDDEN CAUSES OF BRAIN MALFORMATIONS

Report by Editorial Team

Using a novel DNA sequencing strategy, a team of scientists have identified disease-causing gene mutations occurring in a tiny proportion of the body's cells, in patients with brain malformations. The researchers carried out the DNA sequencing strategy on blood samples from 158 patients with brain malformations.

“Despite previous genetic testing, the causative genes for these patients’ disorders could not be identified,” says Dr Saumya Jamuar, Consultant, Genetics Service, KK Women’s and Children’s Hospital (KKH), who led the study during his clinical genetics fellowship at Boston Children’s Hospital, USA.

“Our team questioned whether this could be due to the inadequacies of traditional methods of genetic testing, resulting in them being unable to pick up mutations which occur only in a small fraction of cells. Instead of casting a wide net, we decided to focus on a narrow list of possible genes and probe deeper.”

The types of brain malformations included double-cortex syndrome (n=30), polymicrogyria with megalencephaly (n=20), periventricular nodular heterotopia (n=61) and pachygyria (n=47). Patients with these brain malformations had presented at varying ages with neurocognitive symptoms such as seizures, intellectual disability and speech and language impairment.

IDENTIFICATION AND DIAGNOSIS

Shortlisting a customised panel of known genes and candidate genes associated with brain malformations from the patients’ DNA samples, the scientists performed targeted high-coverage sequencing – more than 200 times per gene. They discovered mutations in 27 (17%) of the 158 patients. Of these 27 mutations, eight (30%) mutations were somatic in nature.

Somatic mutations are non-inheritable gene mutations that occur spontaneously after conception and are present in some, but not all, cells. Such mutations can be limited to specific tissues, such as the brain only, or be found in all tissues but occur in only a fraction of the cells.

“Five of the eight somatic mutations were undetected by Sanger genomic sequencing – the current gold standard for genetic diagnosis. One of the eight had earlier undergone whole-exome sequencing and the cause was still undetected,” says Dr Jamuar.

“The data also suggested that these disorders can be caused by mutations in as few as ten percent of patients’ blood cells.”

Traditional DNA sequencing methods focus on the genome or whole-exome – the protein-coding regions of the genome. These methods break the DNA into fragments that are read 30 to 50 times, to find disease-causing mutations. However, as somatic mutations can occur in as few as 15 to 20 percent of the body’s cells, and a somatic mutation may affect just one of two copies of a gene, these mutations often remain undiscovered by low-depth DNA sequencing methods.

By focusing on panels of known or suspected genes and covering them hundreds of times instead of the traditional 30 to 50 times, the scientists were able to search deep enough into the panel of genes to reliably pick up and identify the disease-causing somatic mutations missed by routine genetic tests.

INTERVENTION AND GENETIC COUNSELLING

The research findings promise far-reaching benefits for patients, physicians and scientists.

"Finding the mutation and diagnosing its genetic cause provides physicians insights into the biology and disease process of the disorder," says Dr Jamuar. "This enables us to end the patient's diagnostic odyssey, provide gene-specific prognoses to help prepare the family for the child's future capabilities and special needs, and identify therapeutic targets for intervention.

The diagnosis also enables us to reassure parents that the condition was not genetically inherited, provide accurate recurrence risk in future pregnancies and help parents to mitigate the risk of having another affected child."

On the research front, the novel diagnostic strategy is valuable for the evaluation of other brain-based disorders unassociated with brain malformation, the genetic cause for which could not be identified. These include intellectual disability (ID), developmental delay (DD) and epilepsy, which affect up to 0.5 to one percent of all live-borns.

"These disorders have strong genetic links – over 500 genes have been found to be associated with ID, DD and/or epilepsy. However, despite testing of known genes, the molecular etiology of these disorders has remained unidentifiable for a significant number of individuals," says Dr Jamuar.

GENETIC TESTING

By limiting sequencing to a shortlisted panel of candidate genes, the new strategy proposed by the research permits a higher depth of coverage and cost-efficient detection of somatic mutations.

Future applications of sequencing panels may also allow the successful interrogation and better understanding of other disorders with high rates of spontaneous mutations, such as autism spectrum disorders and other neuropsychiatric disorders.

