Department of Paediatrics & Child Health

ANNUAL RESEARCH DAYS 2021

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Programme and Abstract Book

Tuesday, 09th and Wednesday, 10th November 2021

VIRTUAL MEETING (ZOOM)

CPD Points for Tuesday, 09th and Wednesday, 10th November 2021

Please complete online form on both days to claim your points. (Please note: Form to be completed twice on Wed,10th November – once before lunch and once after lunch)

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Title: **TRENDS IN CYSTIC FIBROSIS SURVIVAL OVER 40 YEARS IN SOUTH AFRICA: AN OBSERVATIONAL COHORT STUDY**

Authors: Zampoli M[1, 2], Kassanjee R[3], Verstraete J[1], Westwood A[1], Zar HJ[1,2], Morrow BM[1].

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Introduction:
Temporal trends in CF survival from low-middle-income settings are poorly reported. We describe changes in CF survival after diagnosis over 40 years from a South African (SA) CF center.

Methods:
An observational cohort study of people diagnosed with CF from 1974 to 2019. Changes in age-specific mortality rates from the year 2000 (versus before 2000) were estimated using multivariable Poisson regression. Data were stratified by current age < or ≥ 10 years and models controlled for diagnosis age, sex, ethnicity, genotype, and *P. aeruginosa* (*PA*) infection. A second analysis explored association of mortality with weight and FEV1z-scores at age 5-8 years.

Results:
288 people (52% male; 57% Caucasian; 44% p.Phe508del homozygous) were included (median diagnosis age 0.5 years: Q1,Q3: 0.2, 2.5); 58 (35%) died and 30 (10%) lost to follow-up. Among age >10 years, age-specific mortality from year 2000 was significantly lower (adjusted hazard ratio aHR: 0.14; 95% CI: 0.06,0.29; p<0.001), but not among age <10 years (aHR: 0.67; 95% CI: 0.28,1.64; p=0.383). In children <10 years, Caucasian ethnicity was associated with lower mortality (aHR 0.17; 95% CI 0.05,0.63), and time since first *PA* infection with higher mortality (aHR 1.31; 95% CI 1.01,1.68). Mortality was 7-fold higher if FEV1z was < -2.0 at age 5-8 years (aHR 7.64; 95% CI 2.58,22.59).

Conclusion:
Overall, CF survival has significantly improved in SA from year 2000 in people older than 10 years. However, increased risk of mortality persists in young non-Caucasian children, and with FEV1z<-2.0 at age 5-8 years.

Funding: Cystic Fibrosis Foundation, NRF Thuthuka, Harry Crossley Foundation, Molly McNeil family Trust and SA CF Association.

Author's contribution: MZ is the student PI of the project and lead author.

Title: **INFECTION WITH ORIGINAL SARS-COV2 VIRUS PROTECTS AGAINST INFECTION WITH BETA-VARIANT – A PROSPECTIVE STUDY OF MOTHERS AND CHILDREN IN A SOUTH AFRICAN BIRTH COHORT**

Authors: Heather J Zar,[1] Rae MacGinty[1], Lesley Workman[1], Maresa Botha[1], Marina Johnson[4], Adam Hunt[4], Tiffany Burd[1], Mark P Nicol[2,3], David Goldblatt[4,5]

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Background:
Whether natural infection with original SARS-CoV2 virus protects against variant viruses is a critical question. We longitudinally investigated illness and serological responses in mothers and children in a South African birth cohort through 2 waves of the COVID-19 pandemic, the first due to original virus and the second due to beta-variant.

Methods:
Mothers and children in the Drakenstein Child Health Study, in a low-income peri-urban community were followed from 6 March 2020 through 31 May 2021, spanning two waves. Illness and health seeking behaviour were recorded throughout and serum samples obtained through each wave. Serum IgG to SARS-CoV-2 full length spike from original (S-original) and beta variant (S-beta) was measured with the MesoScaleDiscovery platform. Seroprevalence was defined by S-original. To investigate the impact of infection in wave-1 with original virus on outcome following wave-2 we stratified those seropositive post wave-1 by changes in spike IgG following wave 2.

Findings:
Amongst 367 mothers [median age 32.7y (IQR 28.8-37.2y)] and 385 children (median age 6.7y (5.9-7.3y); 49% male] there were only two COVID related maternal hospitalisations, no deaths and no COVID-associated child illness. Ten mothers (2.7%) had PCR-confirmed SARS-CoV-2 infection over the study period. Despite little disease, 52.6% of mothers and 34.3% of children were seropositive following wave-1. Of those **seronegative** after wave-1, a further 87 (50%) mothers and 84 (33.2%) children seroconverted during wave-2 (overall seroprevalence of 74% in mothers and 54% in children) and for these S-beta titres were higher (S-beta:S-original 1.52 and 1.45 respectively). For the majority of those seropositive after wave-1 spike titres remained the same or were lower when measured after wave-2. However 53/193 (27.4%) seropositive mothers and 20/132 (15%) seropositive children further increased their titres. This group had significantly lower S-original ($p<0.001$) and cross-reactive S-beta GMTs ($p<0.001$) post wave-1 compared to those whose S-original titres declined or stayed the same.

