HK J Paediatr (new series) 2013;**18**:230-265

Proceedings of Congress

Joint Annual Scientific Meeting 2013

The Hong Kong Paediatric Society and Hong Kong Paediatric Nurses Association
8 September, 2013

Oral Presentation (Doctor's Session)

Intranasal Corticosteroids for Mild Childhood Obstructive Sleep Apnoea – A Randomised Placebo-Controlled Study

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Background: Background Childhood obstructive sleep apnoea (OSA) is prevalent and if untreated could lead to significant cardiovascular and neurocognitive complications. Although adenotonsillectomy remains the first-line treatment of childhood OSA, it has its limitations and risks. Use of non-surgical treatment is gaining popularity especially in children with mild OSA.

Objective: To test the hypothesis that topical intranasal corticosteroids would decrease the severity of mild OSA in children.

Methods: We conducted a randomized, double-blinded, placebo-controlled trial of intranasal mometasone furoate (MF) versus placebo in children aged 6 to 18 years with mild OSA (apnoea hypopnoea index (AHI) between 1 and 5) proven on polysomnography (PSG). The medication / placebo were taken once daily. The primary outcome was the change from baseline AHI as documented by overnight PSG after a 4-month treatment. The secondary outcomes included the change from baseline (1) tonsil and adenoid size and (2) nasal symptoms.

Results: 62 children (mean age±SD = 11.1±2.8) were recruited. Thirty one received MF and 31 received placebo. AHI and oxygen desaturation index (ODI) were significantly reduced only in the MF group. The AHI decreased from 2.7±0.2 to 1.7±0.3 in the MF group but increased from 2.5±0.2 to 2.9±0.6 in the placebo group (p=0.039). The mean change in ODI in the MF group and placebo group were -0.6±0.5 and +0.7±0.4 respectively (p=0.037). The proportion of children having habitual snoring was also reduced in the MF group, from 75% to 54.5% (p=0.031), but not in the placebo group. Changes from baseline in tonsil and adenoid size, and daytime nasal symptoms were not significantly different between groups.

Conclusion: A 4-month treatment with intranasal mometasone furoate effectively reduced the severity of mild OSA in children. These findings justify the use of topical steroids as an initial therapeutic option in children with mild OSA.

Prevalence of Vitamin D Insufficiency Among Adolescent Girls in Hong Kong and Its Correlations with DXA Parameters

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Objectives: Vitamin D (Vit-D) is essential for bone homeostasis but the relationship between Vit-D status and areal bone mineral density (aBMD) remains inconclusive especially in adolescent population. The aims of this study were to evaluate the Vit-D status and its correlation with BMD parameters among adolescent girls in Hong Kong.

Methods: 248 adolescent girls (11.5-16.5 years old) were recruited separately in both summer (June to September, N=124) and winter (December to March, N=124). Bone mineral content (BMC) and aBMD of bilateral femoral necks were measured by dual-energy X-ray absorptiometry (DXA). Serum 25(OH)Vit-D and PTH level were measured by liquidchromatography- tandem mass-spectrometry and immunoassay respectively. Dietary calcium intake and physical activity level were assessed by validated food frequency questionnaire and modified Beacke questionnaire respectively. Multivariate linear regression analysis was applied to detect any correlation between DXA parameters and serum 25(OH)Vit-D levels.

Result: Mean serum 25(OH)Vit-D level in summer was significantly higher than that in winter (44.6±12.2 nmol/L and 34.4±9.9 nmol/L, p<0.001). Prevalence of Vit-D insufficiency [25≤25(OH)Vit-D≤50 nmol/L] in summer and winter were 60.5% and 76.6% respectively while the prevalence of Vit-D deficiency [25(OH)Vit-D<25 nmol/L] was 4.0% and 15.3% respectively. The prevalence of Vit-D insufficiency and deficiency were significantly higher in winter (p<0.001). Serum PTH level in summer was significantly lower than that in winter (5.15±3.16 pmol/L and 6.16±3.79 pmol/L, p<0.05). In multiple linear regression analysis, after adjustment for age, BMI, Tanner staging, physical activity level, dietary calcium intake and season, the positive correlations between 25(OH) Vit-D and both dominant and nondominant femoral neck aBMD and BMC were statistically significant. In season-specific model, positive correlations between 25(OH)Vit-D and both dominant and non-dominant femoral neck aBMD and BMC were significant in summer while no significant correlations could be detected in winter.

Conclusions: Although Hong Kong is a subtropical city at latitude of 22°N with sufficient sunshine, the prevalence of Vit-D insufficiency and associated low femoral BMD were still high among adolescent girls. This important bone health issue can be a significant public health concern. Further studies to investigate possible association between lifestyle factors and related therapeutic measures targeted on Vit-D insufficiency are warranted.

Acknowledgments: The project was funded by General Research Fund, University Grants Council of Hong Kong (Project number: 468411, 468809).

Quality of Life and Psychosocial Issues Are Important Outcome Measures in Eczema Treatment

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Background: Atopic eczema (AE) is a common relapsing inflammatory skin disease in children associated with chronicity and poor quality of life (QoL). Many children also display depressive, anxiety and stress symptoms.

Aim: To investigate the prevalence of depressive, anxiety and stress symptoms, and if these symptoms are associated with disease severity, QoL and skin biophysiology in childhood AE.

Methods: Psychological symptoms, eczema severity, QoL and biophysical skin condition of consecutive adolescents at the pediatric dermatology clinic of a teaching hospital were evaluated with the validated Chinese versions of Depressive, Anxiety, Stress Scales (DASS-42), Beck Depression Inventory (BDI-13), Nottingham Eczema Severity Score (NESS), Children's Dermatology Life Quality Index (CDLQI), transepidermal water loss (TEWL), and stratum corneum skin hydration (SH), respectively.

Results: AE patients (n=120) had lower SH, higher TEWL, worse CDLQI, and reported higher prevalence of depressive, anxiety and stress symptoms, personal history of atopy, current topical corticosteroid usage and food avoidance than non-AE patients (n=25) (Table 1). Depressive, anxiety and stress symptoms were reported in 21%, 20% and 42% of AE patients, respectively. Multivariate analyses showed that these symptoms were significantly correlated with a poor QoL (partial correlations of 0.40-0.49; p<0.001) (Figure 1). Male patients had more severe disease (higher NESS, p=0.036) and DASS-depressive symptoms (multivariate OR=3.2, p=0.034) than females. Patients who reported current topical steroid usage generally practiced food avoidance (p=0.047), had poor quality of life (p=0.043) but less DASS-depression (multivariate OR=0.354, p=0.043). Only 6% of the 120 AE patients reported prior psychology consultation.

Conclusions: Quality of life impairments correlate with disease severity, aberrant skin biophysiology, depression, anxiety and stress symptoms in adolescents with AE. Physicians caring for these patients must evaluate the different but inter-correlated medical, biophysiological and pertinent psychosocial domains. These significant correlations imply that a holistic approach should encompass psychotherapy, behavioral therapy and coping strategies in conjunction with dermatologic therapy.

Table 1: Comparison between AE and non-AE patients

	AE N = 120	non-AE N = 25	Mann Whitney Test (2-tailed)
Age	16.0 (14.4-18.2)	16.0 (14.5-17.8)	0.63
Male (%)	69 (58%)	16 (64%)	0.15
SH	35.4 (25.4-43.4)	48.6 (41.8-57.0)	< 0.001
TEWL	11.0 (10.0-12.6)	9.8 (9.3-11.4)	0.006
CDLQI	8 (4-11)	1 (0-3)	< 0.001
DASS-Depression	2.0 (1.0-8.0)	0.0 (0.0-3.0)	0.01
Depression (%)	25 (21%)	0	0.027*
DASS-Anxiety	4.0 (2.0-8.0)	2.0 (1.0-5.0)	0.036
Anxiety (%)	24 (20%)	0	0.031*
DASS-Stress	7.0 (3.0-13.3)	3.0 (1.0-6.0)	0.006
Stress (%)	50 (42%)	2 (8%)	0.003*
DASS-42	14 (6-28.3)	7 (4-11)	0.011
DASS	17 (14%)	1 (4%)	0.29*

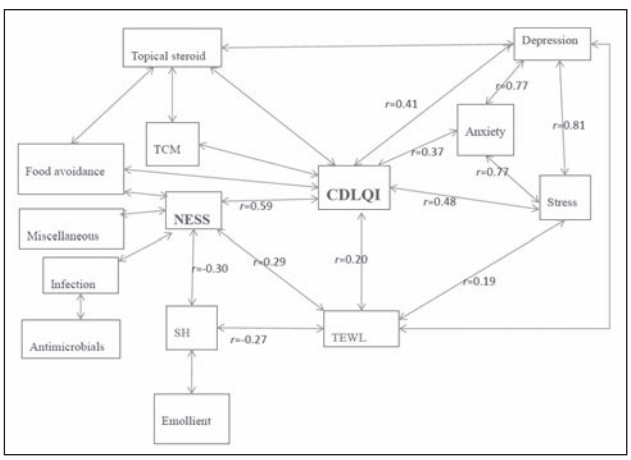

Figure 1

Effects of Histone Deacetylase Inhibitor and Proteasome Inhibitor on Epstein-Barr Virus-Positive Burkitt Cells and Lymphoblastoid Cell Lines

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Background: Both histone deacetylase inhibitors (HDACis) and proteasome inhibitors have been shown to be capable of mediating cytotoxic effects in Epstein-Barr virus (EBV)-positive lymphomas. EBV can establish latent infections with different latent gene expression patterns. In latency I pattern of viral infection, only EBNA1 and EBERs are expressed, whereas in latency III pattern, all of the EBV latent genes including EBNA-1, -2, -3A, -3B, -3C, - LP, LMPs and EBERs are expressed. In Wp-restricted latency pattern, all of the latent genes are expressed in the absence of EBNA2 and LMPs. It is known that EBV latent gene expression protects lymphoma cells from apoptosis. We hypothesised that EBV infected cells with different EBV latency patterns would have differential responses to the treatment with HDACis or proteasome inhibitors. In this study, we aim to investigate the effects of HDACi (suberoylanilide hydroxamic acid), proteasome inhibitor (bortezomib) and their combination on a panel of EBV-positive burkitt lymphoma (BL) cells and lymphoblastoid cell lines (LCLs) with different patterns of EBV latency.

Methods: Cytotoxic effects of SAHA, bortezomib and their combination on BL cells, including latency I (Akata 2003, Mutu-I), Wp-restricted (Daudi, P3HR1-c16), latency III (Raji, Mutu-III and LCLs) were determined by MTT assay. Apoptosis and cell cycle were measured by flow cytometry. Expression of apoptotic markers, acetylation of histone and EBV latent proteins were determined by western blot analysis.

Results: Either SAHA or bortezomib alone inhibited proliferation of EBV-positive BL cells and LCLs. BL cells with Wp-restricted or type III latency pattern were more resistant to killing by SAHA or bortezomib alone than those BL cells with standard type I latency. Interestingly, combination of SAHA and bortezomib synergistically enhanced the killing of Wp-restricted or latency III BL cells. Substantial increase in Annexin V-positive and sub-G1 were observed in these cell populations. Further, the drug combination enhanced proteolytic cleavage of PARP, activation of caspase-3 & 9 and acetylation of histone when compared with either drug alone. Furthermore, combination of SAHA and bortezomib suppressed the growth of BL xenografts in nude mice. The resistance to either SAHA or bortezomib alone and enhanced apoptosis by combining bortezomib and SAHA could also be observed in LCLs which express a full set of EBV latent genes. Further examination of the expression pattern of EBV latent proteins indicated that EBNA3A, rather than EBNA1, EBNA2 or LMP1, contributed to the resistance to the single drug treatments.

Conclusions: Expression of EBV latent genes in Wp-restricted and latency III infected cells confers resistance to treatment with SAHA and bortezomib. Bortezomib could potentiate SAHA induced apoptosis of EBV-positive BL cells and LCLs expressing more EBV latent genes. Further investigation of the drug combination regimen for the treatment of BL cells is warranted.

This work forms part of the MPhil thesis of YY Leung and is funded by CRCG grant #104001264 and Epstein-Barr virus research grant (#20004525) of AKS Chiang.

Unveiling The Genetics of Long QT Syndrome: A Local Paediatric Experience

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Long QT syndrome (LQTS) is the most common form of Sudden Arrhythmia Death Syndrome (SADS) with a prevalence of 1 in 2,500 individuals. Conventional diagnosis is based on case history, family history and ECG evaluation. Since 1996, thirteen LQTS genes have been discovered and current guidelines recommend that genetic testing should be incorporated as part of standard assessment in patients with suspected LQTS. The genotypes of our local cohort, is however, unknown. We recruited all the patients diagnosed with LQTS from the Department of Paediatric Cardiology of Queen Mary Hospital and offered genetic testing. Sequencing and MLPA were performed on 6 LQTS genes (LQT1-3, 5-7) by the Victorian Clinical Genetic Services to identify disease-causing mutations. A total of 19 patients were identified, 9 were male, with the QTc ranging from 460-619 ms. Mode of presentation included syncope (n=9), ventricular tachycardia (n=2), convulsion (n=1) and as incidental finding (n=7). Thirteen patients have been treated with β-blockers, one received

mexiletine and ICD insertion, one was treated with a combination of mexiletine, propranolol and ICD insertion. Pathogenic mutations were identified in 9 patients (LQT1=3, LQT2=4, LQT3=1, LQT5=1), likely pathogenic mutations in 2 (LQT2), unclassified variants in 2, and no mutation in 6. Patients with pathogenic and likely pathogenic mutations had significantly longer mean QTc than those without such mutations (p=0.046). Three mutations, all in the LQT2 genes, represented novel mutations. All 3 patients with mutations in the porelooping forming domains of the KCNH2 (LQT2) channel had personal or family histories of malignant arrhythmia or sudden cardiac death compatible with previously reported genotype-phenotype correlation. The cost per positive genotype was approximately HK$47,000. Eight families involving 18 family members underwent cascade testing, and family mutations were identified in 10 individuals from 6 families. Autosomal dominant transmission was the likely mode of inheritance in these 6 families. Genetic testing is useful in diagnosis, prognostication and family screening in patients with LQTS, and should be offered to all patients with such condition. Future research direction would involve the use of next-generation sequencing techniques especially for mutation negative patients.

Regulation of HIV-Tat Induced Cytokine Expression and Consequent Opportunistic Infection by The Proto-Oncogene c-Myc

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Human immunodeficiency virus (HIV) remains a major health problem around the globe, especially in third world countries where acquired immunodeficiency syndrome (AIDS) is highly prevalent and currently incurable. The HIV-1 trans-activator (Tat) protein is an important viral protein that is known to contribute to the AIDS pathogenesis via the dysregulation of cytokines such as TNF-α and IL-6. In this study, we recognised that c-Myc, a proto-oncogene known to regulate a wide range of cellular process, also regulated primary blood derived macrophage (PBMac) immune response induced by HIV-1 Tat. We first found that HIV-1 Tat could induce the expression of c-Myc.The function and expression of HIV- 1 Tat induced c-Myc was subsequently found to be regulated through the activation of the dsRNA-activated protein kinase (PKR), ERK1/2 and p38 mitogen-activated protein kinase (MAPK). Inhibition of c-Myc expression in turn demonstrated that c-Myc may be essential for the up-regulation of the pro-inflammatory cytokines TNF-α and IL-6 by HIV-1 Tat. Furthermore, c-Myc regulation of HIV-1 Tat induced cytokine expression consequently affected the intracellular survival of the opportunistic microbe, Mycobacteria avium intracellulare, in PBMac. Taken together, we demonstrated that c-Myc may play a significant role in the pathogenesis of AIDS, by mediating the dysregulation of cytokine expression induced by Tat and possibly accentuate opportunistic infection.