"While traditional methods of genetic testing may have limited sensitivity in pinpointing mutations that only affect a tiny fraction of the body's cells, they still hold an important place in the evaluation of disorders and disease," says Dr Jamuar.

"Neither strategy offers a single solution for all patients, but their complementary strengths give geneticists a more complete set of tools to provide better diagnoses and interventions for our patients and their families."

The study was led by Dr Saumya Jamuar, under the supervision of Dr Christopher A. Walsh, an Investigator of the Howard Hughes Medical Institute (HHMI) and Chief of the Division of Genetics at Boston Children's Hospital (BCH), and Dr Timothy Yu, Instructor in Pediatrics, BCH. During the study, Dr Jamuar was a clinical genetics fellow at BCH and is now Consultant, Genetics Service, KKH.

A paper outlining the study findings, entitled 'Somatic mutations in cerebral cortical malformations', was published in the 21 August 2014 issue of the New England Journal of Medicine.

GERMLINE VS SOMATIC MUTATION: DOUBLE-CORTEX SYNDROME

Double-cortex syndrome, also known as subcortical band heterotopia, is an example of a brain malformation caused by abnormal migration of neurons during brain development. Patients with double cortex present with varying degrees of epilepsy and learning disability.

In the case of double-cortex associated with germline mutation of the *DCX* gene (Figure A), the presence of an extra band of neurons under the normal gray matter of the brain cortex gives the appearance of the double cortex (indicated by white arrows).

In the case of double-cortex due to somatic mutation of the *DCX* gene (Figure B), as the neurons develop independently of each other, mosaic variants will affect the migration of a small subset of neurons, and hence, the band appears to be thinner (indicated by red arrows, which represents approximately 10 percent of the cells being affected).

Figure A

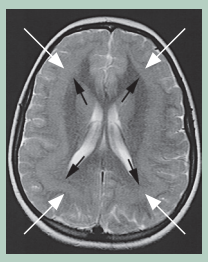

Figure B

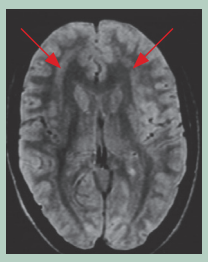

Figure A. Classical double-cortex associated with germline mutation in the *DCX* gene.

Figure B. Double-cortex due to somatic mutation in the *DCX* gene.

Reference

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INFLUENZA VIRUS INFECTIONS

A brief overview of epidemiology and diagnostic modalities

Associate Professor Matthias Maiwald, Senior Consultant; Dr Loo Liat Hui, Principal Scientific Officer; Associate Professor Nancy Tee, Senior Consultant and Head; Department of Pathology and Laboratory Medicine, KK Women's and Children's Hospital

What is commonly termed the 'flu' may be a variety of influenza-like illnesses caused by true influenza viruses, as well as by many other viruses that affect the upper and lower respiratory tract of humans. However, influenza viruses stand out, causing infections that tend to be more severe than those caused by most other viruses.

Influenza viruses disproportionately affect vulnerable members of the population, such as young children, the elderly and patients with pre-existing medical conditions. The World Health Organisation estimates that each year, about three to five million cases of severe influenza and about 250,000 to 500,000 influenza-related deaths occur worldwide[1].

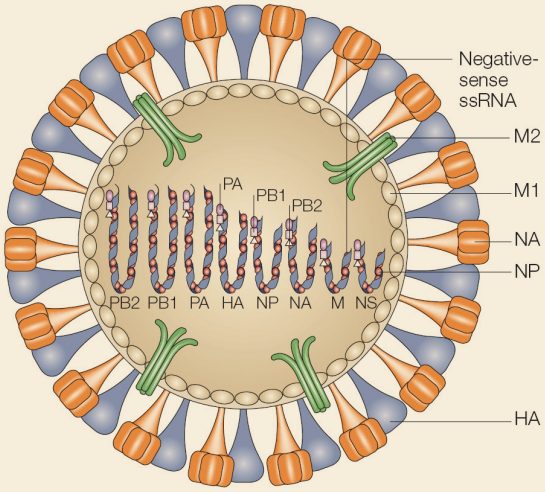

Figure 1. Scheme of an influenza A virus. Major components: hemagglutinin (HA); neuraminidase (NA); M2 ion-channel protein; nucleoprotein (NP); three polymerase proteins (PA, PB1, and PB2); matrix protein (M1); non-structural protein (NS). Inside the virus, eight RNA segments code for these proteins.