Interpretation:
Seroprevalence was very high in mothers and children increasing over time but disease was rare. Antibodies to original virus protected against infection with beta-variant. Protection was related to higher S-original and cross-reactive S-beta IgG levels.

Funding: UK NIH GECO (GECO1111) award, the Bill & Melinda Gates Foundation(grant numbers OPP1017641, OPP1017579), the Wellcome Trust Centre for Infectious Disease Research in Africa (CIDRI) and the SA-MRC.

FHS UCT HREC: 401/2009

Title: **CYTOMEGALOVIRUS ACQUISITION IN INFANCY AND THE RISK OF TUBERCULOSIS DISEASE IN CHILDHOOD: A LONGITUDINAL BIRTH COHORT IN CAPE TOWN, SOUTH AFRICA**

Authors: Leonardo Martinez[1], Mark Nicol[2,3], Attie Stadler[4], Catherine J. Wedderburn[4,5], Maresa Botha[6], Lesley Workman[4], David M le Roux[4], Heather J. Zar[4]

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Objective:
The risk of tuberculosis disease after recent exposure is greatest in the first few years of life, however the mechanisms responsible for this vulnerability are not well elucidated. Acquisition of viral infections, such as cytomegalovirus, in early life may modulate the immune system. We studied the relationship between acquisition of cytomegalovirus in infancy and subsequent development of tuberculosis disease in children prospectively followed until 9 years of age.

Methods:
We enrolled pregnant women between 20–28 weeks' gestation attending antenatal care in a peri-urban, poor South African setting in the Drakenstein child health study, a birth cohort study. Nasopharyngeal swabs for cytomegalovirus detection using qPCR were done in infants at birth, three weeks, six weeks, three months, six months, 12 months, and 24 months. Children were followed prospectively for tuberculosis infection or disease using tuberculin skin testing done annually, and radiographic examinations with GeneXpert, culture, smear on induced sputum samples. We compared tuberculosis disease incidence in children with and without cytomegalovirus infection using Cox regression and hazard ratios (HRs) with 95% confidence intervals (CIs).

Results:
Among 963 children tested for cytomegalovirus infection (N_{tests}=7,186; median 6 tests per child, interquartile range, 2–11), 42% had cytomegalovirus infection by one year of age. Children who were breastfed were at greatest risk (44% versus 14%, P<0.0001). Mother-child pairs were followed for tuberculosis disease for a median of 6.9 years (IQR, 6.0–7.8) and children with cytomegalovirus by one year of age had an increased hazard of subsequently developing tuberculosis disease (AHR, 3.2; 95% CI, 1.6–6.4) including microbiologically confirmed disease (AHR, 4.4; 95% CI, 1.2–16.3). Infants with a high cytomegalovirus load were at consistently greatest risk of developing tuberculosis disease.

Conclusions:
Prevention of tuberculosis disease in childhood in high-burden countries may need to include strategies to deter or delay acquisition of cytomegalovirus prenatally or in the first months of life.

Title: **MIS-C AT TWO TERTIARY HOSPITALS IN CAPE TOWN, SOUTH AFRICA: CLINICAL PHENOTYPE AND DISTINGUISHING FEATURES FROM SIMILAR ACUTE INFLAMMATORY CONDITIONS**

Authors: Claire Butters*[1, 2], Deepthi Raju Abraham[3], Heidi Facey-Thomas[2], Raphaella Stander[2], Debbie Abrahams[2], Ayodele Faleye[2], Helena Rabie[3], Christiaan Scott[2], Liesl Zühlke[2], Kate Webb[2].

Affiliation: [1]Department of Pathology, University of Cape Town, South Africa; [2]Department of Rheumatology, Red Cross War Memorial Children's Hospital, University of Cape Town, Western Cape, South Africa; [3]Tygerberg Hospital, Stellenbosch University, Cape Town, Western Cape, South Africa

Introduction:
Distinguishing Multisystem Inflammatory Syndrome in Children (MIS-C) associated with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) from acute, pyrexial childhood illness can be challenging. We present a case series from two tertiary centres in Cape Town, South Africa and compare the clinical phenotype of MIS-C with mimicking systemic inflammatory disorders.