Outcome of Hepatobiliary Scanning: Preterm Versus Full-Term Cholestatic Infants

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Objectives: The aims of this study were to evaluate the specificity of a non-draining hepatobiliary scintigraphy (HBS) for biliary atresia (BA) in preterm and full-term babies, to verify the relationship between non-draining scan and higher levels of direct bilirubin and to find an objective criterion to guide the time in performing HBS.

Methods: A total of 175 infants (113 males and 62 females, median age of 45 days) with 181 HBS performed in Tuen Mun Hospital between January 1998 and May 2010 were retrospectively analysed. A "non-draining" scan was defined as one showing no excretion of radiolabelled tracer into the small bowel 24h after injection. The disease category, epidemiological and laboratory data were compared between infants having non-draining and draining scans. In addition, the predictive value of a negative scan for BA was compared between preterm and full-term infants.

Results: Twenty infants (11.4%) were surgically confirmed to have BA. A non-draining scan was found to be 100% sensitive for BA, and the specificity was 96% and 78% among full-term infants and preterm infants, respectively. The mean direct bilirubin values of infants with BA and intrahepatic cholestasis were 141.9 and 111.3 μmol/L, respectively, which were significantly higher than 67.2 μmol/L seen in infants with draining scans. This analysis shows that using direct bilirubin ≥63 μmol/L as an objective criterion in guiding the time to perform HBS is most cost-effective.

Conclusion: Our data supported that using direct bilirubin ≥63 μmol/L as an objective criterion in guiding the time to perform HBS will avoid unnecessary scans.

Integration of Chromosomal Microarray into Paediatric Clinical Care in Hong Kong

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Chromosomal microarray (CMA) has emerged as a major tool to identify unbalanced chromosomal aberrations in children and is recommended as the first tiered investigation for intellectual disability, autism spectrum disorders and multiple congenital anomalies. While the clinical interpretation and genetic counseling remain as ongoing challenge, data about potential downstream benefits and harms of CMA is lacking, especially in paediatric population. Our objective is to evaluate the clinical impact of CMA on medical management in children. In 2011-2012, we performed high resolution CMA using the NimbleGen 135k oligonucleotide array on 240 children in a university-affiliated paediatric unit in Hong Kong. By retrospective chart review, descriptive and multivariate analyses are performed to understand the association between CMA results and change in the medical management. The detection rate of pathogenic/probably pathogenic chromosomal aberrations is 20% in our cohort. While detailed analysis is underway, it is clear that CMA detects chromosomal changes missed by karyotype in some patients, while in others it provides significant information in addition. Importantly these findings can be medically actionable and/or have major implications for family members. The insights we have learned from some of our patients have wider implications for the medical community e.g. the recommendation of cardiac assessment for patients with 17p13.3 duplication (*Eur J Med Genet 2012; 55(12): 758-62*) and renal surveillance for patients with Xq22.3 deletion (Esophagus, in press), and have resulted in publications in peer-reviewed journals. One family with a neurodevelopmental phenotype and a probably pathogenic CMA finding has decided not to receive any further information as the parents realised that "knowing more may not be better". The potential of CMA findings to impact, positively and negatively, on patients is tremendous and warrants careful evaluation. Our findings will be instructive in anticipating the impact of whole genomic analyses on medical management and downstream utilisation of health services.

Orlistat Improves Endothelial Function in Obese Adolescents: A Randomised Trial

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Aim: To investigate the effect of orlistat on endothelial function in obese adolescents.

Methods: Single-blind 10-week controlled trial of sixty-seven normolipidaemic obese adolescents randomised into three groups. Group 1 (diet alone), Group 2 (diet and orlistat), Group 3 (diet, orlistat, and exercise). Endothelial function measured by flow-mediated dilatation (FMD) of the brachial artery, anthropometric parameters, blood pressure, fasting blood lipids, insulin and glucose levels were recorded at baseline and at 10-weeks.

Results: Sixty-four subjects completed the study. Groups were comparable at baseline. FMD increased significantly with orlistat (groups 2 and 3) but not in Group 1. Orlistat treatment resulted in significantly reduced body weight, BMI, waist circumference, total and LDL cholesterol levels. HDL-cholesterol levels were unchanged. Triglyceride and insulin levels were significantly reduced in all three groups. The reduction in cholesterols did not correlate with reductions in weight and BMI. A slight reduction of body fat, both with and without orlistat treatment, correlated with reduction in BMI after adjustment for baseline values. Blood pressure was unaltered by orlistat. Calorie intake was reduced with orlistat and the decrease noted in % fat and increase in % carbohydrate was significant only in those taking orlistat. The addition of exercise (Group 3 cf. Group 2) altered no parameter.

Conclusions: Orlistat improves endothelial function and reduces body weight, BMI, fasting total and LDL-cholesterol in obese adolescents when combined with dietary control. Improvement in endothelial function if maintained could reflect long term cardiovascular benefit.

SDF-1α Analogue (CTCE-0214) Can Enhance Survival and Migration of Human Mesenchymal Stem Cells Under Anoikis Stress

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Background: Mesenchymal stem cells (MSCs) have been applied to a variety of clinical conditions. However, several barriers hinder their usage. MSCs are adherent cells and require prior detachment into suspension for delivery. This disruption of cell-extracellular matrix interaction is known as anoikis and will induce massive cell death. This study focused on the migratory and survival mechanisms of MSCs under anoikis stress and explored the potential method to minimise such adversity.

Materials and Methods: Human MSCs was obtained from normal human bone marrow transplantation donors with written informed consent under the approval of IRB of HKU-HKWC Hospitals. The *ex-vivo* expansion of human MSCs as we previously described (Li J, NJH, 2004). In vitro anoikis stress was generated by seeding cells to the ultra-low attachment plate coated with the covalently bound hydrogel layer. CellTiter-Glo luminescent cell viability assay was used to test the cells viability. Expression of CXCR-4 & cell cycle analysis was tested by flow cytometry. Protein expression was assessed by Western analysis. Migration potential was evaluated by transwell cell migration assay with polycarbonate membrane inserted. GvHD mouse model was used to verify our findings *in-vivo*.

Results: Under non-adherent culture, anoikis induced MSCs to ball-like cellular aggregates which have better migratory response to stromal cell derived factor-1α (SDF-1α) or its analogue (CTCE-0214). It was correlated with increased expression of CXCR4 (receptor of SDF-1α) and can be blocked by CXCR4 inhibitor (AMD3100), suggesting this migration was CXCR4-dependent. Although the viability of MSCs under anoikis stress was dramatically reduced, the aggregates could overcome such adversity via possible paracrine support. CTCE-0214, which has longer half-life than native SDF-1α *in-vivo*, could promote cellular survival under anoikis. Our study showed that CTCE-0214 increased the expression of *Bcl-2* and modulated the cell survival through autophagy in a time-dependent manner. Such favorable effects were further verified by *in-vivo* study. The homing and engraftment effect could be suppressed by CXCR4 blocker, AMD3100.

Conclusion: Under aniokis, MSCs exerted distinct migratory and survival characteristics. Their migration was facilitated by forming aggregates with better migratory response to SDF-1α. Compared to SDF-1α, CTCE-0214 exhibited better biological effects. Our approach provides a new perspective to maximise the MSCs delivery and may facilitate the clinical applications of MSCs.

Poster Presentation (Doctor's Session)

Developing and Assessing the Effectiveness of an Internet-Based Curriculum for Obese Adolescents in Hong Kong

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Background: Obesity is an increasing public health issue among children and adolescents. Approximately, 22% of teens in Hong Kong are obese. Traditional face-to-face consultation with medical professionals alone may not be effective in addressing obesity among Chinese adolescents. In addition, many Hong Kong children and adolescents rely heavily on the internet to acquire updated knowledge and cell phone texting for communication. Using a web-based curriculum with cell phone follow up is an innovative means of managing obese teens.

Research Purpose: The objectives of this qualitative study were to investigate the feasibility of adapting an internet-based lifestyle change curriculum and the use of cell phone for follow-up support, and to better understand the challenges and weight management needs of obese Hong Kong adolescents. This study is part of a larger randomised controlled trial (RCT) study on the use of an internet-based curriculum with cell phone reminders among obese Hong Kong adolescents.

Methods: An eleven-week articulated internet-based curriculum was created in Cantonese and English. Information related to nutrition such as the Food Pyramid, portion size, and increasing energy expenditure through physical activity such as brisk walking, decreasing computer usage and increasing relaxation practices were included. Short videos, reflective questions, wrap up quizzes and matching games were included to make the curriculum interactive. Focus groups were conducted with participants with primary obesity attending the paediatric obesity clinic of a tertiary care hospital. All subjects were asked to review the articulated 11-week curriculum and provide feedback on the curriculum and the use of social media and texting in the larger study. Transcripts were reviewed and data was coded using open and axial coding. Themes were identified by grouping all coding.

Results: A total of 11 participants (aged 14-18 years) were recruited; four themes emerged. This novel study explored obese Chinese adolescents' perspectives of the usability and acceptability of adapting an internet-based lifestyle change curriculum along with a text message follow-up support. The challenges and weight management needs of obese Chinese adolescents were also examined in this study. The findings revealed that emphasis on academic performance, heavy school work load and time management issues were important barriers for adolescents to reduce weight by restricting the amount of time available for physical activity. The use of the web-based curriculum and text message reminders in assisting obese Chinese adolescents to make behavioural change were well accepted by most participants.

Conclusions: This study highlighted that the internet-based curriculum along with professional consultation and text message reminder is a feasible and acceptable means to help obese Chinese adolescents lose weight. The study participants were limited to the obesity clinic of a tertiary care hospital in Hong Kong and may not be representative of Chinese youth in general. However, findings may be useful for larger studies incorporating internet curriculum and text messaging in obesity management.

Knowledge, Attitude and Skill Related to Adolescent Sexual Health Education and Counseling Among Paediatric Nurses in Hong Kong

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Purpose: Adolescents in Hong Kong are becoming more sexually liberated. Premature sex, sexual transmitted diseases (STD's) and unplanned pregnancies among teenagers are increasing. Early engagement in sexual behaviours is associated with significant risks for physical and psychosocial problems. Paediatric nurses play an important role in meeting the challenges of the increasing demand for adolescent sexual healthcare. Whether nurses are well prepared to address these challenges is unclear. This study explores the knowledge, attitude and practice towards adolescent sexual health issues among Hong Kong paediatric nurses.

Methods: An anonymous self-administered questionnaire was designed based on an extensive review of the literature and partially adapted from previously utilised surveys, and included background information, knowledge

assessment, attitude and actual practice. Data was collected at a paediatric conference in Hong Kong with a response rate of approximately 78.5% and 394 completed surveys. Data analysis was carried out using descriptive statistics, correlation test and stepwise logistic regression. Nurses' actual practice was regressed as an outcome variable. Nurses' socio-demographic characteristics, knowledge and attitude were treated as predictors.

Results: About 70.3% of the respondents had a baccalaureate or higher degree. The majority of nurses were working in public settings, e.g., 55.6% in Hospital Authority and 41.4% in the Department of Health. Only 14.5% had training in adolescent health and 3.3% for adolescent sexual health. More than half of the nurses (56.1%) had correct response on sexual health knowledge. Most of them were highly aware of the importance of sexual education for adolescent (74.7%) but did not feel knowledgeable (9.1%) or comfortable (36.3%) to discuss these topics. Inadequate training (39.4%), time constraints (26.8%) and teens' unwillingness (22.9%) were identified as the top three barriers in clinical practice. Nurses preferred further training on communication skills (63.4%) and counseling skills (60.6%) through field visit (82.3%) and workshops (74.5%). Nurses who felt very comfortable with teen sexual health issues were more likely incorporate sexual health screening and counseling in their practice (Avg. $OR_{adj.}$=2.643). Previous training (Avg. $OR_{adj.}$=2.690) and self-rank knowledge level (Avg. $OR_{adj.}$=4.096) were also important predictors.

Conclusions: This study shows a high awareness of importance but poor training experience or preparation in adolescent sexual healthcare among Hong Kong paediatric nurses. More training/practice programmes should be provided for paediatric nurses. Also, further study is suggested to investigate how to enhance nurse comfort level in clinical practice. The main limitations of the study were inaccurate self-reported information and selection bias.

Validating a Chinese Version of the Gaps Questionnaire to Examine Health Risk Behaviours and Depressive Symptoms Among Undergraduate Students at the Chinese University of Hong Kong

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Introduction: Unhealthy habits and risk behaviours in youth are associated with serious health problems in adolescence and adulthood such as psychological disorders, cardiac and respiratory diseases, cancer, complicated pregnancies and deliveries. GAPS or the Guidelines for Adolescent Preventive Services, developed by the American Medical Association, is a validated and standardised screening tool for healthcare providers to assess adolescents for health risk behaviours. They are in English and Spanish, but there is no Chinese version available.

Objectives: The objectives of this study were to validate a Chinese version of GAPS questionnaire, to examine the general health risk behaviours, and to assess for depressive symptoms and associated factors among undergraduate university students at the Chinese University of Hong Kong.

Methods: The anonymous self-administrated Chinese version of the GAPS questionnaire was translated using a valid translation process and administered to the participating students. A cross-sectional study was conducted using a convenient sample (n=400) of undergraduate students who presented to the university health service center medical care. Data analysis was carried out using descriptive statistics, correlation test and stepwise logistic regression.

Results: Participants reported a number of health risk behaviours including inadequate physical activity (73.2%), disordered eating (50.6%), and depressive symptoms (29.3%). In addition, respondents also reported getting drunk in the past month (28.3%), engaging in sexually activity (13.3%), and having suicide attempts (7.3%). Multivariable regression results indicate that the number of health concerns, a learning problem, lack of parental support, body image disturbance, and history of sexual or physical abuse were strongly related to self-reported depressive symptoms.

Conclusions: The GAPS is a useful tool for healthcare providers to assess adolescent health risk behaviours. Further interventions could include standardising GAPS for routine student health visits and providing targeted screening and counseling for depression, disordered eating and inactivity among university students in Hong Kong.

Family Studies in Children with Obstructive Sleep Apnoea

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Objectives: To determine if obstructive sleep apnoea (OSA) has different familial aggregation characteristics in obese and non-obese children.

Subjects and Methods: Children aged between 6 and 16 years were recruited. Subjects with habitual snoring and an obstructive apnoea hypopnoea index (OAHI)>1/h as confirmed by overnight polysomnography (PSG) were recruited as cases. Non-snoring subjects with PSG confirmed absence of OSA (OAHI <1/h) were recruited as controls. The parents of both cases and controls were also invited to participate. All cases and controls underwent anthropometric measurements, nocturnal attended PSG and upper airway size examination. All parents underwent the same set of assessments except for nocturnal attended PSG, which was replaced by unattended home PSG. Children with BMI >85th percentile of the local reference were defined as overweight, while those with BMI >95th percentile were defined as obese. Families of obese, overweight and normal weight children were analysed separately.

Results: One hundred and ten families were enrolled into the study. Eleven of them quitted subsequently due to personal reasons. Of the remaining 99 families, 36 probands were overweight or obese, of whom 23 were diagnosed to have OSA. Of the 63 normal weight probands, 27 had OSA. The results revealed that in normal weight subgroup OAHI in children was associated with maternal OAHI ($r=0.335$, $p<0.05$) while in obese subgroup it was associated with paternal OAHI ($r=0.618$, $p<0.05$). It was also found that father of children with OSA tends to have a higher OAHI than those had a non-OSA child, especially in the overweight/obese subgroup.