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BIOLOGY OF INFLUENZA VIRUSES

Influenza viruses are ribonucleic acid (RNA)-containing viruses that belong to the Orthomyxoviridae family. There are three types of influenza viruses, A, B and C. Among these, types A and B cause more severe disease; type C occurs rarely and usually causes only a mild disease. The most characteristic feature of influenza viruses is that the RNA genome consists of several distinct segments. Types A and B have eight segments each and type C has seven segments[2].

All influenza viruses are subject to genetic mutations, which slowly and continuously change their antigenic composition in a process known as antigenic drift. This impacts the human immune system's ability to recognise the viruses. In addition, the influenza A virus has the ability to exchange its genome segments between different virus strains. This can occur when strains from different animal species infect one host concurrently. This process is known as genomic reassortment and leads to a more abrupt antigenic shift. Thus, the influenza A virus possesses two distinct mechanisms, one acting slowly and the other rather abruptly, to overcome the human immune response and cause new waves of infections.

Two genome segments of the influenza A virus (Figure 1) are of particular importance, as they code for two important antigens – haemagglutinin (H) and neuraminidase (N). Both molecules are required by the virus to infect host cells, and conversely, effective antibodies against both can confer immunity. There are now 16 recognised H subtypes and nine N subtypes[3]. Different H and N subtypes tend to occur in different host species; for example, H1, H2 and H3 regularly occur in humans, birds and swine, while many of the other subtypes predominantly infect birds and some other animals. An overview of notable H and N subtypes is given in Table 1.

EPIDEMIOLOGY OF INFLUENZA VIRUSES

Influenza virus infections in humans occur in three different epidemiological scenarios:

Seasonal influenza – in which the influenza viruses circulate continuously in the human population, usually after first having spread in a pandemic. In colder climates, seasonal influenza tends to peak in the winter months, whereas in tropical climates, such as in Singapore, infections occur year-round.

Pandemic influenza – which arises when a new influenza A strain, usually a new genomic reassortant, freshly enters the human population and spreads in a worldwide epidemic. One notable pandemic was the infamous H1N1 "Spanish Flu" (1918-1919) which caused approximately 50 million deaths worldwide. A recent example was the H1N1 influenza pandemic in 2009-2010, which spread very quickly around the globe but caused relatively mild disease and is now established as a seasonal illness.

Zoonotic or variant influenza – in which the influenza A strains that usually circulate in animals – mostly birds – cause human disease. These viruses are primarily animal-adapted and do not spread easily between humans; consequently, none of these viruses currently causes sustained human-to-human transmission (Table 1)[1].

Zoonotic strains tend to have a different cell tropism than human-adapted strains, and when they infect, they tend to cause more severe human disease, mostly in the lower airways. This is reflected in the high fatality rates of the current avian H5N1 and H7N9 strains.

The big threat looming from zoonotic influenza strains is that these viruses may gradually acquire mutations that adapt them to humans, or recombine with already human-adapted strains – while retaining their pathogenicity – and one day cause a new human pandemic with worldwide spread and a high fatality rate.

These are good reasons to remain vigilant about any new developments in influenza virus epidemiology. The strains currently circulating in Singapore are the 2009 H1N1, seasonal H3N2 and influenza B.