Objectives:
To describe the clinical characteristics of children with MIS-C within the region and to compare the clinical features of children with confirmed MIS-C to those who presented during the same period with suspected MIS-C and ultimately an alternative diagnosis of inflammatory or infective conditions (inflammatory controls).

Methods:
Children with MIS-C admitted to the Red Cross War Memorial Children's Hospital (RXH) and Tygerberg Hospital (TBH) between 22 June 2020 and 5 March 2021 were recruited. At RXH only, children with suspected MIS-C with an ultimate alternate diagnosis (inflammatory controls) were also recruited. Clinical data were collected. (Ethics approval: UCT HREC 112/2012, 599/2020)

Results:
During the time period, 69 children had confirmed MIS-C and 23 suspected MIS-C cases had an alternate diagnosis including typhoid, tuberculosis, sepsis and appendicitis among others. Sixty percent of children with MIS-C had no SARS-CoV-2 contact but all had evidence of SARS-CoV-2 exposure by antibody (91.3%) or PCR nasal swab (14.5%). There was no difference in age, sex or ethnic distribution between children with MIS-C and inflammatory controls. The most common presenting features of MIS-C were fever (100%), tachycardia (98.6%), rash (84.1%), conjunctivitis (76.8%), and abdominal pain (60.9%). Compared to inflammatory controls, children with MIS-C had lower platelets ($p=0.036$), haemoglobin ($p=0.036$) and sodium ($p<0.001$) and higher ferritin ($p=0.036$), troponin-T ($p<0.001$) and pro-brain natriuretic peptide (pro-BNP) ($p<0.001$). In a logistic regression model, the presence of tachycardia (expB=44.91, $p=0.011$), rash (expB=9.13, $p=0.053$), conjunctivitis (expB=4.93, 0.005) and platelets below $250x10^9$/L (expB=9.53, $p=0.007$) individually increased odds of a diagnosis of MIS-C, and together this model explains 64.7% of the variability between the diagnoses. The median minimum ejection fraction in MIS-C patients was lower than inflammatory controls (52% vs 65%, $p=0.039$). Ninety four percent of MIS-C patients received at least one dose of intravenous immunoglobulin (IVIG), 64% required methylprednisolone and 5.8% received IL-6 inhibition. Children with MIS-C more commonly required inotropes ($p=0.022$) and oxygen ($p=0.006$). They were more commonly admitted to ICU compared to inflammatory controls (41% vs 9%, $p=0.003$) and had a longer duration of hospital stay (7 days vs. 5 days, $p=0.028$). No children died.

Conclusion:
Distinguishing MIS-C from acute infectious or inflammatory causes of childhood fever may be challenging. The presence of conjunctivitis, tachycardia, rash or low platelets associates with higher odds of MIS-C in this population. Differences in widely available blood tests like sodium, haemoglobin and platelets may be useful to differentiate MIS-C in the acute setting.

Title: **EXPOSURES TO IVERMECTIN USED FOR COVID-19 REPORTED TO THE POISONS INFORMATION HELPLINE OF THE WESTERN CAPE**

Authors: V. Pillay-Fuentes Lorente[1], R. van Rensburg[1], G. Voigt[1], C.E. du Plessis[1], C. Stephen,[2] K. Balme,[2] E.H. Decloedt[1], C.J. Marks[1]

Affiliation: [1] Division of Clinical Pharmacology, Department of Medicine, Stellenbosch University, Cape Town, South Africa; [2]Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, University of Cape Town, Cape Town, South Africa

Background:
Ivermectin is an antiparasitic drug that has shown *in vitro* activity against COVID-19. Clinical studies supporting ivermectin for COVID-19 prevention and treatment are conflicting, with important limitations. Public support for ivermectin is significant, with extensive off-label use despite the divisive views on its efficacy. Ivermectin tablets and injectable formulations are not registered by the South African Health Products Regulatory Authority for human use, apart from section 21-approved products. Currently the National Department of Health does not recommend the use of ivermectin for COVID-19.

Objectives:
To describe cases of exposures to ivermectin used for prevention or management of COVID-19 reported to the Poisons Information Helpline of the Western Cape (PIHWC).

Methods:
We conducted a retrospective review of calls to the PIHWC related to ivermectin exposure during a 13-month period during the COVID-19 pandemic (July 2020 to July 2021; Period 1). We compared these calls to ivermectin exposure calls reported to the PIHWC before the first publication suggesting efficacy of ivermectin against SARS-CoV-2 (June 2015, inception of PIHWC database, to June 2020; Period 2).

