

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1302	Medical Oncology
<p>Authors A.J.Q.OOI¹, C.WONG¹, M.S.P.NG¹, I.W.Y.CHIA¹, X.F.TAN¹, W.X.TEO², G.W.C.YIP¹</p> <p>National University of Singapore, Tan Tock Seng Hospital (Singapore)</p> <p>Title The Role of Intracrine Fibroblast Growth Factors in Colorectal Cancer</p> <p>Background & Hypothesis Fibroblast growth factors (FGFs) play crucial roles in colorectal cancer (CRC) development, but the roles of intracrine FGFs, composing of FGF11, FGF12, FGF13 and FGF14, are poorly understood. This review aims to provide an overview of intracrine FGFs involvement in CRC, including mechanisms, contributions to CRC progression, metastasis, and therapeutic potential.</p> <p>Methods A narrative review was conducted to outline the most recent clinical findings concerning the significance of intracrine FGFs in CRC.</p> <p>Results Among the four intracrine FGFs, FGF12, FGF13 and FGF14 were found to contribute to CRC development while FGF11 had minimal involvement. FGF12 was identified as a potential CRC biomarker, as it was observed to be methylated in cancer tissues. FGF12 was found to predict poor clinical outcomes in CRC. The mutual regulatory effect of FGF12 with high-mobility group nucleosome-binding domain 5 (HMGN5) presented a potential therapeutic target for CRC treatment. Targeting FGF13 with miR-10b suppressed CRC cell growth and metastasis. Long intergenic non-protein coding RNA 963 (LINC00963) acted as an oncogene by inhibiting miR-10b and inducing FGF13 expression. The LINC00963/miR-10b/FGF13 axis could serve as a potential diagnostic and therapeutic target in CRC patients. FGF14 was found to be a tumour suppressor that inhibited the P13K/AKT/mTOR pathway and induced cell apoptosis, making it a promising biomarker and therapeutic target for CRC.</p> <p>Discussion & Conclusion This review highlights the significance of intracrine FGFs in CRC and their potential as biomarkers and therapeutic targets. Further research is required to fully understand their impact and develop better treatment strategies.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1309	Nursing
<p>Authors H.LI², K.V.TAY³, J.J.LIU¹, C.Y.G.ONG², H.W.KHOO², A.J.ZHOU², M.MIYASAKA¹, L.S.J.PHEE¹</p> <p>¹Nanyang Technological University (Singapore), ²Tan Tock Seng Hospital (Singapore), ³Woodlands Health (Singapore)</p> <p>Title Feasibility of A Low-cost Magnet Tracking Device in Confirming Nasogastric Tube Placement at Point of Care, A Clinical Trial</p> <p>Background & Hypothesis An affordable and reliable test that can confirm the correct placement of nasogastric tube (NGT) at point-of-care is an unmet need. Using a novel algorithm and few sensors, we developed a low-cost magnet tracking device and showed its potential to localize the NGT preclinically. Here, we embark on a first-in-man trial of this device to determine its feasibility in the clinical setting.</p> <p>Methods Six male and 4 female patients from the general ward of an urban hospital were recruited. The device was used to locate the NGT in these patients and the localization compared with chest X-ray (CXR).</p> <p>Results In 5 out of the 10 patients, with the sensors placed on the sternal angle, the trajectory of the NGT was reproduced by the tracking device and the direction in which the NGT turns inferior to the xiphisternum was correctly visualized. In these 5 cases, the tracked location of the NGT deviated from CXR by 0.55 to 1.63cm, and a downward tracking range of 17 to 22cm from the sternal angle was achieved. Placing the sensors on the xiphisternum, however, resulted in overt discordance between the tracked location of the NGT and that on CXR. A shorter distance between the sternal angle and the tip of xiphisternum, and lower body weight were observed in patients in whom tracking was feasible. Tracking was quick and well tolerated. No adverse event occurred.</p> <p>Discussion & Conclusion This device feasibly localized the NGT in 50% of patients when appropriately placed. Further refinement is anticipated.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1310	Hand Surgery
<p>Authors S..LIN², Y.R.WONG¹, D.A.MCGROUTHER¹</p> <p>¹Singapore General Hospital, ²Yong Loo Lin School of Medicine (Singapore),</p> <p>Title Biomechanical Evaluation of Surgical Knot Security: 0° Longitudinal Pull vs 90° Transverse Pull at the Last Throw of Reef Knots</p> <p>Background & Hypothesis There are a myriad of techniques used to make a surgical knot. However, few biomechanical studies focused on the intricacies of the suturing steps and techniques and its influence on knot security. This paper aims to develop a biomechanical testing method and evaluate the integrity of reef knots made using the 0° longitudinal pull and 90° transverse pull at the last throw.</p> <p>Methods 40 samples of fresh porcine skin sutured and locked with either a 0° longitudinal pull (n = 20) or a 90° transverse pull (n = 20). This study utilizes the biomechanical testers, Instron 3343 and E-1000 Dynamic Tester to standardize the tying force at 4N, and perform survival testing on the samples. The mean and standard deviation of the slippage/ breakage force and number of cycles survived were tabulated. One-way ANOVA test was carried out to test for significant difference in between groups.