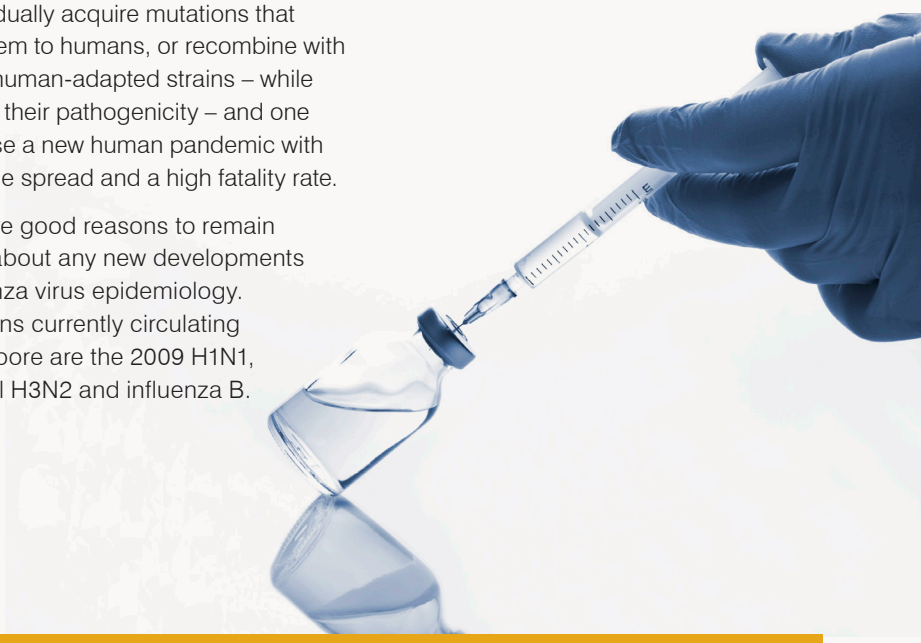

TABLE 1. NOTABLE INFLUENZA A VIRUS HAEMAGGLUTININ (H) AND NEURAMINIDASE (N) SUBTYPES

INFLUENZA A SUBTYPE	COMMENTS/PROPERTIES
H1N1 ("seasonal" pre-2009)	Was a dominant seasonal H1N1 strain in humans before 2009; now replaced by the 2009 H1N1; no longer circulating; not contained in current vaccine.
H1N1 (pandemic 2009)	Pandemic strain that arose in 2009 through a reassortment of swine, human and avian strains; still circulating in Singapore; contained in current vaccine.
H2N2	One H2N2 strain caused a human pandemic in 1957 and circulated in the 1960s; no longer actively circulating.
H3N2	An H3N2 reassortant has been circulating in humans since a pandemic in 1968 and is still circulating as a seasonal strain; contained in the current vaccine.
H5N1	A highly pathogenic strain of H5N1 is currently circulating in bird populations, mainly in South-East Asia, but also in some other countries. Since 1997 it has caused sporadic human infections with a high case-fatality rate. There have been more than 600 cases so far with approximately 60% fatality; it has no sustained human-to-human transmission.
H7N9	The first human case occurred in March 2013 in China; the virus appears to be circulating in poultry without apparent disease, but the epidemiology is unclear. There have been about 450 human infections up to October 2014, mostly severe, with a fatality rate of approximately 30%; no sustained human-to-human transmission.
H10N8	The strains circulate in wild birds, and also some domestic poultry, and are associated with mild disease. The first human case was reported in November 2013 in Jianxi Province, China; there have been three human cases reported so far, of which two died.

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CLINICAL FEATURES

Many symptoms are shared between illnesses caused by influenza viruses and other respiratory infections. There are no clear-cut distinguishing clinical features, and despite the tendency of influenza to be more severe, it is also possible to have quite mild infections with influenza viruses. However, the likelihood of a respiratory illness being caused by a true influenza virus infection is somewhat increased if there are constitutional symptoms such as high fever, malaise, headaches, myalgia and arthralgia.

Hospital and/or specialist referral, including virological diagnosis, should be sought in cases involving severe illness, significant lower respiratory tract involvement and/or a travel history that includes regions that have known zoonotic influenza. Treatment with neuraminidase inhibitors, such as oseltamivir, may be indicated in severe cases and/or in high-risk patients, but is usually not necessary in uncomplicated influenza. Treatment with antibiotics is generally not indicated in patients with isolated upper respiratory tract infection.