Conclusion: There was a correlation between the child's OSA severity and their parents' OSA severity. Our data suggest that there are differences in the heredity of the disease in obese and nonobese subgroups.

β-Glucans Uptake by Human Dendritic Cells via a Variety of Endocytotic Mechanisms

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Background: β-glucans are natural polysaccharides carrying β-glycosidic bonds and exist diversely in cell wall of bacteria and fungi. Ganoderma Lucidum (G.lucidum) is a kind of mushrooms fungus that has potent immunomodulatory effects on human immune cells. Since the β-1-3 and 1-6 glycosidic linkages of β-glucans cannot be digested by human, how β-glucans are uptaken and then stimulate dendritic cells (DCs) remains elusive. We explored whether its uptake involves various endocytotic pathways.

Methods: We utilised human monocyte-derived DCs as in vitro models and investigated the involvement of three known endocytosis mechanisms: clathrin-mediated, caveolaedependent and macropinocytosis. Chlorpromazine (CPZ), genistein (GNS) and cytochalasin D (CCD) were selected as their respective inhibitors. G.lucidum β-glucans (GL-PS) were used due to its high potency in stimulating the DCs maturation. Cell colonies were observed by microscopy and selected CD markers expression were assessed by Flow Cytometry.

Results: Our results showed that all inhibitors exerted suppressive effects on DCs maturation by down regulating a panel of surface maturation markers expressions. The suppression indirectly suggested that GL-PS was internalised via all these 3 mechanisms.

Conclusion: We hypothesised that clathrin, caveolae and macropinocytosis pathways were all potentially involved in β-glucans uptake into DCs. Further study is ongoing to confirm our findings.

Cluster Evaluation on Teenage Pregnancy Management in Hong Kong

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Introduction: The Comprehensive Child Development Service (CCDS), a community-based early childhood intervention program aiming to improve child health and targeting high-risk families, was implemented step-by-step in different districts of Hong Kong after the 2005 policy address. Pregnant teenage ladies aged below 18 were one of the targeted risk groups under the program which provided antenatal and child care by collaboration of the Departments of Obstetrics, Paediatrics and Maternity and Child Health Centers. The New Territories West cluster was one of the first pilot clusters for the CCDS program provided by Tuen Mun Hospital from 2006. This service was extended to the New Territories East cluster in March 2012.

Aim: The aim of this evaluation is to compare child health problems among the intervention cluster (NTW) and control cluster (NTE) over the following 2 periods: (1) the period without a CCDS program in 2001 to 2005 and (2)

the period with the CCDS program implemented in 2007 to 2011 in NTW. Method: Data was retrieved by the Clinical Data Analysis Report System (CDARS). Results: There were 146 and 167 of births from teenage in NTW in these 2 periods respectively, whereas, 129 and 104 in NTE. No significant difference was found in all demographic parameters of birth weight, gender ratio, gestational age, mode of delivery or requirement of NICU admission in these two periods in both intra or inter-cluster comparisons. There was a significant increase in the number of Accident and Emergency unit (A & E) attendance of children aged below 2 years with teenage mothers in NTW, changing from 48.5% to 73.3% respectively, before and after the implementation of the CCDS program ($p<0.0009$). However, this trend increase was not noted in the control cluster (NTE). The median number of A & E admissions rose from zero to three times in the intervention cluster (NTW) after the CCDS program was implemented ($p<0.0035$). But there was no positive associated increase in hospital admission in the same periods, which indicates that the medical consultations were not for urgent or serious conditions ($p=0.14$). After the implementation of the CCDS program in NTW, 99% of children aged under 2 years with teenage mothers were followed under the CCDS Paediatrician ($p<0.001$). The median number of attendance rose from zero to three times in NTW during the 2 periods. ($p<0.001$) In contrast, the control cluster showed a significant decrease in the number of A & E attendances which fell from 73.9% to 45% ($p=0.001$). Moreover, in this control cluster the median attendance number of out-patient consultations dropped from two to zero over these periods. Longer follow up for analysing details of admissions, death rate or child abuse rate are required.

Conclusion: A comprehensive inter-departmental and well planned program providing antenatal and child care was successfully reaching nearly all targeted teenage mothers. The increase in A & E attendance after the commencement of the CCDS program may indicate the satisfactory engagement and rapport among the Paediatrician and the families, and the enhancement in the early recognition of subtle symptoms. Moreover, this group of teenage mothers under the CCDS program was more ready to seek public medical services. We would like to suggest for long term follow up for details of adverse outcomes.

Dental Health of Preschool Children with Autism Spectrum Disorder in Hong Kong

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Introduction: Autism Spectrum Disorder (ASD) is one of the most devastating neurodevelopmental disorders with major impact on families of affected children as well as social support and education systems. They were reported to have higher rates of dental care problems or oral hygiene problems. With the lack of dental services for preschool children in Hong Kong, the severity of dental problems in this group of children has not been documented.

Aim: The aim of this study is to evaluate how well the preschool aged children with autism spectrum disorder comply with the recommendations from the dental profession, namely of tooth brushing habits, dental visits and parental dental health education.

Method: All children aged 2 to 6 years diagnosed with Autism Spectrum disorder, Asperger Syndrome based on the Fourth Edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM-IV), were invited from 13 rehabilitation-training centres of Heep Hong Society. Written consent was obtained from their parents. Basic demographic data collection and a self-administered dental survey questionnaire addressing 3 important sessions namely tooth brushing habits; dental caries status and consultation of dental services were carried out.

Results: Seventy percent of the 196 recruited children with ASD with mean age of 5.36 years from thirteen rehabilitation centres had established a twice daily tooth brushing habit at mean age of 2.5 years. Half of the 196 children exhibited tooth brushing procedure related problems. 30% of these exhibited behavioural problems, including crying and screaming which were displayed by the majority during tooth brushing. Twenty-six percent suffered from dental caries of which 60% were reported as severe. Only forty-eight percent of them had visited dental services, the majority of these attending dental checkups. Most of the dental health related information was delivered by rehabilitation centres, and dental visits were organised by the centres.

Conclusion: Dental problems are not a minor issue for this group of children with special needs, with the limited resources from the government for dental services and dental education. The rehabilitation centre plays the biggest role in training and health promotion. With substantial

difficulty in establishing the healthy oral hygiene of ASD children, parents are working very hard to achieve it. With the collaboration network which lacks professional and financial support, the ability to sustain this important health scope is in doubt.

Feasibility and Effectiveness of Structural Aerobic Exercise Training on Physical Fitness in Children with Autism Spectrum Disorder - A Pilot Study

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Background: The prevalence of Autism Spectrum Disorder (ASD) in children has been increasing. Children with ASD typically present with decreased physical activity levels and tolerance.

Aim: This pilot study investigated the feasibility and effectiveness of a structural aerobic exercise training program on physical fitness in a group of children with ASD.

Method: 28 children (aged 4 to 6 years) with the diagnosis of ASD from two special child care centres of the Heep Hong Society participated in the study. Children from one centre serves as the exercise group and received structural aerobic exercise training for 16 weeks, whereas children from the other centre served as the wait-list control group and received the same training thereafter. Safety was defined as the absence of adverse events, feasibility was measured by attendance. Assessment of physical fitness (muscle strength of upper and lower limbs, balance, aerobic power) were carried out at the beginning, and at 16-week of the program.

Results: No adverse event was reported during the training. Mean attendance rate of the exercise classes was 75%. Repeated measures ANOVA showed that the balance of the children in the exercise group improved at 16-week of the program.

Conclusions: Structural aerobic exercise program was safe and feasible for children with ASD. In this study, balance of the children with ASD improved after 16-week's training.

Prevalence of Feeding and Mealtime Behavioural Children with Autism Spectrum Disorder in Hong Kong

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Introduction: Children with Autism Spectrum Disorder (ASD) are characterised by a triad of symptoms, namely lack of social reciprocal responsiveness, language and communication deficit and rigid repetitive behaviour. Their typical feeding development is greatly affected by their behavioural difficulties. The lack of communication and language abilities may limit their request their preferences on food. Their rigidity and repetitive behaviour will lead to food restrictions. Sensory dysfunction may further lead to food restriction.

Aim: To evaluate prevalence of feeding and mealtime behavioural problems in children with ASD using the Brief Autism Mealtime Behaviour Inventory (BAMBI).

Methods: Parents with children aged 2 to 6 years old diagnosed with ASD and currently undergoing training at Heep Hong Society were recruited. They were asked to complete a Chinese version of BAMBI, which is a validated 18-item questionnaire designed to measure mealtime behavioural problems in children with ASD. A total frequency score was obtained and the higher the score the more problematic behaviours exhibited by the child concerned.

Results: 176 out of 194 questionnaires were valid for analysis. The sample population consisted of 77.4% of boys and the mean age of the children was 5.36 (SD3.2-6.8) years. "Limited variety" of food was the most preference feeding problem. Thirty-two percent of children were not willing to try new foods, 43.2% disliked certain foods and, often or almost every meal, they won't eat them. Close to 40% of them preferred crunchy foods and did not accept variety kind of food. Nearly 30% and 36.5% caregivers found their child "turns his/her face or body away from food" and "not remaining seated at the table until the meal is finished" were problematic respectively. Thirty-four of our subjects were monitored by at least 2 caregivers during the mealtime. Forty-five percent of caregivers found limited food variety being problematic and affecting their daily function. The perception of problems by carers was positively correlated with the frequency of problematic feeding behaviours. Durations of training did not relate with BAMBI score, nor perception of problems by caregivers.

Conclusion: BAMBI can be used in Chinese population to assess the feeding and mealtime behaviour of children with ASD. Limited variety of food was the most frequent presentation of feeding problems in ASD children and which caused most problems perceived by caregivers. These feeding behavioural problems were not significant improved by duration of current training; we suggested incorporating and concentrating specifically to address the feeding behaviour with dietary advice during the training module.

Patterns of Seafood Consumption and Mercury Exposure Amongst Hong Kong Children

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Background: Low-dose methylmercury (MeHg) exposure can cause adverse health outcomes in children. Maternal and childhood fish consumption result in low-dose MeHg exposure in fetuses and young children, respectively. In this study, we aimed to evaluate the 1) children's fish consumption patterns and their estimated weekly MeHg intake; 2) their blood mercury levels (B-Hg); and 3) proportions of at risk subjects.

Methods: Subjects were recruited from our previous cohort. Fish food frequency questionnaires were administered to the two groups. MeHg intake was estimated from fish consumption and mercury analyses. B-Hg levels in children were determined. Associations between fish intake, estimated MeHg intake and B-Hg levels were analysed.

Results: 608 children were recruited. Most commonly consumed freshwater fish were grass fish, freshwater grouper and mud carp. Most commonly consumed marine fish were golden thread, big eye and yellow croaker. All analysed fish samples had mercury levels lower than the WHO recommendation of 0.5 ppm. B-Hg exceeded 29 nmol/L in 9% of children and was correlated with monthly fish intake ($r=0.254$, $p<0.001$). Logistic regression showed that children with MeHg intake greater than reference dose (RfD) of 0.7 μg/kg bw/ week had 2.5 fold (95% CI 1.07-5.68) risk of exceeding the 29 nmol/L B-Hg level after adjustment for age, gender and serum selenium level.

Conclusions: Fish commonly consumed in Hong Kong have low mercury levels. However, 9% of the subjects exceeded international recommendations for MeHg exposure of 29 nmol/L due to fish consumption. Children above the 90th percentile of estimated MeHg intakes are at higher risk of exceeding the 29 nmol/L B-Hg level and thus may be at risk of adverse health outcomes of MeHg exposure.

Iron Overload and Apoptosis of HL-1 Cardiomyocytes: Effects of Calcium Channel Blockade

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Background: Iron overload cardiomyopathy that prevails in some forms of haemosiderosis is caused by excessive deposition of iron into the heart tissue and ensuing damage caused by a raise in labile cell iron. The underlying mechanisms of iron uptake into cardiomyocytes under iron overload condition are still under investigation. Both L-type calcium channels (LTCC) and T-type calcium channels (TTCC) have been proposed to be the main portals of nontransferrinic iron into heart cells, but controversies remain. Here, we investigated the roles of LTCC and TTCC as mediators of cardiac iron overload and cellular damage by using specific Ca channel blockers as potential suppressors of labile Fe(II) and Fe(III) ingress in cultured cardiomyocytes and ensuing apoptosis.

Design and Methods: Fe(II) and Fe(III) uptake was assessed by exposing HL-1 cardiomyocytes to iron sources and quantitative real-time fluorescence imaging of cytosolic labile iron with the fluorescent iron sensor calcein while iron-induced apoptosis was quantitatively measured by flow cytometry analysis with Annexin V. The role of calcium channels as routes of iron uptake was assessed by cell pretreatment with specific blockers of LTCC and TTCC.

Results: Iron entered HL-1 cardiomyocytes in a time- and dose-dependent manner and induced cardiac apoptosis via mitochondria-mediated caspase-3 dependent pathways. Blockade of LTCC but not of TTCC demonstrably inhibited the uptake of ferric but not of ferrous iron. However, neither channel blocker conferred cardiomyocytes with protection from ironinduced apoptosis.

Conclusions: Our study implicates LTCC as major mediators of iron(III) uptake into cardiomyocytes exposed

to ferric salts but not necessarily as contributors to ensuing apoptosis Thus, to the extent that apoptosis can be considered a biological indicator of damage, the etiopathology of cardiosiderotic damage that accompanies some forms of haemosiderosis would seem to be unrelated to LTCC or TTCC, but rather to other routes of iron ingress present in heart cells.

Outcome of Haematopoietic Stem Cell Transplantation for Children with Acute Myeloid Leukaemia in Hong Kong

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Purpose: We aimed to review the outcomes of children with acute myeloid leukaemia (AML) who received allogeneic haematopoietic stem cell transplant (HSCT) in Queen Mary Hospital.

Methods: We performed a retrospective review of all children with AML who underwent allogeneic HSCT in the past 20 years (1994-2013) and analysed their transplant outcomes.

Results: We have performed allogeneic HSCT for 45 children (29 boys and 16 girls) with AML. The median age at HSCT was 9.1 years (range, 0.8 to 18.5 years). Sixteen children were transplanted in first complete remission (CR1), 20 in second remission (CR2), 1 in third remission (CR3), and 8 with non-remission (NR). Donors were matched sibling (MS) (n=19), 1-antigen mismatched parent (MP) (n=2), matched unrelated donor (MUD) (n=11), or 4-6/6 HLA-matched unrelated cord blood (UCB) (single CB: n=10, double CB: n=3). Five-year overall survival (OS) and relapse-free survival (RFS) were 42.7% and 33.6% respectively. Survivals differed significantly with remission status (OS: 55% in CR1, 44.6% in CR2, vs. 14.3% in CR3/NR; RFS: 55% in CR1, 24.2% in CR2, vs. 14.3% in CR3/NR). OS but not RFS was significantly better in patients who received UCB compared to MS, MUD, or MP (OS: 68.7% vs. 34.4% vs. 36.4% vs. 0%). OS and RFS were 100% for patients with double cord blood transplant but the follow-up was short (median 9 months). Transplant-related mortalities in UCB, MS, MUD, and MP were 7.7%, 17.6%, 72.7% and 50% respectively.