</p> <p>Results The 0° longitudinal pull had a higher survival rate compared to the 90° transverse pull, (Stage 1: 85% vs. 80%, Stage 2: 65% vs. 40%). However, statistical analysis reported no significant difference in the knot strength (21.3±2.5N vs. 19.8±3.9N, p= 0.31) and number of cycles survived for the 0° longitudinal pull and the 90° transverse pull (330±168.5 vs 263±157.9, p = 0.311).</p> <p>Discussion & Conclusion Based on the results obtained, this warrants further studies to investigate if this hypothesis holds true for different types of suture techniques, suture materials and operators of a different skill level.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1350	Sports Medicine
<p>Authors C.YANG², Z.X. LIM², C.LIM², J.H.PARK², S.CHOW¹, D.LOW¹, J.GOH²</p> <p>¹Singapore Sport Institute, ²National University of Singapore</p> <p>Title Chronological Age Modulates the Response of Circulating Exerkines to Acute Aerobic or Resistance Exercise</p> <p>Background & Hypothesis Regular exercise training can attenuate the adverse effects of sarcopenia. This study explores the age-related physiological response to acute exercise in women, focusing on circulating exerkines (FGFs, alpha-Klotho and beta-Klotho) and their interaction with different exercise types.</p> <p>Methods Young (n=6, 26±1.51 y/o) and post-menopausal (n=10, 58.6±1.33 y/o) women were randomized to perform either an aerobic or resistance exercise intervention in a cross-over design. Serum FGFs and Klotho were measured using the Olink panel assay and ELISA respectively.</p> <p>Results FGF19 and FGF21 decreased post-exercise across exercises and age groups. Post-menopausal participants undergoing resistance exercise showed a 2.6% increase in serum FGF23 (1.17±0.03 NPX to 1.2±0.03 NPX). Timepoint-based significance (p<0.05) was observed for FGF19 and FGF21, regardless of exercise type or age. In the young group, both exercises decreased alpha-Klotho (sol) concentrations. Post-menopausal participants exhibited a 5.3% increase in alpha-Klotho (sol) with aerobic exercise (454.08±24.29 pg/mL to 479.04±30.4 pg/mL), and a 1.5% decrease with resistance exercise (475.7±24.9 pg/mL to 468.92±33.93 pg/mL). Both exercise types increased alpha-Klotho (sec) in both age groups. Significant differences (p<0.05) were observed between the young and middle-aged groups for both alpha-Klotho (sol) and alpha-Klotho (sec).</p> <p>Discussion & Conclusion Exerkine concentrations change during acute exercise due to energy demands and metabolic adaptations. Aerobic exercise relies on aerobic pathways, while resistance exercise engages anaerobic sources, which promotes strength and hypertrophy. Chronological age may influence age-related metabolic responses to exercise. FGFs and Klotho are potential mediators of aging, warranting further research in longevity.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1475	Endocrinology
<p>Authors T.K.KWAN¹, J.J.LIU¹, C.U.UBEYNARAYANA¹, K.ANG¹, J.LIM¹, S.LOW¹, S.C.LIM¹ ¹Khoo Teck Puat Hospital (Singapore)</p> <p>Title Validation of protein intake with urinary urea nitrogen and its association with skeletal muscle mass in the SMART2D cohort.</p> <p>Background & Hypothesis The catabolic effect of insulin deficiency coupled with anabolic resistance accelerates muscle wasting among older adults with Type 2 Diabetes (T2D). This study aims to 1) validate the Food Frequency Questionnaire (FFQ) via objective urinary urea nitrogen (UUN) biomarker, and 2) explore the relationship between protein intake (PI) and physical activity with skeletal muscle mass (SMM).</p> <p>Methods This cross-sectional study includes 1,009 T2D participants from the SMART2D cohort (mean age 62.2±11.3yrs; HbA1c 8.1±1.6%; SMM 23.8±5.9kg; median MVPA 600METs-min/wk). PI is assessed via a 179-item semi-quantitative FFQ, nutrient analysis is performed using the Dietplan7 software containing a local food-composition database. The Global Physical Activity Questionnaire is used to assess moderate-vigorous physical activity (MVPA) per week. ELISA is performed to measure spot UUN, and total PI is calculated via the Maroni method. SMM is derived from the Bioelectrical Impedance analysis. Analyses are performed using Spearman's correlation coefficients and multiple linear regression.</p> <p>Results FFQ-derived PI is significantly correlated (p<0.001) with UUN-derived total protein level (r=0.250), SMM (r=0.343) and HGS (r=0.320). MVPA is significantly correlated to SMM (r=0.105, p=0.001). The unadjusted model is statistically significant (β =0.359, p<0.001) with FFQ-derived PI positively associated with SMM. The association remains significant after adjusting for age, sex, BMI, ethnicity, education level, MVPA, HbA1c and urine ACR.</p> <p>Discussion & Conclusion Results are consistent with other literature, strengthening the validity of the FFQ in the SMART2D cohort. PI and MVPA are independently associated with SMM. Future longitudinal study is recommended to determine their causal effect to prevent muscle wasting in T2D population.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1476	Endocrinology