DIAGNOSTIC MODALITIES

Nasopharyngeal swabs or aspirates are the specimen types of choice for diagnosing influenza virus infections. Other specimen types, such as bronchoalveolar lavage samples, are also suitable. A number of diagnostic tests are suitable to diagnose influenza virus infections. These include:

1. Classical virus cultivation in cell culture
2. Polymerase chain reaction (PCR) for influenza A, B or C virus RNA
3. Multiplex PCR for a panel of many different respiratory viruses that includes influenza A and B viruses
4. Direct immunofluorescence (IF) testing for a panel of respiratory viruses including influenza A and B (Figure 2)
5. Rapid point-of-care commercial antigen tests for influenza A and B viruses

KK Women's and Children's Hospital's Department of Pathology and Laboratory Medicine routinely performs PCR, multiplex PCR and IF testing. Clinical samples which test positive for influenza A or B are forwarded to the Singapore National Public Health Laboratory for further testing, which includes virus culture and influenza A subtyping.

In urgent cases, such as when patients returning from avian influenza-affected regions are admitted to the hospital – and it is important to know whether these patients need to be isolated – subtyping of influenza A strains can also be performed by the department.

These diagnostic modalities help to keep track of what is happening in the epidemiology of influenza viruses and contribute to the epidemic preparedness of Singapore.

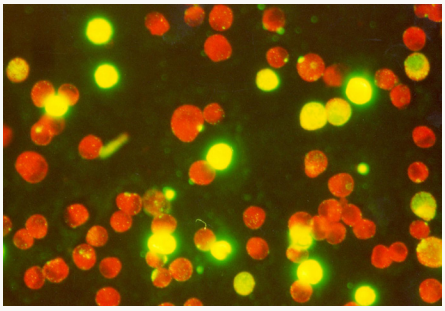

Figure 2. Image of an IF test showing a positive result for influenza A virus (original magnification 400x). Cells exhibiting a yellow-green fluorescence are virus-infected; cells stained red (with a counterstain) are normal.

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Associate Professor Matthias Maiwald graduated with a Doctor of Medicine from the University of Heidelberg in Germany and completed a Fellowship of the Royal College of Pathologists of Australasia (FRCPA) in Australia. He is also Adjunct Associate Professor at the NUS Yong Loo Lin School of Medicine and Duke-NUS Graduate Medical School.

Dr Loo Liat Hui graduated with a Bachelor of Science from National University of Singapore. He subsequently obtained a Master of Science from the London School of Hygiene and Tropical Medicine and a PhD from Nanyang Technological University.

Associate Professor Nancy Tee graduated with a Bachelor of Medicine, Bachelor of Surgery from National University of Singapore. She trained in clinical microbiology and obtained a Fellowship of the Royal College of Pathologists of Australasia (FRCPA). She is also an Adjunct Associate Professor at the Duke-NUS Graduate Medical School and a Senior Consultant at the National Public Health Laboratory, Ministry of Health, Singapore.

INTEGRATED CARE FOR DIABETES

New one-stop clinic improves care delivery for children with diabetes

Children and adolescents with diabetes are receiving even closer monitoring for diabetes-related health conditions, at the Diabetes Annual Review Clinic at KK Women's and Children's Hospital (KKH).

Started in July 2014, the multidisciplinary initiative allows young patients with diabetes to obtain the recommended annual screening tests for diabetes-related health conditions, diabetes education and counselling on preventative self-care, healthy lifestyle and dietetic advice, as well as social support and financial counselling if needed – all within a single visit to the hospital.

Within four months since the introduction of the one-stop service for children and adolescents with diabetes, 91 percent of patients who were scheduled for annual screening at the clinic attended and completed all their annual screening tests. This marks an increase of 30 percent in test completion rates compared to the same time period in 2013. The added convenience has also drawn positive feedback from patients and their families.

Diabetes is a metabolic disorder characterised by high levels of sugar in the blood and is associated with an increased risk of damage to blood vessels. Individuals with diabetes should be screened for eye, kidney, nerve and cardiovascular problems that can develop as a result of diabetes.

"Many diabetes-related health conditions are asymptomatic in their early stages. To optimise the growth, development, health and life expectancy of every child with diabetes, we wanted to ensure that no child misses any of the recommended annual screening tests," says Dr Lek Ngee, Consultant, Endocrinology Service, KKH.

"Working together with Singapore National Eye Centre (SNEC) and other healthcare colleagues at KKH, we were able to condense the annual review process for patients with diabetes into a single hospital visit. Earlier, this review had required multiple visits to various locations on different days."