Results:
During the study period, 65 ivermectin exposure calls were identified, with 46 calls received by the PIHWC during Period 1, and 19 during Period 2.
Forty (86.9%) ivermectin calls during Period 1 were COVID-19-related (20 definitely and 20 probably), with 79.3% (n=36) being adults ≥20 years. Thirteen calls involved paediatric patients ≤ 12 years across Periods 1 and 2, of which 5 were COVID-related (3 definitely and 2 probably, all in Period 1). Veterinary preparations were reported in 76.1% (n=35) of calls during Period 1, and 3 (4.6%) cases were severely symptomatic. Common presentations included neurological (34.8%, n=16), gastrointestinal (30.4%, n=14), ocular (10.9%, n=5), and dermal (6.5%, n=3) symptoms.

Conclusion:
Ivermectin is being used to prevent and manage COVID-19 in the absence of robust evidence, dosing recommendations or appropriate formulations. Consequently, ivermectin exposure-related calls to the PIHWC increased markedly after July 2020, predominantly due to ivermectin being taken for COVID-19.

Title: **INVESTIGATING THE CLINICAL CHARACTERISTICS OF PAEDIATRIC COVID-19 IN CAPE TOWN, SOUTH AFRICA: INITIAL RESULTS FROM THE UNIVERSITY OF CAPE TOWN (UCT), DEPARTMENT OF PAEDIATRICS AND CHILD HEALTH, COVID-19 PAEDIATRIC REPOSITORY**

Authors: Liesl Zühlke, Raphaella Stander, Alexia Joachim, Thomas Aldersley, Adila Dawood, Cameron Hendricks, Khushbu Soni, Jessica Abrams, Brenda Morrow, Heather Zar, Kate Webb, Kirsty Donald on behalf of the UCT, Department of Paediatrics and Child Health, COVID-19 paediatric repository nvestigators

Presenter Affiliation: Department of Paediatrics and Child Health, University of Cape Town

Introduction:
Studies show that children account for only 1-5% of diagnosed COVID-19 cases, they have milder disease than adults and deaths are extremely rare. However, the full clinical spectrum of paediatric COVID-19 has not yet been fully defined. Additionally, the South African paediatric population has unique characteristics and risks that may affect this spectrum including immunocompromise, malnutrition and underlying medical conditions. We aimed to characterise COVID-19 in Cape Town children.

Methods:
The COVID-19 paediatric repository is a prospective cohort of children recruited via convenience sampling at 5 Western Cape Hospitals. All patients < 18 years who tested PCR positive for SARS-CoV2 were eligible for inclusion in the study. Sociodemographic and clinical features were recorded.

Results:
To date 227 participants, 56% (125/227) male with median age 2 years (IQR 0-6) have been enrolled. Only 28 (12%) participants had a known contact with a confirmed COVID-19 case; 67% of these, were first degree relatives, 28% second degree relatives and 6% health care workers.
Comorbidities were present in 125 (56%) participants, these included neurological abnormalities 25 (11%), parental smoking 19 (8%), congenital heart disease 15 (7%), age ≤ 28 days 14 (6%), genetic defects 12 (5%), seizure disorders 10 (4%), active tuberculosis 9 (4%), obesity 8 (4%), acquired cardiac disease 7 (3%) and chronic pulmonary disease 6 (3%).
On presentation 173 (76%) were symptomatic. Predominant symptoms included cough 40%, documented fever 34%, difficulty breathing 28%, and nausea or vomiting 20%. On examination, 65% had abnormal heart rates, 47% abnormal respiratory rates, 35% showed signs of respiratory distress and 24% were hypoxic. Of the 227 patients, 169 (74%) were admitted to hospital, median length of stay was 3 days (IQR 1-6). During their admission 38 (17%) patients developed COVID-19 complications, including secondary infection 22 (10%), sepsis 9 (4%), MIS-C 5 (2%), and myocarditis or new onset heart failure 3 (1%). Of those admitted 33 (15%) were admitted to ICU, where 26 (79%) of patients required non-invasive and 8 (24%) invasive ventilation, median length of ICU admission was 3 days (IQR:2-7.5). Of the 169 patients admitted to hospital 159 (94%) were discharged home alive, 8 (5%) were transferred to another facility and 2 (1%) died. In 65% (109/167) of patients discharged home or transferred out, COVID-19 symptoms had fully resolved, and care needs on discharge were the same or better than on admission for 19 (11%) and 136 (80%) participants.

Conclusion:
The initial findings of the UCT paediatric COVID-19 registry, confirm that underlying comorbidities are common in children hospitalised for COVID, but that the outcome is predominantly favourable. We anticipate that these data will help to complete the clinical picture of COVID-19 in the South African paediatric population.