<p>Authors K.X.KEE¹, S.H.TAN.CLARA¹, K.M.LOW.SERENA¹, K.L.ANG.KEVEN¹, Y-M.SHAO¹, S.TAVINTHARAN¹, C.F.SUM¹, S.C.LIM¹,</p> <p>¹Khoo Teck Puat Hospital (Singapore)</p>	
<p>Title Re-assessment of clinical variable-based novel subgroups of type 2 diabetes: A 3-year follow up study</p>	
<p>Background & Hypothesis We proposed three novel type 2 diabetes (T2D) subgroups using cluster analysis on five clinical variables: mild obesity-related diabetes (MOD), severe insulin-resistant diabetes with relative insulin insufficiency (SIRD-RII), and mild age-related diabetes with insulin insufficiency (MARD-II). In a 3-year follow up study, we aim to reassess the subgroups and their clinical trajectories.</p>	
<p>Methods De novo k-means cluster analysis, using onset age, BMI, HbA1c, HOMA2-B and HOMA2-IR, was performed in 671 recent-onset (duration <5 years) T2D patients from the SMART2D cohort. 500 (75%) patients with 3-year follow up data were reassessed using nearest centroid method.</p>	
<p>Results At baseline, 43.7% patients were assigned to MOD, 19.4% to SIRD-RII, and 37.0% to MARD-II. At 3-year follow up, 500 patients were reassessed, 45.8% with MOD, 18.8% with SIRD-RII, and 35.4% with MARD-II. Of which, 175 (35%) patients had a change in subgroup classification. HOMA2-B significantly decreased across all subgroups; 92.8% (72.0-120.0%) vs. 96.8% (78.7-130.8%) in MOD, 34.6% (23.12-47.3%) vs. 44.5% (32.0-60.8%) in SIRD-RII and 48.0% (34.9-62.6%) vs. 55.3% (45.8-68.0%) in MARD-II. HOMA2-IR significantly increased in MOD (2.7 (2.1-3.4) vs. 2.2 (1.8-2.9)) and HbA1c was significantly increased in SIRD-RII (9.9% (9.1-11.0%) vs. 9.0% (8.4-9.9%)). The ratio of average change in each centroid after reassessment to average inter-centroid distance is 0.07.</p>	
<p>Discussion & Conclusion A substantial proportion of patients changed cluster membership over 3 years suggesting ongoing metabolic dynamics in T2D. Clinical trajectories suggested decreased beta-cell function across all three subgroups, increased insulin resistance in MOD and poorer glycaemic outcome in SIRD-RII.</p>	

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Abstract ID	Clinical Specialty
SHBC1526	Infectious Diseases
<p>Authors J.Y.CHUA¹, Z.Q.LIM¹, S.Q.D.LOY¹, V.KOH¹, N.M.THEVASAGAYAM¹, X.HUAN¹, K.W.LINN¹, K.MARIMUTHU¹, O.T.NG¹</p> <p>¹National Centre for Infectious Diseases (Singapore)</p> <p>Title Evaluation of the Xpert Carba-R Assay for Quantifying Carbapenemase-Producing Bacterial Load in Stool Samples</p> <p>Background & Hypothesis The spread of Carbapenemase-producing Enterobacterales remains a major threat globally. Within clinical settings, the existing method of determining gene load involves traditional culture to determine bacterial load and PCR-based Xpert Carba-R Assay to determine carbapenemase gene type. However, there is a need for a fast and accurate method of quantifying CPE colonization to study the risk of persistent CPE carriage. This study aims to evaluate the accuracy of Xpert Carba-R Ct value in predicting carbapenemase producing bacterial loads in stool samples.</p> <p>Methods Stool samples were obtained from an ongoing study investigating the household transmission of CPE in Singapore (CaPES-C). Stool samples lacking CP-positive organisms were spiked with organisms carrying a single CP gene (blaKPC, blaNDM, blaVIM, blaOXA-48(-like) or blaIMP-1) and serially diluted before being subjected to Xpert Carba-R assay and culture. Correlation between Ct values and bacterial counts was examined by a linear regression model. Standard curves were generated and validated with stool samples collected from patients.</p> <p>Results The limit of detection of blaNDM, blaKPC, and blaOXA-48 was approximately 103 CFU/mL, while that of blaIMP-1 and blaVIM was approximately 104 CFU/mL. Validation of the blaNDM and blaOXA-48 standard curves revealed an average error of 0.56 log(CFU/mL) (95% CI 0.24 – 0.88) and 0.80 log(CFU/mL) (95% CI 0.53 – 1.07), respectively.</p> <p>Discussion & Conclusion Our results show that bacterial loads in stool positive for blaNDM and blaOXA-48-type can be estimated by GeneXpert Carba-R assay within a reasonable range of error and short turnaround time.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1560	Psychiatry
<p>Authors K.Z.S.TEY⁴, J.S.R.CHIN³, P.HUANG³, H.CHEN², M.V.FORTIER³, D.WANG,³ H.PAN³, V.GUPTA³, M.MEANEY³, G.C.Y.TAN¹</p> <p>¹Institute of Mental Health (Singapore), ²KK Women's and Children's Hospital (Singapore), ³Singapore Institute for Clinical Sciences ⁴Yale-NUS College (Singapore)</p>	
<p>Title Childhood Active Play is Negatively Associated with Putamen Structural Changes in Children</p>	
<p>Background & Hypothesis Physical activity and aerobic fitness affect brain structure in adults and adolescents. Here, we investigated how structural brain changes in children relate to childhood active play at age 8.</p>	
<p>Methods Active play scores were categorized into low (<2 hours daily) and high (>2 hours daily) groups. T1-weighted MRI scans were obtained from 218 GUSTO cohort children at ages 4.5 and 6.0. Using SPM12, Voxel-Based Morphometry and full factorial analyses identified brain regions associated with active play.</p>	