RETINAL EYE SCREENING AND RESULTS WITHIN AN HOUR

As an added convenience for patients, the new Diabetes Annual Review Clinic at KKH is able to conduct retinal eye screening for the detection of diabetic retinopathy, i.e. damage to the blood vessels of the retina which can cause vision problems, and deliver the results of the test within an hour. This feat is achieved through seamless coordination between KKH and SNEC.

First, a diabetes nurse educator takes high quality images of the patient's retina using a computer-assisted eye image analysis platform developed by SNEC (Figure 1).

Figure 1. A child with diabetes undergoes retinal eye screening for the detection of diabetic retinopathy.

Figure 2. A paediatric diabetes specialist doctor discusses the results of the retinal eye screening with the child and his father.

The retinal image is sent electronically to SNEC for analysis, after which the report is returned to KKH. Based on the report from SNEC, the paediatric diabetes specialist doctor at KKH then discusses the results of the retinal screening with the patient and their parents, and recommends a management plan if necessary (Figure 2). The entire process takes place within the same patient visit.

"Collaborating with fellow institutions and across disciplines helps us to better deliver holistic care and convenience to our patients in a timely manner, while increasing their adherence to the annual screening tests for diabetes-related health conditions," shares Dr Lek. "This enables us to keep a close watch on our young patients' health status."

RECOMMENDED ANNUAL SCREENING TESTS FOR INDIVIDUALS WITH DIABETES

Children with diabetes who have had the condition for more than five years, or who are aged ten years and above, are recommended to undergo the following tests annually to screen for diabetes-related health conditions:

Thyroid dysfunction test
Measures the thyroid-stimulating hormone and free thyroxine levels in the blood. Thyroid dysfunction can impair metabolic control and increase the risks of cardiovascular disease.

Diabetic retinopathy test
Examines the eyes for retinal changes and damage to the blood vessels in the retina, which can lead to vision problems and blindness.

Dyslipidaemia test
Measures the levels of various lipids in the blood. Raised lipid levels are associated with increased risks of cardiovascular disease.

Microalbuminuria test
Measures the level of albumin in the urine. Small increases in its level may indicate early kidney problems.

MENTAL DISORDERS IN CHILDREN WITH INTELLECTUAL DISABILITIES

Dr Radha Srikanth, Consultant, Department of Psychological Medicine (Child and Adolescent); Department of Child Development, KK Women's and Children's Hospital

The worldwide prevalence of intellectual disability in the general population is one percent. Children with intellectual disabilities can be at high risk of developing mental disorders – medical literature has found the general prevalence of psychopathology in children with intellectual disabilities to be as high as 40 to 50 percent[1, 2, 3]. More generally, other co-morbid mental disorders include depression, which is common, as well as bipolar disorders and schizophrenia[2, 4], both of which are rare during childhood.

PSYCHOPATHOLOGY

At KK Women's and Children's Hospital (KKH), common co-morbid mental disorders seen in children with intellectual disabilities include autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) and anxiety disorders.

Children with ASD are noted to have a higher incidence of mental disorders in comparison to the general population. This predisposition may be due to multiple factors, including poor coping ability; social deprivation; lack of support; abuse; communicative and sensory difficulties; a higher prevalence of epilepsy; physical disorders; medication and a family history of mental disorders and behaviours associated with genetic conditions.

It has been widely studied that mental health problems in children with intellectual disabilities are often overlooked by caregivers and medical professionals alike, leading to poor clinical outcome, increased healthcare cost and impaired quality of life for the patient.

This can be due to under-diagnosis or diagnostic overshadowing, where symptoms of the mental disorder are attributed to peculiarities of the co-existing intellectual disability.

ASSESSMENT

Early identification of mental disorders and implementation of appropriate intervention is crucial in optimising quality of life for children with intellectual disabilities and their families. Additionally, caregivers must be educated to identify warning symptoms of emerging mental issues and engaged to appreciate the urgency of bringing these to the attention of their attending physician.

Medical professionals should be alert to changes in the child's functional skills, the emergence of previously non-existent behaviours which cannot be explained by recent physical illness, or a common social stressor or life event, such as bereavement. While the symptoms exhibited may vary with different levels of intellectual disability, these may indicate the emergence of a mental disorder.