Conclusion: Mortality remains high in children with AML despite stem cell transplantation. Outcomes were better for patients transplanted in first complete remission and those who received unrelated cord blood, especially double cord blood.

Injuries Among Children 0 To 19 Years in Hong Kong

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Background: Injury is one of the major causes of morbidity and mortality among children in Hong Kong. The aim of this study is to contribute to the planning, implementation and evaluation of injury prevention measures in Hong Kong by providing a comprehensive comparison of injury accident and emergency department (AED) attendance rates among 18 districts.

Methods: A retrospective analysis was undertaken by using the traumatic coded AED attendance data of children aged 0 to 19 retrieved from the Hong Kong Hospital Authority database. Focusing on data of 2009, injury rates of intentional and unintentional, and the avoidable injury attendances were calculated at district level. District with the lowest overall injuryrelates AED attendance rate was taken as the reference incident rate for the calculation of excess injury rate for other districts.

Results: There is a great variability between the best performing and poorer performing districts in 2009, with the overall AED injury attendance rates up to three times higher in districts with poorer performance. Of all the 18 districts in Hong Kong, 7 districts have injury rates above the mean (4,716 per 100,000) and the top 3 highest overall child injury attendance rates are found in Islands, Sai Kung and Yuen Long. For intentional injury attendance rates, the top three highest are Islands, Yuen Long and Sai Kung. For unintentional injury, Islands, Sai Kung and Yuen Long reported the highest injury rates.

Conclusion: This study demonstrated a potential tool for monitoring and measuring injury trend. Districts should first aim to lower injury rates below the mean rate and subsequently work towards the lowest district reference rate. Moreover, this can also facilitate the future allocation of resources by identifying areas of strength to be built on and areas of weakness which need improvement, in particular for those newly developed districts.

What Should Be Said and What Should Not Be Said? – Perception of Parents and Caregivers of Individuals with Down Syndrome in Hong Kong on Sensitive Language in Cantonese Used in Healthcare Setting

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Background: Every word that health professionals said may be heavily valued, making it particularly imperative for us to select word choices appropriately. To our knowledge, there is limited medical linguistics study in Cantonese to date. Down syndrome (DS) is a common genetic and parents of individuals with DS have extensive experience in interacting with health professionals. This current study aims to explore the perception of parents and caregivers of individuals of DS on the language used in healthcare settings in Hong Kong.

Method: We recruited parents/caregivers of individuals with DS through Hong Kong Down Syndrome Association (HKDSA). Parents/caregivers were invited to complete a questionnaire with words adapted from a study on sensitive language used in genetics (Hodgson et al., 2005). The questionnaire was reviewed critically by the HKDSA scientific committee. Participants were asked to rate each words/phrases as "offensive"/"not offensive", offer alternatives to the words listed and give other words/phrases based on their past experience in healthcare setting which they found as offensive.

Result: We have recruited 116 parents / caregivers of individuals with DS (age 5-55). Most participants rated "成為負擔become a burden" (82%), "冇用useless" (77%), "冇希望hopeless" (77%) and "唔正常abnormal" (76%) as "offensive". Some participants suggested alternative words, such as "特殊special" instead of "成為負擔become a burden" and "唔正常abnormal" respectively. Some participants also gave their other perceived offensive words, such as "蒙古仔Mongols". On the other hand, the least rated "offensive" words are "染色體異常Chromosome deviant" (35%), "發育遲緩growth delay" (35%) and "傷殘人士handicapped person" (34%).

Conclusion: Overall, the findings of this study showed that words that were mostly colloquial, dysphemism, or slang commonly used in vernacular speech were rated as offensive by most participants. On the other hand, literary terms were more acceptable. The findings reflect that participants have sensitive impression on the language used in medical setting. This has implication in the practice of genetic counseling. Health professionals should be aware of their choice of language in order to provide support to parents and caregivers of individuals with special needs.

Iron-Overload can Increase IL-4 Expression from Human Monocyte-Derived Dendritic Cells and Subsequent Th2 Expansion

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Introduction: Iron overload is the most common complication in transfusion-dependent thalassemias. Literature has shown that iron overload can alter immune response but hitherto little work has been done on the effect of iron-overload on dendritic cells. We investigated the role of iron overload on dendritic cells, the most potent antigen-presenting cells.

Methodology: Human monocyte-derived dendritic cells (moDC) were treated with various doses of iron citrate to investigate the effect of iron overload on DC expression of costimulatory molecules, CD80, CD86, programmed death-1 ligands 1 and 2, PD-L1 and PD-L2, respectively, cytokine production and CD4 T cell activation. IL-4 and IL-23 were measured by qRT-PCR and ELISA. Mixed leucocyte reaction was done with iron-treated moDCs; CFSE cell proliferation and immunofluorescent staining of intracellular cytokines IFN-γ, IL-4 and IL-17 were measured by flow cytometry.

Results and Conclusion: Addition of iron citrate suppresses PD-L1 and PD-L2 expression but not CD80 and CD86. It increased IL-4 and suppresses IL-23 expression from activated moDCs. Iron-treated moDCs significantly increased Th2 cell population and suppressed Th1 and Th17 cell population as measured by mixed leucocytes reaction. It also increased CFSE cell proliferation. In conclusion, our study demonstrated that iron-overloaded moDCs can suppress IL-23 and downstream expansion of Th17 cells, and increase IL-4 and downstream expansion of Th2 cells. It can also increase T cell proliferation possibly by suppressing PD-L1 and PD-L2 expression. This may contribute to altered immune response intransfusion-dependent thalassaemias.

Astragaloside IV Enhances MSCs Cytokines Release and Its Supporting Effect on Haematopoiesis in Bone Marrow

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Background: Our previous study confirmed that Astragaloside IV promotes haematopoietic cell survival and differentiation both *in vitro* & *in vivo*. However, besides of the haematopoietic cells in the bone marrow microenvironment, mesenchymal stromal cells (MSCs) are the major supporting cells for the others. The effect of Astragaloside IV on MSCs has not been studied yet.

Methods and Materials: *In vivo*, AS-IV treated C57BL6N mice with 25 mg/kg for 7 days compared to vehicle control group, followed by CFU-F and CFU-GM assays and flow cytometry experiments. In vitro, AS-IV treated human MSCs followed by cytokines detection and quantification experiments. Furthermore, co-culture assay was presented to examine the enhanced supporting effect of AS-IV treated MSCs on neutrophils.

Results: This study demonstrated that astragaloside IV indirectly enhanced haematopoiesis by stimulating cytokine release from MSCs, especially IL-6, IL-8, MCP-1 and GRO1. Matured and activated population of neutrophils was increased after cultured with mesenchymal stromal cells conditional medium stimulated by astragaloside IV. This finding further supported why there was a significant increment of CFU-GM in vitro culture with murine bone marrow collected from mouse model after astragaloside IV treatment, where MSCs serve as the feeder layer in such system in mice.

Conclusion: AS-IV enhances MSCs supporting effect in bone marrow and this study also demonstrated a primary role of AS-IV stimulated MSCs cytokine release in regulating neutrophil production and maturation.

An Estimate of the Prevalence of Down's Syndrome in Hong Kong

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Background: With improved medical care, people with Down's syndrome are now living longer. Given the increased healthcare needs of this population throughout life, it is important for the planning of healthcare services to know the age-specific prevalence of this condition. Currently, there is no national birth defects registry in Hong Kong and the prevalence of Down's syndrome in Hong Kong is unknown.

Method: The CDARS system was used to identify all people who had used any Hong Kong Hospital Authority service between 1995 and 2012 and had an ICD9 diagnosis code of 758.0 – Down's syndrome in any diagnosis field. Duplicates were removed and those who had died before 31/12/10 or were born after 31/12/10 were excluded. The remaining 2120 patients were stratified by gender and 5 year age group. Age and gender stratified population counts from the Hong Kong Census 2011 were used as the denominator.

Results: The overall prevalence of Down's syndrome in Hong Kong is 3.00 per 10,000 population (95%CI 2.87, 3.12). Prevalence is higher in males with an overall prevalence of 3.38 per 10,000 (95%CI 3.18, 3.59) compared with 2.66 per 10,000 (95%CI 2.50, 2.83) for females. The difference between genders is most marked in the younger age groups. Prevalence is highest amongst the under 5s at 9.95 per 10,000 population (95%CI 8.71, 11.19) and decreases with age to 5.74 per 10,000 population (95%CI 5.04, 6.43) in the 20-25 year age group and 1.99 per 10,000 population (95%CI 1.65, 2.34) in the 45-50 year age group. The prevalence is 0 per 10,000 population by age 80 and over. Almost half (47.5%) of the Down's syndrome population in Hong Kong is under 20 years of age.

Conclusion: This study provides an initial estimate of the age and gender-specific prevalence of Down's syndrome in Hong Kong. The results are important for planning Hospital Authority services for this population of people with Down's syndrome, who are known to have increased healthcare needs.

Factors Influencing Length of Stay Amongst People with Down's Syndrome

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Several studies have demonstrated that children and adults with Down's syndrome (DS) have an increased average inpatient length of stay (LOS) compared with people without DS. This study assesses if the same relationship is observed in Hong Kong and explores the patient and admission characteristics that are associated with increased LOS amongst those with DS. The Clinical Data Analysis and Reporting System (CDARS) of the Hong Kong Hospital Authority (HA) was used to identify people with DS (ICD9 code 758.0) from inpatient and outpatient records of all HA hospitals from 1995-2012. A search was then performed on CDARS for the details of any admissions in 2010 by these patients. Inpatient data from 1995-2012 and outpatient data from 2010 were used to establish if patients were known to have congenital heart disease, other circulatory malformations, thyroid disease, diabetes, epilepsy, lymphatic or haematopoeitic malignancies or gastrointestinal malformations. Average LOS was calculated, stratified by 5 year age group and gender. For comparison with the general population, aggregate counts of admissions and total LOS for all admissions in 2010, stratified by 5 year age group and gender, were also obtained from CDARS. A negative binomial with log link regression model was then used to assess the relationship between LOS and admission age group, gender, ethnicity, known DS-associated co-morbidities, emergency admission, admitting speciality, surgery, ICU admission and Down's associated primary diagnosis in patients with DS. The average LOS was 1.75 times higher in those with DS than those without (8.49 days compared with 4.84 days). However, this was not consistent across age groups and between genders, especially in children and young adults. Children under 5 years with DS had a LOS 3.37 times longer (11.26 days compared with 3.34) but children aged 5-10 and 10-15 with DS had a lower LOS than those without DS. Admission factors significantly associated with increased LOS in DS included non-emergency admissions, surgery and admission to PICU/ICU. The effect of a primary diagnosis associated with DS was not significant. Patient characteristics significantly associated with increased LOS included infant age group, 3 or more known co-morbidities, circulatory malformations and thyroid disease. Gender and ethnicity had no significant effect on LOS. Further investigation is recommended to assess if the reason for decreased length of stay in children with Down's syndrome is the result of unnecessary emergency admissions.

The Targeted Therapy Evaluation of Genetic Modified Salmonella Typhimurium Against Human Neuroblastoma Between Different Immunological Background Orthotopic Mouse Models

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Background: Neuroblastoma cancer stem cells thrive in hypoxic microenvironment and they are considered as the leading cause that such childhood high-incidence disease resists to current intensive treatment. Previous studies using genetic modified Salmonella typhimurium with transfected hypoxic gene exhibited excellent in vivo cytotoxic effect (liver and breast cancer). The purpose of the current study was to elucidate the underlying immunological mechanism and compare the effect of this attenuated & anaerobe Salmonella on neuroblastoma orthotopic mouse models with different immunological background.

Methods: Tumour variation with or without Salmonella treatment was detected after the orthotopic neuroblastoma SK-N-LP/Luciferase nude & NOD-SCID mouse models were fully developed. The tumour size was monitored by in vivo imagining system. The change of body weight and Salmonella test in stool & urine were kept record daily since post-Salmonella injection. All the needed tissues, such as heart, lung, liver, spleen, brain, gall and blood were collected for Salmonella cfu counting. Immunohistochemistry and haematoxylin-eosin staining were applied to evaluate the Salmonella distribution and tissue toxicity respectively.

Results: Tumour regression rates between nude & NOD-SCID mouse groups were measured through tumour size ($p=0.039$), tumour & kidney weight ($p=0.044$) and in vivo imagining system ($p=0.047$). First three days body weight loss in Salmonella-treated nude & NOD-SCID mice were no more than 20% and 15% respectively. Furthermore, in NOD-SCID mice ($n=4$), Salmonella could be detected in stool from the 6h-post injection and would be cleared up within two weeks, while the stool of one mouse was undetectable at any timepoint. The Salmonella test of urine was negative. Accumulation of Salmonella occurred in

heart, spleen, tumour, liver, lung, brain, kidney and spinal cord through cfu test, but no found in gall bladder and blood except the NOD-SCID mouse without Salmonella checkout in stool. Besides, heart contains the highest Salmonella quantity in nude mice compared with tumour, liver and lung tissue ($p<0.05$); in NOD-SCID mice, tumour was relatively the highest although with no significant difference among those tissues. Immunohistochemistry staining showed significant Salmonella-positive expression in tumour, heart, lung, liver, spleen and week expression in brain, kidney and spinal cord. Haematoxylin-eosin staining further showed tissue damage in Salmonella-treated nude & NOD-SCID mice.

Conclusion: The engineered anaerobe Salmonella provides a new approach in anti-cancer therapy and the potential side effects are tolerant even to immune deficient mouse. The macrophage together with other immune cells should play a critical role in the process but the underlying immunological mechanism still need to be further unfolded.

Creating Safe Playgrounds: A Safety Promotion Approach

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Background: Playground is a common platform for play and recreation, offering children opportunities to run, jump, climb and socialising with other children. In general, playgrounds are not as hazardous as playing on streets; however they still bear high risk of injuries that become alarming worldwide. This study aims to understand playground injuries from a wider perspective by making use of injury data from a hospital injury surveillance system (HISS) and to develop an educational intervention to promote playground safety.

Methods: Sports related injury incidents of children aged 0 to 14 for the period of January 2009-June 2011 were analysed spatially to identify 10 playgrounds with high incidence of injury in Kwai Tsing and Sham Shui Po. Additional selection criteria including location, accessibility and playground size were used to select playgrounds. Site survey observations were conducted in selected playgrounds to evaluate design of playgrounds and environmental factors. Safety hazards and play risks identified in observations were used to develop educational play booths that to induce safe play concepts and enhance supervision through play activities among parents and caregivers. Pre- and post-evaluation questionnaires were used to measure the effect of educational play booth, which aimed at altering parents' supervision behaviour.

Results: There were a total of 784 injury incidents of children aged 0 to14 identified, which represented 27% of the two districts' overall injury incidents. The top four play risks which observed in all surveyed playgrounds were play balls or toys on play equipment; play equipment with improper clothing; eating on play equipment; and play on equipment occupied by adults. The use of educational play booth has successfully increased parents' knowledge level as well as attitude towards playground safety within a very short period of time.

Conclusion: This study has illustrated a systematic method in developing intervention for playground injuries. From the use of HISS data analysed spatially to locate injury hotspots, providing the prerequisite for playground selection that to conduct site survey, and finally making use of site survey findings to develop educational play booth. In view of the heavy burden of playground injury among children, it is advisable to apply the current project's practice in 18 districts of Hong Kong to reduce the risk of injury in playgrounds.

Prolonged Non-Survival in PICU: Does A Do-Not-Attempt-Resuscitation Order Matter?