<p>Results At 4.5 years old, children with low active play displayed higher grey matter volume in the temporal lobe (kE= 1529, T=5.59, cluster-level pFWE-corr=8.0e-08), left frontal gyrus (kE= 876, T=4.99, cluster-level pFWE-corr=2.3e-05), and bilateral cerebellum (R: kE= 918, T=4.87, cluster-level pFWE-corr=1.5e-05; L: kE= 961, T=4.67, cluster-level pFWE-corr=1.0e-05) than children with high active play. At 6.0 years old, children with low active play exhibited higher grey matter volume in bilateral supplementary motor cortex (R: kE= 791, T=4.49, cluster-level pFWE-corr=0.019; L: kE= 676, T=3.93, cluster-level pFWE-corr=0.040) and left precuneus (kE=1265, T=4.24, cluster-level pFWE-corr=0.0012) than children with high active play. Notably, bilateral putamen grey matter showed consistent negative correlation with active play at ages 4.5 (R: kE= 1961, T=4.93, cluster-level pFWE-corr=3.02e-09; L: kE=342, T=4.59, cluster-level pFWE-corr=0.0081) and 6.0 (L: kE=1706, T=4.20, cluster-level pFWE-corr=1.3e-04; R: kE=431, T=4.18, cluster-level pFDR-corr=0.046), suggesting the putamen's role as mediator between active play and early brain development.</p>	
<p>Discussion & Conclusion These findings highlight the influence of active play on brain structural changes during early childhood, informing interventions for healthy brain development.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1563	Infectious Diseases
<p>Authors C.FAHIM⁴, C.C.YU¹, J.COOPER⁴, T.T.LEE⁴, M.W.K.LAU⁴, C.MARQUEZ⁴, B.TANG¹, M. MATHEW³, M. SHARMA⁴, E.WONG⁴, T. O'SULLIVAN⁵, J.A.LOW², S.STRAUS⁴, S. THEIVENDRAMPILLAI⁴</p> <p>¹Geriatric Education and Research Institute (Singapore), ²Khoo Teck Puat Hospital (Singapore), ³National University of Singapore, ⁴St. Michael's Hospital (Canada), ⁵University of Ottawa (Canada)</p> <p>Title Stigma and Fear during the COVID-19 pandemic: Perceptions of healthcare workers in Canada and Singapore</p> <p>Background & Hypothesis Stigmatization towards healthcare professionals (HCPs) who care for patients with infectious diseases is not a new phenomenon. We sought to explore HCPs' perceptions of and experiences with stigma during the COVID-19 pandemic and its impact on patient health-seeking behaviours.</p> <p>Methods We conducted an international, qualitative study rooted in the Health Stigma and Discrimination Framework with HCPs including physicians, nurses, program and patient supports, and allied health professionals in Canada and Singapore. Key informant interviews were between May 2020 - February 2021. A thematic analysis method was used to analyze the data. Coded data were charted into a framework matrix.</p> <p>Results We conducted 51 interviews (23 in Canada; 28 in Singapore). Participants were mostly women (82.6% in Canada; 60.7% in Singapore) with an average of 11.9 years of work experience (range 1-40). Participants noted high levels of fear and mistrust among patients towards HCPs, which they perceived resulted in avoidance of seeking health care out of fear of contracting COVID-19 at clinics or hospitals. Participants feared contracting COVID-19 and spreading it to their networks; this fear often resulted in participants choosing to isolate from their families and friends. Participants felt stigmatized by members of the public, their networks, and by/towards their colleagues</p> <p>Discussion & Conclusion Occupation-related stigma was experienced during COVID-19 by HCPs. HCPs also noted perceptions of stigmatization towards marginalized patient populations. The majority of themes identified were consistent in both Canada and Singapore. Strategies to mitigate COVID-19 related stigma towards HCPs and at-risk patient populations are warranted.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1591	Endocrinology
<p>Authors B.PANDIAN¹, A.M.C.MOH¹, S.K.M.LOW¹, X.L.TAN¹, K.K.L.ANG¹, T.K.KWAN¹, T.SUBRAMANIAM¹, C.F.SUM¹, S.C.LIM¹ Khoo Teck Puat Hospital (Singapore)</p> <p>Title Association of circulating Leucine-rich α-2-glycoprotein 1 with cognitive impairment in multi-ethnic Asians with type 2 diabetes</p> <p>Background & Hypothesis Age-dependent blood-brain barrier breakdown in the hippocampus may lead to cognitive function decline in older population with type 2 diabetes (T2D). Leucine-rich α-2-glycoprotein 1 (LRG1) is a multi-functional glycoprotein that plays a pathological role in vascular dysfunction and inflammation. In the present study, we assessed the association between LRG1 and cognitive function decline in older multi-ethnic Asians with T2D.</p> <p>Methods This study involved subjects who participated in the SMART2D study. The inclusion criteria were aged ≥ 55 years old and underwent cognitive assessment by Mini-Mental State Examination (MMSE). The locally validated version of the MMSE is a 30-item questionnaire, including tasks dependent on orientation, memory, attention, language functioning, and visual spatial skills. Circulating levels of plasma LRG1 were measured using enzyme-linked immunosorbent assay.