Title: **SARS-COV-2 ANTIBODY PHENOTYPE AND IMMUNE GENE EXPRESSION IN MIS-C**

Authors: Kate Webb[1,2], Thandeka Moyo-Gwete[3,4], Simon C. Mendelsohn[6], Claire Butters[1], Simone Richardson[3,4], Heidi Facey-Thomas[1], Debbie Abrahams[1], Mashudu Madzivhandila[3,4], Zanele Makhado[3,4], Frances Ayres[3,4], Nelia Manamela[3,4], Richard Baguma[6], Stanley Kimbung Mbandi[6], Mzwandile Erasmus[6], Liesl Zühlke[1], Thomas J. Scriba[6], Penny L Moore[3,4,5], George Kassiotis[2], Christiaan Scott[1]

Affiliation: [1]Divisions of Paediatric Rheumatology and Cardiology, Red Cross War Memorial Children's Hospital, University of Cape Town (UCT), South Africa (SA); [2]Retroviral Immunology, Francis Crick Institute, London, UK; [3]National Institute for Communicable Diseases, Johannesburg, SA; [4]Antibody Immunity Research Unit, University of the Witwatersrand, Johannesburg, SA; [5]Centre for the AIDS Programme of Research in South Africa (CAPRISA), Durban, SA; [6]South African Tuberculosis Vaccine Initiative, Institute of Infectious Disease and Molecular Medicine, UCT, SA

Background:
Multisystem Inflammatory Syndrome in Children (MIS-C) is a severe disease that affects a small proportion of children exposed to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Differences in SARS-CoV-2 antibody responses and immune gene expression between SARS-CoV-2-infected children who develop MIS-C and those who do not may provide insight into the mechanism of MIS-C.

Methods:
Healthy children presenting for elective surgery and those with MIS-C were recruited between 22 June 2020 and 5 November 2020 from a single paediatric hospital during the first wave of SARS-CoV-2 in the region. Clinical data, whole blood RNA and serum were collected. Titres of SARS-CoV-2 spike-specific antibody (SAb) and their capacity to perform neutralization, antibody-dependent cellular phagocytosis (ADCP) and antibody dependant cellular cytotoxicity (ADCC) were measured. Whole blood RNA gene expression was measured using multiplex Fluidigm quantitative Polymerase Chain Reaction (qPCR) with a panel of 84 immune genes. Principal component analysis was performed to assess for differences in gene expression. A linear regression model was developed with a forward stepwise model selection method to assess which genes associated with C-reactive protein (CRP) in MIS-C after controlling for the neutrophil to lymphocyte ratio (NLR).

Results:
Twenty-three children with MIS-C and 25 healthy children were recruited. Nine healthy children had detectable SARS-CoV-2 serum antibodies (healthy exposed). No children had preceding clinical disease related to SARS-CoV-2 infection. Comparing children with MIS-C and healthy exposed children showed no difference in SAb binding responses ($p=0.372$) or ADCC ($p=0.992$). Increased neutralisation titre ($p=0.084$) and ADCP ($p=0.086$) in children with MIS-C was observed although was non-significant. Antibody function or titre did not change over time or with treatment in MIS-C. There was a clear distinction in immune gene expression between healthy children and those with MIS-C. Immune gene expression in MIS-C resolved to become indistinct from healthy children with time. Whole blood immune gene expression associated with an abundance of neutrophils in MIS-C. In a model that accounted for 66% of the variance in CRP (adjusted $R^2 = 0.66$) *IL27* accounted for 64% of the model effect ($B=35$; $p<0.001$) followed by NLR (15%, $B=6.6$, $p=0.002$) and *MCP2* (11%, $B=-14.59$, $p=0.008$).

Conclusion:
Comparing children exposed to SARS-COV-2 from the same time period and region with or without MIS-C provides unique mechanistic insight into the disease. A trend towards higher SAb titres and ADCP implies a distinct humoral immune response to SARS-COV-2 in children with MIS-C, although further studies are required to validate this observation. The resolution of the abnormal immune gene expression in MIS-C implies a monophasic immune perturbation. The association of *IL27* and *MCP2* with CRP suggests that these may be important targets in future studies for possible pathogenicity and as potential biomarkers in MIS-C.

Title: **PREVALENCE OF PAEDIATRIC ACUTE RESPIRATORY DISTRESS SYNDROME (PARDS) IN A TERTIARY ACADEMIC PAEDIATRIC INTENSIVE CARE UNIT (PICU) IN SOUTH AFRICA**

Authors: Lozano EI[1]; Argent AC[1]; Lupton-Smith AR[2]; Morrow BM[1]

Affiliation: [1]Department of Paediatrics and Child health, University of Cape Town, South Africa; [2]Physiotherapy Department, Stellenbosch University, Cape Town, South Africa

Objective:
This study aimed to determine the prevalence of paediatric acute respiratory distress syndrome (pARDS) amongst infants and children admitted to the paediatric intensive care unit (PICU) at Red Cross War Memorial Children's Hospital, Cape Town, South Africa.