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Objectives: Aetiologies of paediatric intensive care unit (PICU) mortality is diverse. This study aimed to investigate the pattern of PICU mortality in a regional trauma center, and explore factors associated with prolonged non-survival.

Methods: Demographic data of all PICU deaths were analysed. Factors associated with prolonged nonsurvival (length of stay) were investigated with univariate log rank and multivariate Cox-Regression forward stepwise tests.

Results: There were 88 deaths (males 61%; infants 23%) over 10 years (median PICU stay = 3.5 days, interquartile range: 1 and 11 days). The mean annual mortality rate of PICU admissions was 5.8%. Septicemia with gram positive, gram negative and fungal pathogens were present in 12

(15%), 13 (15%) and 4 (5%) of these patients, respectively. Viruses were isolated in 25 patients (28%). Ninety percent of these 88 patients were ventilated, 75% required inotropes, 92% received broad spectrum antibiotic coverage, 32% received systemic corticosteroids, 56% blood transfusion and 39% anticonvulsants. Thirty-nine patients (44%) had a DNAR (Do-Not-Attempt-Resuscitation) order with their deaths at the PICU. Comparing with non-trauma category, trauma patients had higher mortality score, no premorbid disease (such as oncological disease), suffered asystole preceding PICU admission and subsequent brain death. There was no gunshot or asthma death in this series. Prolonged non-survival was significantly associated with DNAR, fungal infections, and mechanical ventilation but negatively associated with bacteremia.

Conclusions: Death in the PICU is a heterogeneous event that involves infants and children. Resuscitation was not attempted at the time of their deaths in nearly half of the patients in honor of caregivers' wishes. Caregivers often make timely DNAR decision when medical futility becomes evident. They could be reassured that DNAR did not mean "abandoning" care. Instead, DNAR patients had prolonged PICU stay and received the same level of PICU supports as patients who did not respond to cardiopulmonary resuscitation.

Multidisciplinary Treatment of Congenital Giant Cervical Lymphatic Malformation

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Aim of the Study: Management of congenital giant lymphatic malformation (LM), particularly those involving head-and-neck regions, can be very challenging because of potential airway difficulty. We report our experience in managing two neonates with congenital giant cervical LM.

Methods: Hospital notes of two patients with the diagnosis of congenital giant cervical LM were retrieved. Both cases were detected antenatally.

Patient 1: A full-term baby-boy had LM involving right neck, extending through the right axilla, chest and lower abdomen. He underwent ex-utero intrapartum treatment (EXIT) for immediate endotracheal intubation. He had staged excision of lesion followed by imageguided sclerotherapy by OK-432 and doxycycline.

Patient 2: A twin-baby-girl with left facial and neck LM extending into the pharyngeal spaces and submandibular area was born at 35 weeks requiring standby EXIT for airway resuscitation. She underwent tracheostomy for airway protection. She developed right chylothorax that was managed by prolonged pleural drainage, total parenteral nutrition and medium-chain-triglycerides-rich formula feeds. Multi-stage image-guided sclerotherapy by sodium-tetradecryl-sulphate (STS) and doxycycline were performed.

Main Results: Patient 1 had mild residual chest wall and right arm LM without any functional deficit after 7-year follow-up. Patient 2 at 3-month of age had significant size reduction of LM and resolution of chylothorax after serial sclerotherapies, awaiting decannulation of tracheostomy.

Conclusion: Peripartum airway protection with EXIT preparation is essential in the management of congenital giant cervical LM. Satisfactory functional and cosmetic outcomes are best achieved by an interdisciplinary team approach with judicious application of multi-stage sclerotherapy.

Outcomes in Laparoscopic Fundoplication in Children with Neurodevelopmental Disabilities: What More Can We Do to Improve?

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Aim: Fundoplication in children with neurodevelopmental disabilities (NDD) was shown previously to improve gastroesophageal reflux disease (GERD) related respiratory symptoms, but GERD recurrence and feeding problems contributed to persistent failure-tothrive, morbidities and some late mortalities. From 2003 laparoscopic Nissen's became the preferred operation and from 2008 strategic surgical-nutrition-team care was implemented for all postoperative patients with dietetic strategies targeting prandial symptoms including retching and stoma problems that impair feeding. This study reviews the outcomes of children with NDD undergoing fundoplication in our institute over these cohort-periods.

Methods: Records of consecutive children with NDD undergoing fundoplication in our institute from 1996-2012

were evaluated retrospectively regarding surgical impacts on respiratory symptoms, feeding and nutrition.

Results: From 1996-2004, 39 children with NDD underwent fundoplication with gastrostomy. Postoperative complication-rate was 53% with 33% early post-operative pneumonia, 8% GERD recurrence and 13% late mortality. Mean hospital-stay relating to pneumonia during 6-month pre- and post-operation were 82-day and 40-day respectively (p=0.001). Mean weightgains were 15th- vs 17th-percentiles (p=0.64). From 2005-2012, 37 patients underwent fundoplication. There were three surgical complications (8%) requiring a second operation, two cases of early postoperative pneumonia (5%), one radiologically proven GERD recurrence following laparoscopic procedure, and one late mortality. Besides reductions in pneumonic admissions post-operation (mean episodes/6-months 1.8 vs 0.6, p=0.001), mean weight-gains improved markedly in this cohort (7th-percentile pre- vs 40th-percentile 6-month post-operation, p=0.0005).

Conclusions: Laparoscopic Nissen's fundoplication significantly reduces GERD related respiratory morbidities in children with NDD and are associated with improved postoperative recoveries and morbidity-rates compared to open anti-reflux procedures. Postoperative prandial complications such as retching and stoma leakage frequently hinder enteric nutrition and targeted nutritional strategies can benefit significantly.

The Use of Viral Marketing to Promote Smoke-Free Lifestyles Among Hong Kong Youth

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Background: Youth smoking is a global public health concern. Internet-based technologies have been used increasingly by health educators but the knowledge of applying viral marketing on health promotion is still scarce. This prospective pilot study aims to assess the efficacy of an online game-based viral marketing campaign for the promotion of smoke-free lifestyle. The study also sought to identify contributing factors in the viral marketing referral processes and how the participants' attitude towards smoking changed.

Methods: 121 individuals aged 10-24 in Hong Kong were invited to participate an online quiz game competition, which was designed to deliver tobacco-related health information. Participants were encouraged to refer others to the game and successful referrals were tracked by our information system. Zero-inflation negative binomial model was used to explore contributing factors of referral processes. Latent transition analysis based on a pre- and postgame survey was used to estimate attitudinal changes towards smoking among participants.

Results: Participants increased sevenfold to 928 (34.6% current or ex-smokers) during the 22-day campaign. Tracking of referrals revealed that seed users aged 10-19 could refer to broader age ranges (range=10 to 80) while seed users aged 20-24 could refer to narrower age ranges (range=17 to 63). Zero-inflation model reveals the older the users, the less likely they tried to refer (OR=1.11, $p<0.05$); but older users had better ability in successful referrals (RR=1.24, $p<0.01$). After the campaign, prevalence of participants regarding smoking as a negative behaviour increased from 57% to 73% and users having neutral and positive attitude toward smoking had probabilities of 48% and 52% respectively to shift to the negative attitude (latent class transition analysis).

Conclusion: Our online quiz game-based viral marketing was effective in reaching a large number of smoking and non-smoking participants and changing participants' attitudes towards smoking. This study demonstrates a practical and cost-effective model to engage young smokers and promote smoke-free lifestyle.

Prediction of Gram Negative Bacterial Resistance by qPCR

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Background and Aims: Neonatal sepsis remains an important cause of neonatal morbidity and mortality. Resistance to first-line antibiotics such as gentamicin and cefotaxime has become increasingly common amongst Gram negative bacteria (GNB). However, blood culture, the gold standard for its diagnosis, has a long turnaround time. Detection of bacterial genes that produce antibiotic resistance genes (ARG) could provide early identification of aminoglycoside and cephalosporin resistance in a clinical

setting. We aimed to develop a qPCR protocol that could rapidly predict GNB antibiotic resistance in a neonatal sepsis.

Methodology: GNB isolated from infants admitted to our neonatal unit were collected. Bacteria were processed according to standard laboratory protocols. Antimicrobial susceptibility was obtained by disc diffusion method. GNB isolated were subjected to DNA extraction for qPCR. The primer sets covered clinically relevant aminoglycoside modifying enzyme (AME) and extended spectrum beta-lactamase (ESBL) producing genes.

Results: 165 GNB were obtained from 131 neonates. *Escherichia coli* (75.1%) and *Klebsiella species* (13.3%) were the most common GNB. Resistance to first-line antibiotics was common: gentamicin resistance = 33.3%, ESBL producing = 16.4%, cefotaxime resistance = 20.6%. Our AME primer set predicted gentamicin resistance with good sensitivity (90.9%). ESBL primer set sensitivity was low (59.3%). Both primer sets had very high specificity for gentamicin and cefotaxime resistance, respectively (96.4% and 100%).

Discussion: Well-designed primer sets can achieve excellent diagnostic utilities for predicting antibiotic resistance commonly encountered in a neonatal unit setting with potential reduction of turnaround time for antibiotic resistance results by 1 to 2 days.

A Role of Interleukin-17A in Modulating Intracellular Survival of Mycobacterium Bovis BCG in Murine Macrophages

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Interleukin-17A (IL-17A) has been demonstrated to participate in a range of autoimmune diseases and infections. Whether IL-17A regulates innate defense mechanisms of macrophage against mycobacteria remain to be investigated. In this study, we investigated the effects of IL-17A on modulating the intracellular survival of Mycobacterium bovis BCG in RAW264.7 macrophages. We first observed that IL-17A pretreatment was able to synergistically enhance both nitric oxide (NO) production and inducible nitric oxide synthase (iNOS) expression in BCG-infected macrophages in dose- and time-dependent manner. Mechanistically, we found that IL-17A was able to specifically enhance BCGinduced phosphorylation of JNK, but not ERK1/2 or p38 MAPK. By using SP600125, a specific JNK inhibitor, the production of NO in BCG-infected macrophages with IL-17A pretreatment was significantly suppressed. The data suggested the involvement of JNK pathway in IL-17A-enhanced nitric oxide production in BCG-infected macrophages. Furthermore, our results revealed that the clearance of intracellular BCG in macrophages was significantly enhanced by IL-17A pretreatment. The IL-17A-enhanced clearance of intracellular BCG could be abrogated by the addition of iNOS inhibitor. In conclusion, our study revealed an anti-mycobacterial role of IL-17A through priming the macrophages to produce NO during mycobacteria infection.

22q11.2 Deletion Syndrome in Adult Chinese Patients with Conotruncal Anomalies: Dysmorphisms, Clinical Features and Underdiagnosis

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22q11.2 deletion syndrome (22q11.2DS) is a multi-systemic disorder with high phenotypic variability. Underdiagnosis in adults is common and recognition of facial dysmorphic features can be affected by patient age and ethnicity. This study aims to determine the prevalence of undiagnosed 22q11.2DS in adult Chinese patients with conotruncal anomalies and to delineate their facial dysmorphic features and extra-cardiac manifestations. We recruited consecutively 156 patients with conotruncal anomalies in an adult congenital heart disease (CHD) clinic in Hong Kong and screened for 22q11.2DS using fluorescence- PCR and fluorescence in-situ hybridisation. Assessment for dysmorphic features was performed by a cardiologist at initial screening and then by a clinical geneticist upon result disclosure. Clinical photographs were taken with consent and childhood photographs were

collected. Eighteen patients (11.5%) were diagnosed with 22q11.2DS, translating into 1 previously unrecognised diagnosis of 22q11.2DS in every 10 adult patients with conotruncal anomalies. While dysmorphic features were detected by our clinical geneticist in all patients, only two-thirds were considered dysmorphic by our cardiologist upon first assessment. Evolution of facial dysmorphic features was noted with age. Extra-cardiac manifestations included velopharyngeal incompetence or cleft palate (44%), hypocalcaemia (39%), neurodevelopmental anomalies (33%), thrombocytopenia (28%), psychiatric disorders (17%), epilepsy (17%) and hearing loss (17%). We conclude that under-diagnosis of 22q11.2DS in Chinese adults with conotruncal defects is common and facial dysmorphic features may not be reliably recognised in the setting of adult CHD clinic. In order to avoid missing the diagnosis, molecular testing of 22q11.2DS should be offered to patients with conotruncal defects regardless of the facial features.

Timing of Adjuvant Radiotherapy and Treatment Outcome in Childhood Ependymoma

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Background: Recent trials incorporating adjuvant focal RT for treatment of young children with ependymoma demonstrated better survival with acceptable adverse effects. The optimal timing of RT administration is however unknown.

Procedure: Retrospective review of territory-wide database to identify paediatric patients with ependymoma diagnosed between 1995 and 2011. OS and EFS were compared between patients receiving upfront RT (<150 days of diagnosis), delayed RT (≥150 days of diagnosis) or no RT.

Results: Thirty-one patients with intracranial ependymoma were identified. Median age was 3.5 years and 14 (45%) were male. Primary tumour was supratentorial in 10 (32%) and infratentorial in 21 (68%). All patients underwent initial surgery, with gross-total resection (GTR) in 27 (87%). Twelve (39%) received upfront RT, 10 (32%) had delayed RT and 9 (29%) had no RT. During the study period, there were 11 relapses (35%) and 10 deaths (32%). Five year- OS was 69.9% and 5yr-EFS was 49.3%. In univariate analysis, GTR led to improved OS ($p<0.001$) and EFS ($p=0.004$); superior OS and EFS was observed in patients who received RT when compared with those without ($p=0.018$ and 0.011 respectively). Upfront RT also resulted in better OS and EFS than delayed RT ($p=0.049$ and 0.014 respectively). No significant effect on survival was observed with age, sex, tumour location, RT dosage and protocol used. In multivariate analysis, GTR significantly improved OS ($p=0.002$) and EFS ($p=0.004$).

Conclusions: Our results support the early initiation of adjuvant RT in the multi-modal management of paediatric ependymomas.

Repeat Serial Transverse Enteroplasty in Children with Short Bowel Syndrome: Short Term Results

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Aim of the Study: Serial-Transverse-EnteroPlasty (STEP) is widely performed in patients with short-bowelsyndrome (SBS). We report three SBS patients with repeat-STEP operations.

Methods: Since 2007, four SBS patients had STEP performed in our centre. Two patients received 2 STEPs and one received 3 STEPs. Indications of repeat-STEP are plateau of enteral tolerance and re-dilatation of small bowel after previous operation. All patients were followed up in our multi-disciplinary nutrition clinic.

Patients	Sex/Age at 1st STEP	Primary Diagnosis	Pre-STEP bowel length	No. of STEPs	Interval of repeat STEPs (months)	No. of staple firing	Post-STEP bowel length
A	M/11m	Midgut volvulus	15cm	3	31 & 22	5 + 6 + 6	50cm
B	F/14yr	Retroperitoneal yolk-sac tumour	20cm	2	13	5 + 4	40cm
C	M/26m	Midgut-volvulus	40cm	2	40	10 + 11	72cm

Main Results: There were no post-operative complications. One patient had weaned off parenteral nutrition, the other two had improved enteral nutrition tolerance (69% and 68% respectively).