</p> <p>Results This cross-sectional study involves 445 subjects (age: 64 ± 6 years, 52.1% male, fasting plasma glucose: 8.7 ± 2.7 mmol/L, duration of diabetes: 17 ± 9 years, MMSE score: 28 ± 2). When divided into two groups by LRG1 mean, higher body fat percentage and visceral fat area were observed in the group with elevated circulating LRG1 (all $P < 0.05$). Univariable linear regression analysis revealed an association between reduced MMSE score and increased log-transformed plasma LRG1 levels ($\beta = -0.40$, 95% CI: -0.65–-0.16, $P = 0.001$). After adjusting for age, gender, ethnicity, and education, the association of MMSE score with log-transformed plasma LRG1 levels remained significant ($\beta = -0.28$, 95% CI: -0.50–-0.06, $P = 0.014$).</p> <p>Discussion & Conclusion Higher circulating LRG1 levels are associated with a lower cognitive function in T2D, suggesting a role of LRG1 in brain vascular pathology.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1595	Endocrinology
<p>Authors C.S.H.TAN², S.K.M.LOW², K.X.KEE², L.W.T.CHAN², ¹Y.SONG¹, T.SUBRAMANIAM¹, C.F.SUM¹, S.C.LIM² Admiralty Medical Centre (Singapore), Khoo Teck Puat Hospital (Singapore)</p> <p>Title Association between psychosocial distress in diabetes, medication adherence and glycaemic control in adults with young-onset type 2 diabetes (YT2D): a cross-sectional study</p> <p>Background & Hypothesis Young-onset type 2 diabetes (YT2D) is clinically challenging as affected individuals usually present with more aggressive disease trajectory attributable to poor glycaemic control. In this cross-sectional study, we explored the association between psychosocial distress, medication adherence and glycaemic control in recently diagnosed (≤ 5 years) YT2D individuals (onset ≤ 35 years).</p> <p>Methods Data were obtained using Problems Areas in Diabetes (PAID) scale and adherence to refills and medications scale (ARMS). PAID score of ≥ 40 indicates severe emotional distress (derived by sum of all item scores multiplied by 1.25). Higher total ARMS score indicates poorer medication adherence. Poor glycaemic control is defined by HbA1c $> 7\%$.</p> <p>Results Mean age of study participants (n=65) was 30 ± 5 years old, majority were male (57%) and of Chinese ethnicity (46.2%). Average BMI was 30.4 ± 6.2 kg/m², median age of onset was 29 (21-31) years old, and median diabetes duration was 3 (1-4) years. 64.6% participants had poor glycaemic control. 17% reported severe emotional distress (median PAID score of 17.5 [7.5-32.5]). 90% reported poor adherence to medications (median ARMS score of 12 [11-15]). Severe emotional distress is positively associated with poorer medication adherence ($\beta=3.49$, 95%CI: 1.22-5.75, p=0.003) and participants with poorer medication adherence had 30% higher odds of poor glycaemic control (OR 1.30, 95%CI: 1.04-1.64, p=0.024) after adjusting for age, gender, ethnicity and duration of diabetes.</p> <p>Discussion & Conclusion Diabetes-related distress is a significant determinant of medication adherence behaviour in patients with YT2D. Addressing diabetes-related emotional distress is an important intervention to improve adherence and health outcomes in individuals with YT2D.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1634	General Surgery
<p>Authors A.M.LIM², B.K.LIM², M.C.A.MOH², K.S.A.CHENG², B.C.TAN², C.Y.D.NG², S.N.B.S.HAMEED², B.PANDIAN², Y.M.SHAO², W.E.TANG¹, S.C.LIM², K.S.M.LEOW³</p> <p>¹NHG Polyclinics (Singapore), ²Khoo Teck Puat Hospital (Singapore), ³Tan Tock Seng Hospital (Singapore)</p> <p>Title Preoperative triglyceride-glucose index (TyG) predicts weight regain beyond 6 months after bariatric surgery.</p> <p>Background & Hypothesis After bariatric surgery, a dramatic reduction in body weight usually occurs within 6 months, after which weight loss slows down and some patients experience weight regain. Limited evidence suggests that the insulin resistance marker triglyceride-glucose index (TyG) predicts weight loss. We investigated the ability of preoperative TyG to predict weight regain after bariatric surgery.</p> <p>Methods Since 2007, patients scheduled for bariatric surgery were recruited into the OMICS cohort. The number of patients with complete data for analysis at 6- and 12-month post-surgery were 395 (baseline age:41±10 years, 39% men, body mass index (BMI):42.4±8.0 kg/m²) and 305, respectively. The percentage changes in BMI from pre-surgery to 6-month post-surgery, and from post-op 6- to 12-months, were calculated. Preoperative TyG was derived from fasting triglycerides and glucose.</p> <p>Results BMI decreased by 19.8% (interquartile range:-24.1, -15.6) at 6 month post-surgery, and a further 3.9% (interquartile range:-7.9, 0.5) at 12 months. The mean TyG was 8.9±0.6 (n=395). Unadjusted linear regression showed that TyG was not associated with BMI change during the initial 6 months post-surgery. However, for every unit increase in TyG, the BMI change increased by 1.48% (95% CI: 0.46–2.50, P=0.004) from 6 to 12 months postoperatively. The association persisted after adjustment for baseline age, sex, race, BMI and surgical procedures (B=1.17, 95% CI: 0.11–2.23, P=0.031). When analyzed by TyG tertiles, the highest tertile predicted the 6–12-month BMI outcome (B=2.03, 95% CI: 0.35–3.70, P=0.018).</p> <p>Discussion & Conclusion Higher preoperative TyG predicts BMI increase from 6–12 months after bariatric surgery.</p>	