Methods:
This was a descriptive, single-centre point prevalence study with twice weekly data collection conducted over a six-month period from 10 August 2020 to 12 February 2021. All infants and children admitted to the PICU on study days were included. Data were captured electronically on a standardised case record form, using a REDCap electronic database. The Pediatric Acute Lung Injury Consensus Conference (PALICC) criteria were used to define pARDS cases. Prevalence was calculated as the total number of pARDS cases/total number of occupied PICU beds on all study days.

Results:
A total of 879 PICU bed days were included in the study - 52.7% of patients were male, mean [range] age and weight 40.8 (0.02 – 638.0) months and 12.9 (0.9 – 70.0) kg respectively. The majority (86.9%) were emergency admissions, most commonly with cardiac disease (24.5%). On data collection days 494 (56.2%) patients were invasively mechanically ventilated, 208 (23.7%) on noninvasive ventilation and 177 (20.1%) were not receiving ventilatory support.

A total of 273 PICU admissions (n=140 (51.3%) male; mean (range) age 24.7 (0.03 -181.9) months) fulfilled the pARDS case definition with a further 56% classified as being at risk of pARDS. pARDS was further classified in cases who were invasively mechanically ventilated (n=216) as mild (n=143; 66.1%); moderate (n=44; 20.4%) and severe (n=29; 13.4%) according to PALICC criteria. Of those on NIV, 57 (27.4%) fulfilled pARDS criteria. The prevalence of pARDS was calculated as 31.1% (95% CI 28% – 34%).

Conclusions:
This is the first study to report the prevalence of pARDS in a South African PICU. The prevalence of >30% is substantially higher than international reports of pARDS incidence, and further investigation of risk factors and outcomes is warranted.

Human Research Ethics committee approval: HREC Ref 766/2019

Title: **A RETROSPECTIVE REVIEW OF CHILDREN STARTED ON NON-INVASIVE VENTILATORY SUPPORT IN THE MEDICAL EMERGENCY UNIT AT RED CROSS CHILDREN'S HOSPITAL: A CROSS SECTIONAL STUDY**

Authors: Heloise Buys [1,2], Tamara Kerbelker [1,2], Shirani Naidoo [1,2], Zakira Sablay[1,2], Zanele Nxumalo[1], Rudzani Muloiwa [1,2]

Affiliation: [1]Red Cross War Memorial Children's Hospital, Klipfontein Road, Rondebosch, Cape Town, Western Cape Province, South Africa; [2]Department of Paediatrics and Child Health, University of Cape Town, South Africa

Objectives:
Bubble CPAP (bCPAP), a non-invasive ventilation modality, has emerged as an intervention that is able to reduce pneumonia-related mortality in children in low resourced settings. Our study primarily aimed to retrospectively describe a cohort of children who were started on CPAP in the Medical Emergency Unit (MEU) of RCH between 2016 and 2018.

Methods:
A retrospective folder review was conducted. All children fulfilling the inclusion and exclusion criteria were eligible for inclusion. Data collected included simple demographic and clinical data, investigations, management, and outcome. Descriptive statistical data were generated for all relevant variables. Percentages depicted frequencies of categorical data while means and standard deviation or medians with interquartile ranges were used to summarise continuous data. The study has approval, HREC: 764/2018.

Results:
Of 500 children started on CPAP, 266 (53%) were male; their median age was 3.7 (IQR 1.7-11.3) months and 169 (34%) were moderately-severely underweight-for-age. There were 12 (2%) HIV-infected children; 401 (80%) had receive appropriate immunisations for their age; and 119 (24%) were exposed to tobacco smoke at home. The five most common primary reasons for admission were acute respiratory illness, acute gastroenteritis, congestive cardiac failure, sepsis and seizures. There was no underlying medical condition in 409 (82%) of the children. Most children, 411 (82%), were managed in high care areas of the general medical wards while 91 (18%) went to PICU. The median time on CPAP was 1.7 (IQR 0.9-2.8) days. The median hospitalisation time was 6 (IQR 4-9) days. Overall, 38 (8%) children required invasive ventilatory support. Two children suffered an air-leak which required intercostal drainage. Overall, 12 (2.4%) children with a median age of 7.5 (IQR 0.7-14.5) months died, seven of whom did not have an underlying medical condition.

Conclusions:
Bubble CPAP is an important form of cardiorespiratory support at a public children's hospital and used in the general wards mainly, can reduce the need for intensive care admission as well as intubation for severe acute respiratory infections. This form of non-invasive ventilatory support should be considered more widely in the context of limited access to paediatric intensive care units in other African settings.