Common warning symptoms can include:

- Isolation
- Regression of daily living skills
- Disturbance in appetite or sleep
- Emergence of aggression or self injury
- Distressing or odd behaviours such as refusal to leave the house, or becoming tearful, clingy or fearful

Should a child with an intellectual disability present with a recent change in behaviours or functionality, they should be first carefully assessed and treated for physical ailments, which commonly include infections of the respiratory or urinary tract, or constipation. If none are identified, the presence of co-morbid mental disorders needs to be considered, and the child should be referred to the paediatrician or child psychiatrist for a behavioural and mental health evaluation.

Due to limitations in their communicative and cognitive abilities, children with intellectual disabilities may be unable to fully express their thoughts and feelings. Rating scales, such as the Connors rating scale for ADHD, are useful to complement the clinical assessment, but should be interpreted with caution, keeping in mind the level of the child's disability. A diagnosis must be made by a medical specialist after a thorough clinical assessment, gathering of collateral information and direct observation of the child.

DIAGNOSIS AND MANAGEMENT

When a mental disorder has been diagnosed, management can include psychological treatments in conjunction with medication, suitably adapted to the child's cognitive abilities. Symptoms and management recommendations for common mental disorders in children with intellectual disabilities are outlined in Table 1.

TABLE 1. SYMPTOMS AND MANAGEMENT RECOMMENDATIONS FOR COMMON MENTAL DISORDERS IN CHILDREN WITH INTELLECTUAL DISABILITIES

CONDITION	SYMPTOMS	MANAGEMENT
Attention deficit hyperactivity disorder (ADHD)	Children with ADHD exhibit higher levels of hyperactivity, inattentiveness and impulsivity than that expected of their individual developmental stage, negatively impacting on their social and cognitive function. These traits should not be overlooked as being part of the intellectual disability.	Management can include attention training by occupational therapists and psychologists, utilising sensory, cognitive and behavioural therapy. Stimulant medication under close monitoring continues to be the mainstay of treatment.
Anxiety disorders	Anxiety disorders may present as the child having more rituals, insisting on routines, having a 'meltdown' if changes are made without pre-planning, as well as having obsessive interests and an increase in stereotypies. This type of disorder is commonly associated with autism and genetic conditions such as Fragile X syndrome.	Multi-modal approaches include environmental modifications, sensory and behavioural therapy and use of the right method of communication, along with input from speech and language therapists. The use of medications such as selective serotonin reuptake inhibitors (SSRI) is beneficial for the management of intense and severe symptoms of anxiety.
Depression	Depression can be hard to detect in children with intellectual disabilities. They are less likely to express low mood and may appear happy. Appetite and sleep disturbance are also atypical. In children with moderate to severe intellectual disability, depression may present as increased self-injury, aggression or isolation. Additionally, they may appear to lose the functional skills they have learnt.	Psychological treatment, such as cognitive behavioural therapy, can be used as a first line of management for children with borderline to mild intellectual disabilities. Additionally, the use of medications such as SSRI has a strong place in the treatment of depression for children with moderate to severe intellectual disabilities. These should be considered as needed.
Schizophrenia and bipolar disorders	Children are likely to present with visual and tactile hallucinations. Symptoms are not well formed and often present as bizarre behaviours. These conditions are rare in childhood but may be associated with certain genetic conditions such as Prader-Willi and Velo-Cardio-Facial syndromes.	Treatment includes the use of antipsychotics, and where necessary, use of a mood stabiliser.

Continued psychoeducation and support for the patient's family and caregivers is of paramount importance to aid the recovery of the child. At KKH, families and caregivers are encouraged to be actively involved in learning about the child's condition during consultations. They are also offered counselling to support their ability to cope with the child's condition. Additionally, the option of seeking further mental support is available to family members and caregivers who are identified to be experiencing high levels of stress, or concern about their psychological wellbeing in coping with the child's condition.

KKH is currently collaborating with Movement for the Intellectually Disabled of Singapore (MINDS) on a study which aims to identify challenging behaviours and co-morbid mental disorders in children with Down syndrome and intellectual disabilities. The first of its kind in Singapore, the study seeks to inform and improve programmes for the prevention, early recognition and management of mental disorders, helping to achieve high quality care for this vulnerable group. The study is currently ongoing, with a targeted completion date of mid-2015.