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Abstract Details	
Abstract ID	Clinical Specialty
SHBC1683	Pharmacy
<p>Authors T.P.PHAM¹, Y.L. THENG¹, K.T. TAN², J. LIM¹, J.C. LIM²</p> <p>¹Nanyang Technological University (Singapore), ²Tan Tock Seng Hospital (Singapore)</p> <p>Title Concerns about Medicines and Self-reported Adherence among Patients from Integrated Care Hub</p> <p>Background & Hypothesis Higher concerns about medicines had been found to relate to lower adherence in patients with chronic conditions. We postulate that education on medications, potential and actual side effects of medications and polypharmacy may help address their concerns and improve medication adherence. Hence, this project is aimed to investigate the relationships between concerns and adherence in patients on the Integrated Care Hub, furthermore, we would explore a gamified solution to improve perceived usefulness of medication education.</p> <p>Methods Twenty patients (10 males), aged between 40-80 years old (M=63.05, SD=11.16), from Integrated Care Hub Trial Ward 8 at Ren-Ci Hospital were recruited for this study. They completed the 5-item Belief on Medication Questionnaire (BMQ) on a 3-point scale (yes, partially, no). They also reported if they stopped taking medicines when feeling better (adherence), if they knew their prescription medications and, if knowing the potential medication side-effects would help them manage their health.</p> <p>Results Using a logistic regression, we found that patients with higher concern had lower odds of adherence (adjusted-odds=-0.36, pD=81%, aOR=0.70, 90% HDI[0.33, 1.39]) after controlling for age and gender. 55% of the samples knew all of their prescribed medications, but 70% of them would like to be educated about their medications.</p> <p>Discussion & Conclusion The results suggested that some patients were not well-educated on all their medical prescriptions, but they were willing to learn to increase ownership. Lowering concern (possibly via education) could increase adherence, despite moderate uncertainty of statistical evidence due to sample size.</p>	

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1686	Rehabilitation Medicine
<p>Authors J. X. LIM¹, M.H.R. HO¹, T.P.PHAM¹, Y.L.THENG¹</p> <p>¹Nanyang Technological University (Singapore)</p> <p>Title Using head and body motions as game inputs: A user experience study with older adults</p> <p>Background & Hypothesis Digital games can promote positive intergenerational interaction (Zhang & Kaufman, 2016). However, conventional input devices (e.g., mouse, keyboard) may not be suitable for older adults with reduced range-of-motion in the wrist and grip strength (Chaparro et al., 2000). Pham et al. (2012) also found that older adults preferred to use gesture control over gamepad. In this study, we examine older adults' experience in using head and body motions as game inputs.</p> <p>Methods Four games (G) were developed to test the user experience of using various motions as input (G1 and G2: body motions; G3 and G4: head motions). Motions were captured using built-in front- and back-facing camera on off-the-shelf tablet. 10 participants aged between 66 and 80 (mean = 71, S.D. = 4.59) played all games under supervision. Ease-of-control was measured as key experience using Player Experience Inventory questionnaire after each game.</p> <p>Results Items were averaged to obtain an ease-of-control score (1 ~ 5) for each game. Participants rated an average score of 4.27 (S.D. = 0.47) for G1. G2 scored 3.77 (S.D. = 0.55). G3 and G4 scored 3.53 (S.D. = 1.14) and 4.57 (S.D. = 0.35), respectively.</p> <p>Discussion & Conclusion Participants generally found the games easy to control using motions, especially for simple upper-limb movement (G1) and head extension-flexion-rotation (G4). This is likely due to its resemblance to using a touchscreen. Wide head lateral rotation (G3) may not be feasible as it interrupted users from viewing the screen. Results suggested the potential of using motion-controlled games for physiotherapy or exercises beyond general gaming.</p>	

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1709	Public Health / Clinical Epidemiology