Patients	Post-STEP follow-up period (months)	Weight-for-age z score*		Parenteral Nutrition given (Kcal/Kg/day)		Estimated enteral nutrition tolerance(%)	
		Pre-STEP	Post-STEP	Pre-STEP	Post-STEP	Pre-STEP	Post-STEP
A	63/32/10	-3.35	-0.28	66.6	24.4	28	69
B	55/42	-1.41	-1.41	33.6	0	40	100
C	46/6	-0.16	0	79.7	25.4	20	68

*"Child growth standard, WHO website"

Conclusion: Repeat-STEP(s) is feasible and should be considered in SBS children with plateauing enteral tolerance and small bowel re-dilatation after previous operation. Longer follow-up is necessary to monitor the outcomes of these patients.

Health-Related Quality of Life of Chinese Individuals with Down Syndrome in Hong Kong

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Purpose: Down syndrome is a chromosomal disorder commonly associated with intellectual disabilities, multiple health issues such as congenital heart disease. Consequently, wellbeing of people with Down syndrome is likely to be compromised. Data on health-related quality of life for people with Down syndrome is limited globally and notably missing amongst Chinese. This study aims to evaluate the health-related quality of life (HRQoL) of people with Down syndrome in Hong Kong by using a Chinese version of Health Utilities Index (HUI).

Methods: Parents or caregivers of people with Down Syndrome were recruited by the Hong Kong Down Syndrome Association to complete a self-designed questionnaire. Data on sociodemographics, 10 chronic health conditions, and HRQoL scores from a translated Chinese version of HUI instrument (proxy version) were analysed. Multiple imputation and multiple regression analysis were used to predict variations in HRQoL due to different factors. Predictors of changes in HRQoL scores were explored using multiple regression.

Results: Of the 109 people (aged 5-53) with Down Syndrome analysed, 60% (HUI2) and 72% (HUI3) of the subject scored 'severe' (HUI2<0.8, HUI3<0.7) in the disability scale. Behavioural problems (HUI2) and hearing problems (HUI2 and HUI3) appear to be statistically significant predictors (p-value<0.05) resulting in a less favorable HRQoL score. A statistically significant dose response relationship was observed where HRQoL scores decreases as number of developmental-behaviour problems increases. Increasing number of physical problems was inconclusive. Multiple chronic health problems were also found to have dose response effect on HRQoL scores.

Conclusion: Our study demonstrated that people with Down syndrome of both children and adults in Hong Kong experience a deficit in HRQoL, with behaviour problems and hearing problems being predictors of lower HRQoL. Such understanding warrants healthcare professionals to provide surveillance program and appropriate therapy to target hearing and behaviour problems. In addition, healthcare professionals should also be mindful of developmentalbehavioural problems as dosage effect greatly compromise their HRQoL. Overall, these results would also be useful for healthcare professionals, social workers, and genetic counselors to communicate to parents or caregivers about the realistic outcome of caring for someone with Down syndrome.

Treatment of Neuroblastoma with an Engineered "Oligate Anaerobic Salmonella Typhimurium Strain YB1"

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Background: Neuroblastoma had poor outcome with current therapeutic approaches. In recent years, some obligate and facultative anaerobic bacteria were reported to target the hypoxic solid tumour core. We constructed an "obligate" anaerobic Salmonella strain YB1 (Huang JT) and tested it on neuroblastoma.

Materials & methods: The *in-vitro* cytotoxicity of YB-1 and wild type salmonella (SL7207) on neuroblastoma (SK-NLP/luciferase) cells were assessed by Annexin V assay (ratio of 500:1) under anaerobic or aerobic conditions. Toll like Receptor 4 and 5 (TLR4 and TLR5) were assessed by Q-PCR. Orthotopic neuroblastoma mouse model was adopted and 3 groups of mice (n=6) were treated with bacteria ($5x10^7$ CFU/mouse): 1) YB1; 2) SL7207; or

3) PBS control via tail vein injections. Tumour growth was assessed by Xenogen-IVIS-100. Survival and body weight were recorded every 2 days. To observe side-effects, YB1 and SL7207 were also injected to 6 SCID mice. Organs were harvested and faeces + urine were collected and the bacteria in different organs were determined.

Results: *In-vitro*, YB1 induced apoptosis in up to 31.4% of the treated cells under anaerobic condition, three times more than that in aerobic condition (10.9%). The expression of both TLR4 and TLR5 in cancer cells were significantly increased ($p<0.05$, $p<0.01$ respectively) after the treatment of YB1 under anaerobic condition. In mouse model, YB1 preferentially accumulated inside tumours but not normal tissues. Tumour growth was markedly arrested with necrosis in the YB1 treatment group. Furthermore, in the YB1 treated mice, no short or long-term damage was noted in all the organs examined including heart, lung, liver, spleen and brain. There was no viable YB-1 in the mice's excreta.

Conclusion: We conclude that the genetic modified Salmonella strain YB1 is a promising therapeutic strategy that can target neuroblastoma in-vivo. With its viability only in hypoxic environment, it did not induce any adverse effect in our mouse model.

Development of Immunodominance Hierarchies Concurrent with Enhanced Polyfunctionality in T Cell Immunity Towards Epstein-Barr Virus

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Background: EBV-specific T-cell immunity is characterised by immunodominant responses towards certain lytic and latent viral proteins. Nevertheless, how such immunodominance hierarchy develops with T-cell functionality from early stage of primary infection to long term persistency remains unclear. This study aims to study i) the difference in CD4+ and CD8+ EBV-specific T cell functions between early and late stage of viral infection; ii) correlation of immunodominant responses to the functionality of T cells.

Methods: PBMCs of ten patients with infectious mononucleosis (IM) and four individuals with asymptomatic EBV primary infection (NIM) were collected longitudinally from the onset of disease through 12-month post infection. Cells were stimulated with overlapping peptides of four lytic- (BZLF1, BRLF1, BMLF1, and GP350) and five latent- (EBNA1, EBNA3A- 3C, and LMP2) proteins, followed by a 9-color flow cytometric assay examining the coexpression of three cytokines (interferon-γ [IFN-γ], tumour necrosis factor-α [TNF-α] and interleukin-2 [IL-2]), perforin and CD107a (degranulation marker) in CD4+ and CD8+ T cells. Stimulated T cells were selected and tested for the cytotoxicity against autologous EBV-transformed lymphoblastoid cell lines (LCLs) and the proliferation capacity.

Results: In both IM and NIM individuals there was a gradual shift of CD8+ T cell responses from targeting the BZLF1 or BRLF1 proteins in acute phase to the EBNA3 proteins in persistent phase of infection, and a shift of CD4+ T cell responses from a broad range of early and late lytic proteins to the EBNA-1 protein over time. Such establishment of immunodominance concurred with increased proportion of lytic- and latent-protein specific CD4+ and CD8+ T cells with multiple functions, which presented enhanced proliferation capacity and cytotoxicity against lysing LCLs.

Conclusions: T cells simultaneously producing multiple cytokines with effective cytotoxicity and proliferation were generated along with establishment of immunodominance hierarchy in EBV-specific T cells. Formation of effective long-term immunity towards EBV requires both sufficient quantity of latent-specific T cells and highly functional T cells.

Mechanisms of Immunosuppression by Mesenchymal Stromal Cells

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Background: Haematopoietic stem cell transplantation (HSCT) is a treatment modality offered to various haematologic and non-haematologic disorders. Graft versus host disease (GVHD) is a common complication of HSCT which can be treated with immunosuppressive agents that have a lot of adverse effects. Mesenchymal stromal cells (MSCs) are proven to have immunosuppressive functions in vitro and in vivo via various mechanisms involving suppression of T cell engraftment and function and nitric

oxide. We aim to demonstrate these mechanisms by treating GVHD murine models with human MSCs.

Methods: Balb/c host mice were subjected to 800 cGy dose of gamma irradiation and given donor T lymphocyte depleted bone marrow cells and CD4+ T lymphocyte from donor C57BL/6N mice via tail vein. Some mice were treated with $0.8x10^6$ human MSCs. Survival rate and symptoms of GVHD were monitored. At day 6 post HSCT, single cell suspensions, tissue lysates and paraffin sections were prepared from target tissues for flow cytometry to check for donor T lymphocyte engraftment, enzyme linked immunosorbent assays to check for levels of proinflammatory cytokines, chemokine and regulatory pathway testing, western blot for inducible nitric oxide synthase (iNOS) expression and imaging by coherent antistokes raman spectroscopy (CARS).

Results and conclusion: The immunosuppressive functions of MSCs were documented in our GVHD models by:

1. Observing protection of GVHD mice from death. This may be due to the decreased engraftment of donor T lymphocyte with concomitant decrease in levels of TNF-α and IFN-γ and decreased RANTES expression which is a chemokine ligand marker in target tissues.
2. Noting an increase in levels of iNOS in MSC treated mice, which is a known immunosuppressive soluble mediator.
3. Suppression in the phosphorylation of STAT 5A/B proteins in MSC treated mice which indicates arrest of the T cell cycle.
4. Finally the presence of MSCs in target tissues is documented by recording differences in chemical bond vibratory signals between control and MSC treated samples using CARS.

The Role of c-Myc in Phagocytosis of Mycobacteria in Human Macrophages

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Mycobacterium tuberculosis is an intracellular pathogen and the causative agent of the disease tuberculosis. Macrophages are the major immunocytes to initiate host immunity against mycobacteria. Among the multiple strategies employ by macrophages to defence against mycobacteria, phagocytosis is the first step. Through phagocytosis, macrophages could not only clear the pathogens from infection sites, but also present antigens derived from the engulfed bacteria to lymphoid cells.

c-Myc is a transcription factor that regulates a variety of target genes. It can form a complex with Max and bind to the enhancer box sequences of the promoter to mediate the transcription. Recently, our group revealed that c-Myc has a potential role in regulating the antimicrobial responses in macrophages.

Here, we further revealed that c-Myc may play a positive role in phagocytosis and contribute to host defense to mycobacteria. Pretreatment of c-Myc inhibitor, 10058-F4, could significantly reduce the amount of mycobacteria internalised by macrophages. The acidification of phagolysosome in mycobacteria infected macrophages was also inhibited by 10058-F4. Further investigation showed that macrophages phagocytose mycobacteria in a PI3K/Akt independent pathway. And the action of c-Myc inhibitor does not affect the expression levels of Rho family GTPases. However, we found that 10058-F4 could significantly inhibit phorsphorylation of ERK1/2 kinase, which has been indicated to play a role in FcR mediated phagocytosis in macrophage. In conclusion, c-Myc may play a role in phagocytosis of mycobacteria through regulating phorsphorylation of ERK1/2.

Symptomatic Meckel's Diverticulum in Children: A 5-Year Review

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Background: Despite being the commonest congenital gastrointestinal anomaly, Meckel's diverticulum (MD) is notoriously difficult for diagnosis due to the diversity of presentations. We aim to review the MD patients in our hospitals, focusing on their various presentations.

Method: Hospital notes of patients aged ≤18 with diagnosis of MD from 2008 to 2013 were retrieved. The demographic data, clinical presentations, treatments and pathological results were analysed. Adult MD patients during the same period were also recruited for analysis.

Result: Thirty children with the diagnosis of MD had operation done (age 1 day to 17 years). Three patients were born with persistent omphalomesenteric duct. In 4 children, MD was an incidental finding during operation only.

Twenty-three symptomatic patients were recruited for analysis. Male to female ratio was 10.5:1. Nine patients (39.1%) had gastrointestinal tract haemorrhage, with 8 acute bleeding and 1 chronic anaemia. Eight patients (34.8%) presented with intestinal obstruction, 5 caused by volvulus or kinking of omphalomesenteric band and its vessels, and 3 by intussusception. Six patients (26.1%) had diverticulitis with or without perforation. The median age of presentation was 5 years, which was lowest in intestinal obstruction (1 year), followed by haemorrhage (6 years) and diverticulitis (13.5 years). Only 4 patients underwent pre-operative Meckel's scan with a false-negative result in 1. Histology revealed ectopic gastric mucosa in 11 patients (47.8%) and pancreatic mucosa in 1 patient (4.3%). All children with bleeding had ectopic gastric mucosa ($p<0.001$). In adults, 62.5% of resected MD was symptomatic, that was significantly lower than children ($p=0.030$). Significantly more children presented with bleeding than adults ($p=0.029$). Adults had increased trend for diverticulitis than children, but was not statistically significant ($p=0.205$).

Conclusion: Symptomatic MD in children is more common than in adults. Acute bleeding is the commonest presentation and occurs at an earlier age. A high index of clinical suspicion is important on children for early diagnosis of MD.

Evidence of Spread of X Chromosome Inactivation On Chromosome 15 in a Girl With an Unbalanced t(X;15) Translocation

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We report on a baby girl with multiple congenital defects including cleft palate, intrauterine growth restriction and double outlet right ventricle (DORV) with ventricular septal defect. G-banding revealed that the proband had a de novo karyotype of 46,XX,der(15)t(X;15) (q10;q10) in all the cells analysed in peripheral blood lymphocytes, resulting in trisomy for the long arm of chromosome X and monosomy for the short arm of chromosome 15. Array-comparative genomic hybridisation showed that a 84Mb copy gain of Xq13.1- Xq28 containing the X inactivation center, whereas there was no copy gain or loss involving genes in chromosome 15. The phenotype of triple X syndrome is usually mild; spread of X inactivation into chromosome 15 leading to partial functional monosomy 15 was suspected which could result in a more severe phenotype. Therefore we study the spreading of X inactivation in terms of DNA methylation changes using the Illumina HumanMethylation450 BeadChip, which is a whole genome DNA methylation microarray which includes a total of 15259 probes in chromosome 15. Results showed there was gain in DNA methylation of more than 20% in 586 CpG sites spanning the long arm of chromosome 15. Since it is known that genes subjected to X chromosome inactivation will have an increase in DNA methylation level in the CpG-island containing promoter, we further examined the hypermethylated CpG sites located in this region only. A total of 75 probes representing 24 genes were hypermethylated. Nearly all of these probes are located in region proximal to the breakpoint, from 15q11.2 to 15q21.3 (35Mb), suggesting that X inactivation was spread to the proximal region of 15q and could potentially worsen the phenotype of our patient. We concluded that DNA methylation microarray can be used to study the spreading of X inactivation in X translocated autosome.

A Simple Way to Identify Insulin-Resistant Obese Chinese Children

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Introduction: Obesity has become pandemic both in our locality and in theworld. Obesity is associated with metabolic complicationssuch as insulin resistance (IR), abnormalglucose tolerance and diabetes mellitus. The main objective of ourstudy is to determine and test the ability of anthropometric, clinical and laboratory markers to predict the risk of exhibiting IR in Chinese obese children.

Method: A cross-sectional study of Chinese childrenaged 5 to 18 years old, followed at Tseung Kwan O Hospital from 1st January 2006 to 31st December 2009 for overweight and obesity was conducted. Demographics, anthropometric data, Acanthosis Nigricans (AN) status, and laboratory results were analysed. We defined IR as Homeostasis Model of Assessment- Insulin Resistance (HOMA-IR) ≥4. Student-t test and Chi-square test were used to compare continuous

and categorical data respectively. Multiple logistic regression was used to determine independent variables that predict IR. Optimal cut-off point was found by receiver-operator characteristic (ROC) curve for the independent predictors thatwere determinedby multiple logistic regression.

Parental Behaviours and Sleep of Infants and Toddlers in Hong Kong

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Objective: To describe the sleep of children below 36 months in Hong Kong and parental sleep-related behaviours and evaluate the association between parental behaviours and children's sleep.

Methods: Parents of 1049 infants and toddlers (46.8% boys) completed an internet-based expanded version of the Brief Infant Sleep Questionnaire.