Keywords: Non-invasive ventilatory support, CPAP, children, Africa

Title: **TRANSFUSION PRACTICES AMONG CHILDREN ADMITTED TO A SOUTH AFRICAN PICU FOLLOWING CARDIAC SURGERY**

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Affiliation: [1]Red Cross War Memorial Children's Hospital, South Africa; [2]Department of Paediatrics and Child Health, University of Cape Town, South Africa

Objective:
To describe the use of blood products following cardiac surgery, as well as the outcomes and factors associated with post-operative blood product use.

Methods:
The study was a prospective, single centre observational study conducted at the Red Cross War Memorial Children's hospital paediatric intensive care unit (PICU). One hundred and twenty-six children <18 years old admitted to the PICU following cardiac surgery between July 2017 and January 2018, were enrolled consecutively. Data were prospectively collected from blood bank charts, intraoperative and PICU observation charts. Demographic data, intraoperative details and post-operative blood product use were extracted from patient records and entered in a standardised case record form.

Results:
Fifty three percent of children received blood products following cardiac surgery. The blood products transfused included cryoprecipitate (30.9%), packed red cells (22.2%), albumin (18.3%), fresh frozen plasma FFP (15.9%) and platelet concentrate (15.1%). Low haemoglobin level (86%), low platelet count (84%) and hypotension episodes (95%) were the most common indications for red cell, platelet and albumin use respectively; whilst bleeding was the commonest indication for FFP (70%) and cryoprecipitate (67%) use. The standardized mortality ratio was 3.1 vs 0 in transfused and non-transfused patients respectively ($p<0.0001$). The median (IQR) durations of PICU stay and mechanical ventilation in transfused vs non-transfused patients were 5 (3-11) vs 2 (2-5) days ($p< 0.0001$) and 47 (22-132) vs 20 (6-27) hours ($p<0.0001$). The factors associated with blood-product use post cardiac surgery include previous cardiac surgery, younger age, lower weights, and prolonged coagulation parameters ($p< 0.05$).

Conclusion:
There is high usage of blood and blood products among children post cardiac surgery, associated with a longer ICU stay, ventilation duration, and higher standardized mortality ratio.

Keywords: blood product(s); cardiac surgery; children; intensive care unit; transfusion

Title: **CENTRAL VENOUS CATHETER CHOICE IN GASTROSCHISIS MANAGEMENT: BALANCING RISK-BENEFIT IN A RESOURCE-LIMITED SETTING TO REDUCE MORBIDITY AND MORTALITY**

Authors: Kruger, Emma; Arnold, Marion

Affiliation: Division of Paediatric Surgery, Red Cross War Memorial Children's Hospital, University of Cape Town, Cape Town, South Africa

Objective:
To evaluate parenteral nutrition requirements and central-line associated outcomes in patients with gastroschisis in a state-funded hospital in South Africa to provide local evidence base for choice of central line type (peripherally inserted central catheters, PICC; central venous catheters, CVC or tunnelled surgically inserted Broviac ® catheters).

Method:
Retrospective audit of central venous catheter outcomes and predictors of parenteral nutrition duration for patients with gastroschisis managed at Red Cross War Memorial Children's Hospital over a 10-year period from 2010-2019 (UCT HREC approval #729/2018)

Results:
Sixty-three patients with gastroschisis included 7 receiving palliative care within 7 days of birth who were excluded from further study. The remaining 56 patients received a total of 168 central lines, including 41 PICC, 69 CVC and 58 Broviac catheters. Mean catheter duration was 8 days for PICC, 9 days for CVC and 25 days for Broviac, with only 56% removed electively. Proven central line-associated blood stream infection (CLABSI) occurred in 15 per 1000 line days for PICC and CVC compared to 5 per 1000 for Broviac lines. Mechanical line failure occurred in 49% of PICC (6% per line days), 29% of CVC (3% per line days) and 14% of Broviac lines (<1% per line days), with increased mechanical failure rate associated with increased CVC use despite no significant increase in median line duration over time. Deep venous thrombosis occurred in 5% of Broviac lines and 3% of CVC lines. Complicated gastroschisis associated with atresia or bowel necrosis occurred in 11/56 (20%) and doubled the mean number of central lines inserted per patient, with mean duration of 53 versus 28 days (p=0.004). Birth weight and gestational age did not predict PN use beyond a month. Factor associated with PN duration beyond one month (32%) included silo bag application after 12 hours from birth (OR 12:1, CI 1.2-114.3, p=0.03), abdominal closure>7 days (median 31 versus 18 days, p=0.04) and bowel necrosis within first week after birth (median 57 versus 21 days, OR12:1, 9%%CI 1.3 to 110.3, p=0.03). No other predictive factors for patients requiring PN ≤2 weeks (27%) could be identified.