<p>Authors TONG SHIMENG¹, ER JUI PIN¹, LIN LIUTONG¹, TAN YI XUAN¹, SUN LING LING¹, ZHANG LI¹</p> <p>¹Temasek Polytechnic (Singapore)</p> <p>Title A Highly Effective Powered Air Purifying Respirator (PAPR) with Antimicrobial HEPA Filter for Safeguarding Healthcare Workers</p> <p>Background & Hypothesis The COVID-19 pandemic has starkly highlighted the inadequacy of PAPRs in safeguarding healthcare workers during airborne disease outbreaks. Existing PAPRs are predominantly designed to protect against noxious gases and chemicals rather than bacteria and viruses. The current work aims to develop a highly effective PAPR that not only boasts exceptional antimicrobial efficacy but also prioritizes wearer comfort and user-friendliness.</p> <p>Methods We developed an antimicrobial PAPR onto a loose-fitting protective hood. Specifically, different antimicrobial agents (Nano-Particle Quaternary Ammonium Salts / Plant extracts) coated on the filter media were evaluated against bacteriophage (T4/MS2/Qbeta) based on established testing protocol. The most effective filter materials and antimicrobial agents were chosen and added to the PAPR HEPA filter. This setup was tested with airflow rates up to 180 L/min to ensure it effectively blocks and eliminates trapped microorganisms.</p> <p>Results Our antimicrobial PAPR HEPA filters can effectively eliminates 99% more viruses from trapped droplets compared to regular PAPR. Meanwhile, the prototype is light and compact (0.86 kg vs. 1.5+ kg for most competing devices) with lower noise and water spray-proof design for easy disinfection. The battery could support 4 hours of operation at 1.1A current drain. Its seamless integration with PPE donning/doffing procedures and disinfection processes further enhances its usability.</p> <p>Discussion & Conclusion Our PAPR product encapsulates user-friendliness, boasting a lightweight and compact design that operates quietly, which serves as an affordable yet robust defence, dedicated to protecting healthcare workers against microorganisms.</p>	

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1710	Endocrinology
<p>Authors M.D.A.MAHADZIR¹, R.Z.Y.LOW¹</p> <p>¹Nanyang Technological University (Singapore)</p> <p>Title Behavioural Change Theories Application in Diabetes Conversational Agents Design</p> <p>Background & Hypothesis With the surging demand for healthcare services and the alarming rise in diabetes prevalence, Singapore faces a formidable challenge in healthcare management. As traditional approaches prove insufficient, innovative strategies are imperative. Conversational agents (CAs) have emerged as a promising technology for healthcare delivery, monitoring, and preventive interventions. However, successful CA implementation encounters hurdles related to patient and healthcare provider acceptance and adherence. Thus, several studies have proposed incorporating behavioural change theories (BCTs) into healthcare-focused CA development to drive effective behaviour change and assess intervention outcomes. Objective: This review systematically evaluated and reviewed the use of BCTs in developing CA-embedded diabetes mHealth apps. A comprehensive framework is proposed to integrate BCTs in future research and development of CAs for diabetes.</p> <p>Methods Eleven databases were systematically searched for articles published since 2002, focusing on diabetes mHealth apps with embedded BCT-driven CAs. EndNote 20 was utilized for the initial title and abstract screening, and subsequent full-text screening, data extraction, and BCT analysis were performed using Microsoft Excel.</p> <p>Results Twelve studies fulfilled the inclusion criteria, with the Transtheoretical Model, Behaviour Change Wheel, and Health Belief Model being the most common BCTs used in CA and User Interface (UI) development. However, the integration of BCTs in development is currently limited, and the review highlights challenges including inconsistent use of theories or models and types of outcomes measured across studies.</p> <p>Discussion & Conclusion This review proposes a framework for the systematic integration of BCTs in future CA development, aiming to enhance the effectiveness and acceptance of CAs for diabetes management.</p>	

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1711	Infectious Diseases
<p>Authors D.H. Chye¹, C.W.Y Chew², H.P Yeo², P. A. Tambyah³, B.E Young², G.G.K Tan¹, B.H. Tan², S. Vasoo², C. CHAN²,</p> <p>¹DSO National Laboratories (Singapore),²National Centre for Infectious Diseases (Singapore), ³National University Hospital (Singapore)</p> <p>Title Neutralization escape of emerging subvariants XBB.1.5/1.9.1 and XBB.2.3 from current therapeutic monoclonal antibodies</p> <p>Background & Hypothesis Monoclonal antibody prophylaxis and therapy were widely used for early treatment to prevent progression to severe illness in unvaccinated COVID patients or those with comorbidities. However, the emergence of the Omicron variant and subsequently the XBB recombinant subvariant containing multiple antibody-evading mutations in the spike protein has resulted in a loss of clinical potency of many monoclonals.</p> <p>Methods We tested the efficacy of tixagevimab, cilgavimab, sotrovimab and bebtelovimab against recently emerging XBB subvariants using a live virus neutralization assay to determine if these exhibit any differences in immune evasion.</p> <p>Results We show that with the exception of sotrovimab, other monoclonals show complete loss neutralization efficacy against XBB.2.3. and XBB.1.5/1.9, while sotrovimab is able to fully neutralize both variants albeit with a six-fold drop in potency</p> <p>Discussion & Conclusion Our findings suggest that sotrovimab may still be considered as part of the therapeutic armamentarium for COVID-19 infection caused by some XBB subvariants including XBB.2.3, XBB.1.5 and 1.9.1, particularly for patients who are not responding to standard anti-viral therapy, although these should be corroborated by clinical outcomes data.</p>	