Results: Hong Kong infants and toddlers slept later at night with shorter nocturnal sleep duration ($p<0.0001$) but less nocturnal awakening compared to other Asian and Caucasian countries and locations ($p<0.0001$). Total sleep duration, frequency of nocturnal awakenings, and duration of awakenings decreased with increasing age, whereas longest sleep duration and nocturnal sleep duration increased with age. Co-sleeping and full-time employment of parents contributed to short sleep duration of children. Although breastfeeding is associated with more nocturnal awakenings, there is no evidence that breastfeeding may decrease the sleep duration of children.

Conclusion: As infants and toddlers develop, their sleep increasingly consolidates. Hong Kong children from birth to 36 months sleep later and have shorter nocturnal sleep duration compared to other Asian and Caucasian countries and locations. Co-sleeping and full-time employment of parents may account for a considerable portion of short sleep duration of children. These findings emphasize the roles of these parental behaviours in children's sleep outcomes and provide information which may help doctors address sleep problems in their daily practice.

Sleep Duration, Cognitive Performance in Preschool Children

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Background and Aims: Few studies have evaluated the impact of short sleep duration on cognitive functioning and physical development of young preschool children. In this study, we aimed to examine the associations between sleep duration, neurocognitive outcomes in local preschool Chinese children.

Methods: Seventy-three healthy 3-5 years old preschool children underwent neurocognitive test including Connor's Kiddie-Continuous Performance Test (K-CPT) and sky search of The Test of Everyday Attention for Children (TEA-Ch). The parents reported their children's sleep patterns by sleep diary in two weeks before the tests and assessments.

Results: Night sleep duration was inversely associated with time-per-target in sky search motor control test ($r=-2.99$, $p=0.015$), whereas daytime nap duration was positively associated with time-per-target in both two parts of sky search ($r=0.318$, $p=0.017$ in attention test; $r=0.481$, $p<0.001$, in motor control test).

Conclusions: Longer night time duration and shorter daytime nap duration are associated with better attention performance.

Sleep Architecture in School-Aged Children with Primary Snoring

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Objective: To examine whether sleep architecture is altered in school-aged children with primary snoring (PS).

Methods: Children aged 6-13 years from 13 primary schools were randomly recruited. A validated obstructive sleep apnoea (OSA) screening questionnaire was completed by their parents. Children at high risk of OSA and a randomly chosen low-risk group were invited to undergo overnight polysomnography (PSG) and clinical examination. Subjects were classified into healthy control, PS, mild OSA and moderate-to-severe OSA groups for comparison.

Results: A total of 619 subjects underwent PSG (mean age 10.0±1.8 years; 396 (64.0%) boys; 524 (84.7%) prepubertal). For the cohort as a whole, there were no significant differences in measures of sleep architecture between PS and non-snoring healthy controls. In multiple regression model, percentage of stage 1 sleep had significant positive whereas percentage of slow wave sleep (SWS) significant negative association with sleep-disordered breathing (SDB) severity ranging from healthy control, PS, mild to moderate-to-severe OSA, after controlling for age, gender, BMI z-score and pubertal status. In prepubertal children with PS, no significant disruption of sleep architecture was found. However in pubertal teenagers, PS subjects had significantly higher adjusted percentage of stage 1 sleep and wakefulness after sleep onset (WASO) compared to healthy controls.

Conclusions: PS did not exert significant adverse influences on normal sleep architecture in prepubertal school-aged children. Nevertheless pubertal adolescents with PS had increased stage 1 sleep and WASO.

Oral Presentation (Nurses' Session)

The Effects of Mentoring on a Healthy Ambassador Training Programme for Primary School Students

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Background: Overweight and obesity are the nation's fastest-rising public health concern and have become a top priority in Hong Kong, with a prevalence rate of 21.7% in 2010. Adequate exercise and healthy eating have an important role to play in the prevention of child and adolescent obesity. School nurses developed an 8-month mentorship programme to engage Chinese primary school students in promoting healthy lifestyle behaviours in the school community. The aim of mentoring programme was to develop nursing students' roles and responsibility and to deliver primary health care through a community service-learning project with the aim of cultivating their social responsibility. The School Health Ambassadors (SHA) training programme aims to achieve significant and lasting effects on the schoolchildren's adoption of healthy lifestyle behaviors and in the prevention of childhood obesity. It is an innovative and effective approach for communicating important health information to peers and their family members.

Methods: This was a mixed method approach. It included a quasi-experimental research design with pre- and post-tests and followed by focus group interviews. Thirty-four Chinese primary school students, aged 10-12 were recruited from three primary schools, and four nursing students provided mentorship. The paired t-test, independent t-test and Chi-squared test were used to test the impact of the SHAs on health ambassadors' knowledge, skills and practice after attending a 2-day training programme. The study tool included a programme evaluation tool, a 5-item self-reported questionnaire measuring students' knowledge and a 10-item scale measuring their attitudes toward carrying out the tasks assigned to them as school health ambassadors.

Results: P.4-5 primary school children (N=34); males (n=12, 36%); females = (n=22, 65%); mean (s.d.) age=11.5 (1.5) years were recruited to the intervention. There was a significant difference between the scores for school health ambassadors' knowledge level at the pre-test (M=0.530,

SD=0.183) and at the post-test (M=0.690, SD=0.198), with t= -4.385 and p=0.000. All the school health ambassadors (100%) agreed that the 2-day training programme had enhanced their competencies in performing the assigned tasks as health ambassadors. Relatively, health ambassadors reported increasing their health knowledge (97.1%) and meeting their expectations (94.1%), and stated that the programme had helped them to become competent health ambassadors (97.1%). Lessons were learned on how to develop relevant, focused SHA training programmes that are low-cost, sustainable and effective. The programme was evaluated for its acceptability and feasibility, and for evidence of its benefit. It was well received; with high attendance levels (95% of participants attended all planned activities). In addition, typical evaluations given by the participating health ambassadors in four focus group interviews included "I enjoyed the training programme very much", "The programme was useful and helpful to me in performing the assigned tasks such as dressing change, taking blood pressure and teaching [about] healthy snacks", and "I feel very good about being able to teach our peers and family members all this health information". This study examined the short-term impacts of the mentorship programme and key learning from the planned SHA training programme. The results were in line with the objectives of the study.

Conclusion: The study demonstrated that the SHA mentorship training programme was effective in helping Chinese primary school students to become trained health ambassadors. School nurses can plan SHA training programmes to enable young leaders to promote health with a sense of belonging in the school community.

Acknowledgement: This project was funded by the TDK TDK-SAE Corporate Social Responsibility (TDK-SAE CSR) Innovative Service-Learning Fund 2012/13.

Transferring Knowledge Into the Daily Practice – Implementation of the Protocol on the Use of 24% Sucrose for Analgesia in Neonates and Young Infants

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The analgesic effect of 24%-sucrose on neonatal procedural pain has been well studied over the past 20 years and there were many recommendations that sucrose should be routinely used for analgesia in painful procedures performed on neonates and young infants.

To understand the effectiveness of repeated dose of sucrose combined with pacifier in relieving pain and distress in premature babies who undergo one of the known painful procedures, namely the eye examination for screening Retinopathy of Prematurity (ROP), a randomised double–blinded placebo-controlled study on the analgesic effect of sucrose during the ophthalmologic examination for ROP was conducted in the Neonatal care unit of Queen Mary Hospital (QMH). The result demonstrated that the loading dose of sucrose two minutes prior to the procedure and the repeated dose just before the procedure were effective in reducing pain responses in premature babies.

To what extent can the knowledge gained by this particular study together with the best available evidences by other institutes be transferred to the daily practice? A discussion on how to adopt the new practice of sucrose use was started among the members of neonatal team in 2012. Early this year, a departmental protocol was developed to address several important issues, namely, the age range, indications and contraindications, the safety dosage, proper administration procedure as well as documentation.

To ensure the knowledge and the details of the protocol are properly disseminated to staff caring neonates and infants, a number of training sessions were arranged for all staff working in neonatal units, day wards and Out-patient Department (OPD) of our unit. Also, repeated seminars on neonatal pain management were given to staff of paediatric unit and obstetric unit. Finally, resource nurse groups were set up in different neonatal & paediatric areas as well as postnatal wards to monitor the practice and feedback on problems encountered.

At the end of June 2013, the sucrose protocol is fully implemented in the whole paediatric unit. By the end of September 2013, this protocol is expected to be implemented in postnatal wards, the obstetric OPD and the paediatric cardiac unit.

This protocol was also presented to the hospital nursing management teams on July 2013 for the promotion of this protocol to other departments where infants are treated.

Enhancing Competence of Junior Nurses in Transportation of Critically Ill Patients Through Simulation Program

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Background: Transportation of critically ill patient is a high risk process for patients. It requires well planning before transfer, strong clinical judgment to detect any change of condition during the process and well communication among different health care team. Nurse is one of the key members of health care team. However, 30% of nurses in the unit are less than 3 years' clinical experience which might increase the risk during the transportation. Simulation training provides a safe environment to enhance clinical experience and clinical exposure. In order to enhance the clinical experience of junior nurses in transportation of critically ill patient, a simulation program was developed.

Methodology: Based on the past clinical near miss situations, three difference clinical scenarios and a skills checklist were developed. The duration of each session of training was one hour. Team of three nurses was participated in the scenario and they were assigned with different clinical roles in the scenario. The skills were assessed by the skill checklist. After 20 minutes of clinical exposure, a debriefing session by clinical facilitators had been conducted to ensure the objectives and the learning points of the clinical exposure would be discussed. Lastly, an evaluation form was distributed to all participants to evaluation the effectiveness of the training.

Results: Total 25 nurses were participates in the training program which is 90% of nurses whose clinical experience less than 3 years. Ninety-six percent of the participants responded that the training had achieved the learning objectives and the training content was practical for use. They commented that the training session provided a good opportunity to refresh knowledge and skills in handling of the transportation. Eighty percent of the participants rated that the program duration was appropriate. All participants recommended this training to other nursing colleagues.

Conclusion: Simulation training is an effective mode of training and learning modality to enhance nurses' clinical experience to handle transportation of critically ill patients.

Age-Differentiated Emergency Transport Bags to Ensure the Safety and Efficiency of Transport of Paediatric Patients

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Introduction: Intra-hospital and inter-hospital transport of pediatric patients are common as patients have to undergo various investigations in different departments or to receive treatment from different specialties in other hospitals. Paediatric patients range from 29 days to 18 years of age. The equipments needed for transport of patients of different age groups vary significantly. Preparation of the appropriate transport equipment is time consuming. Inappropriate equipment and medical consumables might cause mortality and morbidity to the children in transport. Therefore it will be logical to prepare different emergency transport bags according to different age groups. Age-differentiated emergency transport bags program was commenced on October, 2011.

Objectives: (1) Provide safe, efficient and time-saving intra- and inter-hospital transport. (2) Prevent any omission of important medical equipment. (3) Improve patient's safety during transport. (4) Standardise the emergency transport bag in the department.

Methodology: The emergency transport bag is age-differentiated. It is divided according to three age groups: infants (<15 kg), children (15-30 kg) and young adults (>30 kg). Each bag is prepacked with different-sized intubation equipment, intravascular access device, suction tubing and tray with commonly used resuscitation drugs (pre-packed by pharmacy) according to the three age groups. In the past, pediatric nurses collected all the necessary equipment immediately before the transport. With the use of new transport bag, time is saved, and mistakes are avoided.

The same age-differentiated emergency transport bag is

being introduced to all the pediatric and adolescent wards, as well as the pediatric intensive care unit. The uniformity brings efficiency and decreases errors.

Questionnaires concerning the use of old and new emergency transport bag are being distributed to Paediatrics and Intensive Care Unit (PICU) nurses.

Results and outcome: The questionnaires in 2/2012, 100% PICU nurses preferred new transport bag compared with the old one. New questionnaires of the bag conducted one year after (2/2013) implementation. It targeted the user involved medical and nursing disciplines in general ward and PICU which total 52 of peoples. Over 98% agreed the new E-bags increased effectiveness and shorten prepare time in transportation.

Conclusion: The use of age-differentiated E-Bags ensures the safety and efficiency of transport of patients. Meanwhile, time can be saved for patient care, for communication with the other departments and the receiving hospital.

The Effectiveness of the Paediatric Diabetes Improvement Program

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Introduction: An increasing phenomenon of elevated incidents of diabetes mellitus in childhood and adolescent is commonly world-wide. Poor adherence on treatment and irregular medical attendance affect glycaemic control leading to multi-organ complications. Therefore, a paediatric diabetes mellitus service improvement programme was launched in the United Christian Hospital since 2010.

Objectives: It aimed to determine the effectiveness of the improvement programme with the following objectives:

1. To improve patients' HbA1c levels and glycaemic control.
2. To decrease default outpatient attendance rate.
3. To titrate the dosage of insulin for the patients with frequent hypoglycaemia.
4. To empower patient's self-management.
5. To help adolescents smooth transition to adult service.

Methodology: The program included inpatient and outpatient care with an interdisciplinary and family centered care approach. For the inpatient care, the nursing education for diabetes care was started after stabilisation of patient's condition with individualised plan according to the age and developmental stage. Checklists for blood glucose monitor and insulin injection, booklets as well as audio-visual disks had been used to empower patients' self-management and their families. School teachers and school social workers had been liaised by the nurse coordinator with providing special care and advice in school. A pocket size diabetes alert card was given to patients before discharge. For the outpatient one-stop clinic, phone contact to patient is carried out to remind the follow up appointments. A monthly "Diabetes Mellitus Nurse Specialist/ Dietitian/ Paediatrician Attendance Record" was used to monitor multidisciplinary out-patient follow-ups and advice was given to the patients accordingly. Monitoring HbA1c levels quarterly, case discussion, telephone support and support group referral were provided to facilitate the better glycemic control. The data to determine the effectiveness of the program between 2010 to 2012 included measuring mean pre and post HbA1c levels, non-attendance rates, counting of the attendance of Diabetes Mellitus Nurse Specialist/ Dietitian/ Paediatrician were collected by author. Nevertheless, a self-reported survey regarding the knowledge of hypoglycaemia management was conducted in outpatient diabetes center from 20 January 2012 to 21 December 2012. All patients aged under 18 were recruited in this study. The surveys were distributed by the clerks when the patients attended in the outpatient clinic and returned the survey forms voluntarily. Apart from these, "My Health Passport" and "Transitional Care Booklet" were used to facilitate patient's transitional care when they aged 14 or above by discussion with the adolescent nurses at least yearly in the outpatient clinic since the year of 2011. The feedbacks of the transitional care from the patients and the care givers were also obtained to evaluate the effect of the transitional care from 14 July 2012 to 18 January 2013.

Results: Thirty patients with a mean age 14 years in 2010, thirty-one patients with a mean age 12.7 years in 2011 and forty-six patients with a mean age 13.8 years in 2012 were included. The result showed that the mean pre HbA1c values were 8.8%, 9.47% and 9.04% whereas the post HbA1c values were 7.8%, 7.69% and 7.9% in 2010, 2011 and 2012 respectively. There was average decreasing 1% HbA1c values by comparing the post HbA1c values of the year in 2010, 2011 and 2012 to the HbA1c value (8.9%) in 2009 when this program had not been started yet.