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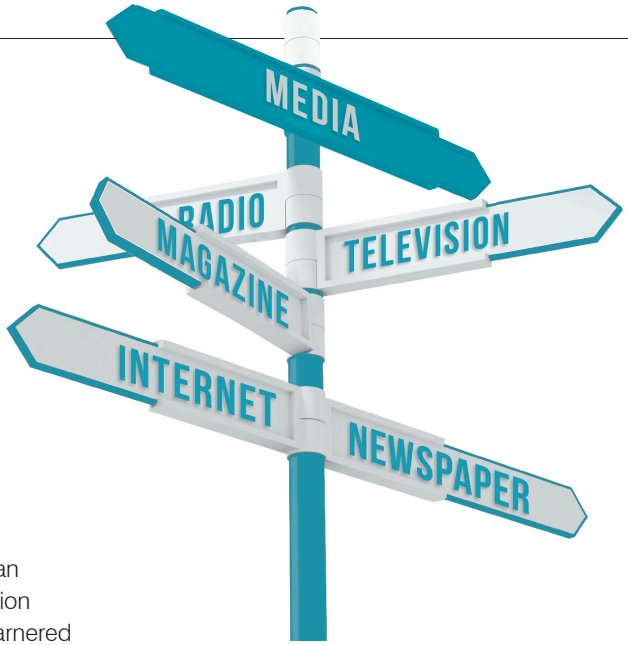
Dr Radha Srikanth graduated from The Tamil Nadu Dr. M.G.R. Medical University in India, and completed advanced training in the psychiatry of learning disabilities and clinical neuropsychiatry in the United Kingdom. She is a member of the Royal College of Psychiatrists, United Kingdom. Dr Radha's areas of interest include paediatric intellectual disabilities presenting with challenging behaviours or other mental, neurodevelopmental and neuro-mental disorders.

TEACHING COMMUNICATION FOR HEALTHCARE TODAY



Healthcare today exists in a complex world of increasing public education, ever-present media, more informed patients and often rapidly evolving global medical crises. Beyond the continual expansion of medical capability, a new requirement confronts the modern healthcare professional as part of care delivery – the ability to engage in effective communication with a highly connected public through a broad spectrum of media.

To enhance the communicative abilities and responsiveness of healthcare professionals toward engaging with situations in healthcare, a team of experienced communications specialists from SingHealth institutions were inducted as faculty with the Singapore Management University (SMU) to develop and teach a module on best practices for media management and crisis communication as part of the SMU-SingHealth Graduate Diploma in Healthcare Management and Leadership.

"Together, the team has more than 60 years of frontline communication expertise. With the experience garnered from many different industries and companies in addition to healthcare, the module was developed to give the best of many worlds," says Mr Vincent Lim, Deputy Director, Corporate Communications and Development, KK Women's and Children's Hospital (KKH), who led the team.

"As practitioners and educators, we custom-structured the course curriculum to address the unique communication needs and scenarios facing healthcare professionals today."

The course was aimed at enhancing healthcare professionals' readiness to communicate with confidence and sensitivity in various healthcare situations. This included equipping participants with awareness and knowledge of the media and the skills to respond to them appropriately.

To provide participants with immediate feedback on the effectiveness of their communication, real-time on-camera simulation training was also conducted akin to a live situation.

"The ability to connect with others strategically and sensitively is critical for the holistic development of the modern healthcare professional," says Mr Lim. "This skill set comes into its own for efforts in patient care, medico-scientific collaboration, and dissemination of knowledge and clinical skills. Most importantly, it helps participants to communicate clearly and compassionately with patients and the public in times of uncertainty and need."

This collaborative effort with SMU aims to develop the modern healthcare professional into an effective leader and communicator in their field.

Led by Mr Vincent Lim, the faculty team also includes: Mr Melvin Tan, Senior Manager, Corporate Communications and Development, KKH; Ms Junaidah Binte Abdul Hameed, Senior Manager, Communications, Singapore General Hospital; and Ms Chio Shu Yu, Manager, Group Communications & Service Quality, SingHealth.

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