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1738	Dermatology
<p>Authors Y.TAN¹, I.KWOK³, J. CHEN³, L.G. NG², H.L. TEY¹</p> <p>¹National Skin Centre (Singapore), ²Shanghai Jiao Tong University School of Medicine (China), ³Singapore Immunology Network</p> <p>Title Dissecting the heterogenous keloid microenvironment with spatial technologies</p> <p>Background & Hypothesis Keloids are itchy, painful pathological scars formed from dysregulated wound healing, resulting in a fibrotic environment where fibroblasts excessively deposit collagen. Current existing therapies do not fully resolve keloids, hence it is important to understand ongoing pathophysiological processes to identify potential targets for developing new treatments. Recent single-cell RNA sequencing (scRNAseq) keloid studies have provided insight into fibroblast and vascular endothelial cell dysregulation, although these studies lack spatial insight. We aim to characterise the keloid microenvironment to understand the spatial heterogeneity of the keloid and identify potential signalling pathways driving fibrosis.</p> <p>Methods scRNAseq datasets were integrated, and keloid sections analysed using 10x Visium spatial transcriptomics using Cell2location and Node-centric expression modelling (NCEM) to map scRNAseq cell subsets onto the Visium dataset. Separately, sections were analysed using MACSima Imaging Cyclic Staining (MICS) for highly cyclic immunofluorescence staining.</p> <p>Results Extracellular matrix (ECM) - fibronectin, collagen I, III and collagen assembly protein SPARC localize to different regions within the keloid, with higher collagen III co-localization with fibronectin. Myofibroblasts co-localize with regions of high ECM deposition and are main signallers to cell subsets such as Schwann cells, T cells and keratinocytes, suggesting that ongoing crosstalk could be driving keloid progression. Keloids are also known to be highly vascularised, and we show that JAK1 expressing T cells are closely associated with keloid vasculature, suggesting their possible role in driving keloid pathogenesis.</p> <p>Discussion & Conclusion Spatial technologies allow us to better understand the keloid microenvironment; with this approach, we can identify at least 100 potential therapeutic targets for ECM over-expressing myofibroblast populations.</p>	

SHBC 2023 SCIENTIFIC COMPETITION
ACCEPTED ABSTRACTS
ABSTRACT CATEGORY: Basic Science / Translational Research

Abstract Details	
Abstract ID	Clinical Specialty
SHBC1739	Psychiatry
<p>Authors R.GARG⁵, C.W.E.TEO³, N.RANE¹, N.B.M.HASHIM¹, D.LEE⁷, S.K.Z.TEY⁷, H.CHEN², K.H.TAN², S.Y.CHAN⁴, J.HUANG⁶, M.KEE⁶, C.CHEE⁵, H.M.TAN⁵, J.KEPPO⁵, M.MEANNEY⁶, G.C.Y.TAN¹</p> <p>¹Institute of Mental Health (Singapore), ²KK Women's and Children's Hospital (Singapore), ³Lee Kong Chian School of Medicine (Singapore), ⁴National University Hospital (Singapore), ⁵National University of Singapore, ⁶Singapore Institute for Clinical Sciences, (SICS), ⁷Yale-National University of Singapore</p>	
<p>Title Utilising Computerised Adaptive Testing (CAT) to reduce respondent burden in maternal mental health assessment and personalised profiling of vulnerabilities</p>	
<p>Background & Hypothesis Maternal mental health is a vital aspect of perinatal care, with significant implications for mother and child. Previous analysis of the GUSTO cohort demonstrated factors like sleep, attachment and anxiety are instrumental in maternal mental health. We studied the feasibility of leveraging Computerised Adaptive Testing (CAT) to administer several psychological scales, providing personalised profiling while minimising respondent burden.</p>	
<p>Methods These scales include the Morningness-Eveningness Questionnaire (MEQ), Experiences in Close Relationship (ECR), Pittsburgh Sleep Quality Index (PSQI) and State-Trait Anxiety Inventory (State) (STAI-S). With the ltm R-package, item discrimination and extremity parameters specified in the Graded Response Model (GRM) were calculated using GUSTO response datasets of up to 460 participants for the aforementioned scales. The items were incorporated into the CAT simulations, run using Firestar R-package. Two-fold cross validation was performed and generated theta values (latent trait estimates) were correlated with true theta values.</p>	
<p>Results Administering CATs with stopping criteria of $SE < 0.5$, the number of questions administered was reduced from 20 to 4.60 (77.0% reduction, $r=0.957$) for STAI-S, 18 to 7.12 (60.4%, 0.952) for MEQ, 16 to 5.03 (68.8%, 0.937) for ECR attachment anxiety, 18 to 4.09 (77.3%, 0.932) for ECR avoidant anxiety and 15 to 6.20 (58.7%, 0.951) for PSQI.</p>	
<p>Discussion & Conclusion CAT-based estimates effectively capture latent traits (r range 0.932-0.957) and identify vulnerabilities while reducing question load (reduction range 58.7%-77.3%). These CATs will guide psychological interventions targeting their respective vulnerabilities. Additional questionnaires could also be combined in a single comprehensive CAT test in the realm of maternal mental health assessment.</p>	