The results of the non-attendance rates were 10.27%, 8.78% and 5.18% in 2010, 2011 and 2012 respectively. This reflected that there was improved in the patient follow up after the program was launched. The frequencies of

appointments seen annually (consultation/patient/year) by paediatrician, diabetes nurse specialist and dietitian were 4.3, 3.5, 1.9 in 2010, 4.35, 2.45, 1.23 in 2011 and 4.2, 2.37, 1.11 in 2012 respectively. The results presented that there was decreasing trend of the patient attendant frequency in diabetes nurse and dietitian consultations. This might be caused by the increasing newly diagnosed patients, limited manpower and more time consuming for providing education to the complicated patients as said by diabetes nurse and dietitian.

The return rate of hypoglycaemia survey was 68.9%. There were 18.8% patients had experienced hypoglycaemia (hypo) attack in the past twelve months. Twent-eight percent experienced frequency of hypo attack more than 5 and 56.8% experienced one time hypoglycaemia at night. 73.8% patients were alert during hypo. Ninty-five percent patients ate sugars and 36% treated with CHO foods in addition. The records were passed to the paediatricians, diabetes nurse consultant to make titration of the dosage of insulin in order to prevent or minimise hypo attacks.

In the transitional care feedback surveys, total 18 patients (aged 14 to 18) and 20 care givers were interviewed by the adolescent nurses in 2011 and 2012 respectively. Seventy-seven percent patients and 100% care givers agreed that transitional care were important to them. They found that it could help them coping well with the change to the adult service and facilitate them more self understanding.

Conclusion: This program showed improvement in diabetic control by interdisciplinary collaboration and enhanced liaison with patients, families and schools. A multi-pronged approach to care is a crucial factor for program success. Through the team's effort, the patients and their care givers may be empowered to tackle with this lifelong disease.

Poster Presentation (Nurses' Session)

Thermal Management for Premature Infant in Delivery Suite

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Background: Premature infants are prone to hypothermia immediately after birth which contributes to adverse outcome thus measures have to be taken to prevent hypothermia immediately after birth.

Objective: To prevent hypothermia after delivery in premature neonates.

Methodology: Eighteen infants of less than 29 weeks of gestation and delivered by caesarean section were placed in polyethylene bag immediately after birth before resuscitation. Body temperature taken at birth and on admission to Neonatal Intensive Care Unit (NICU) were compared.

Results: There was no significant body temperature difference measured at birth and on admission to NICU.

The mean body temperature of the population on admission to NICU was 36.2ºC.

Conclusion: The intervention is useful in preventing moderate hypothermia for premature neonates of less than 29 weeks of gestation in Delivery Suite.

The Effectiveness of Fall Prevention Program in Paediatric Wards

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Background: Fall in hospitals are currently considered a nursing quality indicator. Prevention of hospital falls is a important aspect of the management of patients in acute care settings. Failure to provide a safe environment can lead to fall that may result in injury. Such injuries may prolong hospitalization. The fall incident rate increased from 0.2 to 0.44 (1Q2010) and 0.54 (2Q2010) in paediatric department on 2010, so that the fall prevention team formed for quality improvement. The fall prevention team evaluated the fall risk assessment tool, fall prevention signage and

posters, and parents' education. CHAMPS Pediatric Fall Risk Assessment Tool was used to replace the Morse Fall Scale for fall risk assessment. To educate nurses and healthcare workers about fall risk assessment tool and preventive measures in department. In retrospective review the 14 fall incidents, 71.4% fall cases had accompanied by parents or carers. Therefore, the fall prevention program should involve parents' education. Nurse should introduce the ward environment and fall prevention on admission. Moreover, fall prevention video was played once daily in paediatric wards for parents/carers' fall prevention education.

Aim: Nurse and parents could understand the important of fall prevention, and the fall incident rate decreased after the application of fall prevention program.

Methods: The fall incidents rate and the satisfaction survey of parents/carers were used to explore the effectiveness of the fall prevention in ward. Nurses were interviewed to evaluate the effectiveness of the fall prevention video.

Results: The fall incident rate was decreased from 0.54 (2Q2010) to 0.1(4Q2012). The fall incident rate in paediatric department was lower than the hospital (0.79) and HA (0.47) in 4Q2012. 32 copies of questionnaires about the fall prevention received, 94% of respondents showed that the video could enhance their awareness on fall prevention in hospital. Only 6% respondents reported that no effective for improving their concern for fall prevention. 100% respondents showed that nurses explained to them about using bed rails and ward environment for fall prevention. Moreover, all nurses working in paediatric fever and triage ward were interviewed, they felt the fall prevention videos could enhance parents and carers' awareness on fall prevention.

Conclusion: The effective fall prevention program involves preventive measures, and the education to healthcare workers and parents/carers. Although, fall incident rate was decreased, the fall prevention team should review fall incident continuously to create effective preventive measures for fall prevention in paediatric ward.

Treatment of Children with Drugresistant Graft-Versus-Host-Disease by Extra-corporeal Photopheresis

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Purpose and Method: We retrospectively reviewed the clinical experience of performing extracorporeal photopheresis (ECP) for the treatment of children with drug-resistant graft-versus-host disease (GVHD) after allogeneic haematopoietic stem cell transplantation at Queen Mary Hospital in Hong Kong since 2011.

Results: We performed ECP 89 times (discontinuous flow 16 times and continuous flow 73 times) in 3 children (body weight 26 to 35 kg) who suffered from severe extensive sclerodermatous chronic GVHD with pulmonary fibrosis (patient 1, beta-thalassaemia major girl received matched unrelated stem cell transplant), steroid refractory grade 4 acute gut and liver GVHD (patient 2, AML boy received 5/6 HLA-matched unrelated cord blood transplant), and progressive bronchiolitis obliterans (patient 3, AML boy received matched sibling bone marrow transplant) respectively.

Nurse is a key stakeholder in managing the technical and logistic parts of ECP program. The nurse's roles are discussed on developing the ECP program, setting operating standard, case management, problem encountered and staff training.

The ECP procedures in small children are technically challenging and require special planning with attention to extracorporeal volume, inlet blood flow rate and trouble shooting. Blood priming and prior hypertransfusions were required to minimize fluid shifts in these underweight patients. ECP was performed 1-3 times per week. The anticoagulant: blood ratio (heparin saline 20 units/ml) was adjusted according to the patients' hemostatic status between 8:1 to 12:1. Problems including machine failure possibly caused by poor inlet blood flow, blood clots or air in the circuits were encountered. Transient hypertension and cold sensation had been reported during discontinuous flow but not in continuous flow ECP. There were no adverse hemodynamic events noted. Patient 2 and 3 had significant improvement in their GVHD resulting in the reduction of

immunosuppressive drugs. Patient 1 started ECP at a relatively late stage and she died of pulmonary aspergillosis and atypical mycobacterial infection, unrelated to the procedure. The nurse-led ECP program gained high satisfaction from staff and patients.

Conclusion: ECP was well tolerated in these underweight patients by using the continuous flow photopheresis system. It seems to be an efficacious and safe alternative therapy for drugresistant severe acute or chronic GVHD. A nurse-led ECP program facilitates the success of technical and logistic parts of this new treatment modality.

A Continuous Quality Improvement Programme to Enhance Medication Safety

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Introduction: Enhancing medication safety is the top priority of neonatal nursing. Though all medications are counter checked by 2 nurses upon administration, errors still occur. As neonates are vulnerable to medication errors, a continuous quality improvement (CQI) programme on safe intravenous medication administration was developed using multidisciplinary approach in 2011.

Objective: To enhance patient safety in medication administration.

Methodology: Unit doses of intravenous (IV) medication were prepared in the pharmacy. An electronic verification system, Paediatric IV "Verify to Administer" System (PIVAS) was developed to verify "5 Rights" after counter checking by 2 nurses.

Results: From 24/1/2011 to 23/1/2013, after PIVAS verification, nurses administered 18090 doses of IV medications prepared in the pharmacy. There were 2 medication administration errors occurred out of the 18090 doses.

Conclusion: The outcome of the programme is promising. A multidisciplinary team approach to strengthen medication safety assured safe intravenous medication administration.

A Pilot Study of Paediatric Early Warning Scores Application

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Objectives: We evaluated the Paediatric Early Warning Score (PEWS) sensitivity as an early indicator of patient deterioration leading to improve patient outcome. Besides, it aims to support and empower nurses especially the newcomers in nursing assessment, observation and caring for patients at risk of deterioration.

Methods: A task working group for PEWS was formed in January 2012 to formulate and endorse an integrated observation chart with PEWS and algorithm for the Paediatric Department of Queen Elizabeth Hospital. PEWS are assigned in 3 domains: behaviour, respiratory and cardiovascular. Scores in each domain range from 0 to 3 points. In addition, 2 points are added to nebulization that are continuous or every 15 minutes and 2 points for persistent postoperative vomiting. The total score can range from 0 to 13. Four identical PEWS workshops were conducted in March, 2012 to enhance nurses' knowledge, skill of application, concept of PEWS. A pilot study of PEWS was implemented since May 2012 in all general paediatric wards. Questionnaires from nurse on trial use of nursing observation chart with PEWS were conducted in August 2012. Moreover, a local audit was conducted in December 2012 in four general paediatric wards of Queen Elizabeth Hospital.

Results: Total thirty-one samples and two hundred and sixty-three chartings were identified in December 2012. The sensitivity of PEWS was 57.14% and the specificity of PEWS was 94.11%. The PEWS algorithm, guiding staffs for actions including frequent assessment time, senior nurse consultation or referral to an experienced physician based on the resulting paediatric early warning score. Total eight out of thirty-one samples scored PEWS equal or >3 and received interventions. Treatment may involve elective transfer of the child to Paediatric Intensive Care Unit or ward-based interventions to prevent further deterioration. Furthermore, a total of forty-one questionnaires from nurses on trial use of nursing observation chart with PEWS received with 59% agreed that PEWS is helpful to alert on patient deterioration.

Conclusion: PEWS is a tool which is easy, convenient and helpful to assist nurse early identification of deteriorating sick children who subsequently have an immediate need for medical intervention. When this tool is

used consistently as part of a routine nursing assessment, it allows the bedside nurse to quantify a score and promote concise communication among physicians to alter plans of care in response to changing patient status.

Effective Training to Help Staffs Deal with Paediatric Emergencies

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Background: The outcome for Paediatric cardiopulmonary resuscitation (CPR) is poor especially without high quality of resuscitation. The Paediatric cardiopulmonary arrest is rare occurrence in general paediatric ward. Even experienced paediatric nurses have limited exposure in care critically ill paediatric patient. Many studies stated that the team training resuscitation drill can improved the skills in dealing with cardiopulmonary arrest patient; increase practitioners' confidence and decrease anxiety during actual resuscitations. However, there was an impact on emergency drills which took away the time of care for patients.

Objective: We conducted this study to determine whether resuscitation training program would effective training staffs deal with CPR.

Methods: The researchers used several methods for their study which was organized in two phases. The first phase was intervened some resuscitation training during in 2011 at UCH a general paediatric ward. The second phase was an exploratory the impression on team training resuscitation drills and resuscitation training program of nursing staff. It sought by some questions.

Results: Twenty-eight nursing staffs participated (96% of total number of staff in a ward). Ninety percent of participants can be accomplished the all items of resuscitation training twice in one year. The remaining participants can be accomplished the all items of resuscitation training at least once. On the other hand, there was only about 50% of participation to take part in a team training resuscitation drills. Moreover, there was 100% of participants agree these two training programs both can be improved clinical skills in paediatric emergencies and knowledge in paediatric emergencies. The amounts of participant preferred these two training program were nearly same. 100% of junior RN (<5 clinical experience) and 75% of APN preferred the resuscitation training program because it can be enhanced the procedural knowledge. Large amount of experienced RN (≥5 clinical experience) preferred the team training resuscitation drills because it can be enhanced their team management knowledge.

Conclusion: The resuscitation training program was an effective training especially for junior nurses. These two training programs were necessary to help staff deal with paediatric emergencies. Further research was necessary to measure the improvement of clinical outcomes after resuscitation training program.

Prospective Evaluation of the Pews Tool

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Background: As healthcare providers, we believe that delayed recognition of critically-ill patients is a significant contributor to mortality and morbidity. In order to improve the recognition of patients at risk of deterioration, a structural approach to evaluation of bedside patient observation is essential. This leads to the development of the Paediatric Early Warning Score (PEWS). Abnormal warning score triggers the call out of medical emergency teams for early assessment and prompt treatment. Early intervention is expected to improve outcomes of unexpected cardiac arrest and unplanned intensive care admissions.

Objectives: To test the reliability of a newly developed PEWS assessment tool in detecting clinical deterioration among hospitalized children requiring transfer to paediatric intensive care unit.

Design: Prospective descriptive study.

Participants: All paediatric patients (aged from 1month old to 18 years) admitted into an acute-general paediatric medical ward in United Christian Hospital were scored using the PEWS over a 4-month period.

Methods: The newly developed PEWS tool was used to score patient status in all admissions by nursing staff. In addition, patients' age, gender and responses upon patient deterioration (i.e. a PICU transfer) were recorded. Data were analysed using SPSS. Receiver operating characteristic (ROC) analysis was performed to examine the sensitivity and specificity of the PEWS tool to differentiated between children who needed PICU transfer and those who did not.

Results: 1042 patients were admitted in the 4-month period. The PEWS tool was able to differentiate between

those who needed transfer to PICU from those who did not (area under the curve=0.83, 95% CI=0.76-1.02, p<0.001). According to the ROC curve, the sensitivity=1, specificity=0.71, PPV=0.02, NPV=1.

Implications: The newly developed PEWS tool is a reliable tool in detecting clinical deterioration among hospitalized children who require transfer to PICU.

Evidence-Based Nursing Practice on Changing Intravenous Infusion Set of Central Line in Paediatric Department in UCH

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Introduction: Changing intravenous infusion (IVF) set of central line is a common nursing procedure in our department. However, there are different ways of practice among our units. By limiting the variability of this procedure, an evidenced-based practice initiation is implemented.

Objectives: (1) To standardiae the nursing practice on changing IVF set of central line including antiseptic solution, time of rubbing and needleless devices. (2) To provide the best evidence on nursing procedure.

Literature search: Antiseptic solution: Over the literature review, 18 articles including CDC guidelines are recommended using alcoholic chlorhexidine gluconate solution (2%) for disinfection of skin and devices to reducing colonization (Level 1). However, there is not mentioned the safety or efficacy of using this solution in patients less than 2 months old.

Time of rubbing: Only 5 articles are mentioned the rubbing (vigorous)/scrubbing time of hub/accessing port which is ranged from 10 to 15 seconds (Level 2). One study found that 3-5 seconds which did not adequate to disinfect the surface. The time spent rubbing/scrubbing with disinfectant may be important. In CDC guidelines, the antiseptics should be allowed to dry according to the manufacturer's recommendation prior to placing the catheter (Level 1).

Needleless devices: One of 3 studies recommended using of needleless connectors or mechanical valves appear to be effective in reducing connector colonization. In one study, the incidence of central line associated blood stream infection (CLABSI) was reduced when the needleless connector was compared with standard stopcocks.

Bundle of care: multifaceted strategies are "bundled" together to improve compliance with evidence-based recommended practices (Level 1).

Recommendation: After reviewed the literatures, there has been strong evidence of using alcoholic chlorhexidine gluconate solution (2%) as an antiseptic solution to reduce CLABSI. Additionally, allowing the rubbed/scrubbed accessing port/hub to dry after rubbing/scrubbing at least 10-15 seconds is recommended. The element of using needleless devices is also documented. The departmental guideline on bundle-care of central line is revised and implemented to promote patient safety.

Conclusion: This evidence-based nursing practice is being promoted for implementation across our department. Further study is required to review the compliance of this evidenced-based practice but foresee remarkable outcome.