Conclusions:
CVC or PICC may be suitable for up to a quarter of patients with uncomplicated gastroschisis, however quality improvement interventions are required to reduce line complications to international standards. Early placement of Broviac lines for complicated gastroschisis may reduce number of central lines and CLABSI incidence but increases deep venous thrombosis.

Title: **PROFILE OF CHILDHOOD HEARING LOSS IN THE WESTERN CAPE PROVINCE, SOUTH AFRICA**

Presenter: Silva Kuschke

Affiliation: Audiology, Red Cross Children's Hospital

Objectives:
To describe the nature, associated risk factors and age of diagnosis for childhood hearing loss in a South African cohort from the Western Cape Province.

Methods:
A retrospective review of clinical data from children under six years of age with confirmed hearing loss at Red Cross War Memorial Children's Hospital (RCWMCH) was conducted between 1 January 2019 and 31 July 2019. Data collected included demographic information, type and degree of hearing loss, documented risk factors associated with hearing loss, and age of suspicion and diagnosis of hearing loss.

Results:
The study sample included 240 children with hearing loss, with a mean age of 42 months (21.8 SD; range 2-72). More than two thirds (68.3%) of the children presented with bilateral hearing loss. The majority presented with conductive hearing loss (64.6%), followed by sensorineural (28.7%) and mixed hearing loss (3.3%) or auditory neuropathy spectrum disorder (3.3%). More than half (51.8%) of the bilateral sensorineural hearing losses were of a profound degree. The most prominent risk factor for conductive hearing loss was otitis media, for sensorineural hearing loss it was a family history of childhood hearing loss, and for auditory neuropathy spectrum disorder it was hyperbilirubinaemia. Approximately one third of patients (27.1%) with sensorineural hearing loss did not have any associated risk factors. The mean age of diagnosis of permanent congenital or early-onset hearing loss was 31.4 months (22.8 SD; range 2-72), with a mean delay of nine months (13.2 SD; range 0-60) between age of suspicion and diagnosis of hearing loss (n=93).

Conclusions:
The large proportion of preventable hearing losses in this sample highlights the importance of maximising primary health care efforts to treat preventable causes timeously. Age of diagnosis of permanent congenital or early-onset hearing loss was severely delayed undermining prospects of positive outcomes through early intervention. Infant hearing screening services in the public health sector of South Africa should be prioritised alongside primary health care efforts to reduce preventable risks for hearing loss.

Title: **A DESCRIPTIVE ANALYSIS OF INFECTIONS DUE TO NEW DEHLI METALLO-B-LACTAMASE PRODUCING ENTEROBACTERALES IN CHILDREN AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL**

Authors: L Greybe, HD Tootla , A Brink, JJC Nuttall

Presenter Affiliation: Department of Paediatrics and Child Health, University of Cape Town

Objective:
To describe infections due to New Delhi Metallo-β-lactamase (NDM)-producing carbapenem-resistant Enterobacterales (CRE) in children at Red Cross War Memorial Children's Hospital (RCWMCH)

Methods:
The National Health Laboratory Service database, was searched to identify patients with carbapenem non-susceptible Enterobacterales from clinical samples (excluding surveillance samples) received from RCWMCH, between 01/10/2015 to 28/02/2021. Patients were included if NDM carbapenemase was detected in carbapenem non-susceptible isolates. The medical folders and treatment charts of these children were reviewed to identify clinical parameters, risk factors and definitive management of CRE infection. A descriptive analysis of the retrospective study data was performed.

Results:
Twenty-two children were included, and their median age was 18 (interquartile range [IQR]: 4 – 75) months. The median time in hospital prior to CRE infection was 19 (IQR 3 - 38) days with 4 children (18%) culturing NDM CRE at presentation. Sixty percent of samples were identified after 2018. All patients had at least one risk factor for CRE, with three or more risk factors present in 18/22 (81%) patients. NDM CRE was isolated from 26 samples: blood (27%), urine (23%), pus (23%), respiratory samples (11%), tissues (8%), and catheter tips (8%). Four children (8%) had isolates identified from two different sites, including a ventriculoperitoneal catheter tip and urine (1), pus and tissue (1), and blood culture and pus (2). Only *Klebsiella pneumoniae* (15/26 58%) and *Serratia marcescens* (11/26, 42%) were identified as Enterobacterales species harbouring NDM in these children. Samples collected prior to 2019 exclusively cultured *K. pneumoniae* (7/26, 27%). Thereafter, 8/26 (31%) samples cultured *K. pneumoniae,* and 11/26 (42%) cultured *S. marcescen*s.

Based on routine antimicrobial susceptibility testing (AST), 7/22 (32%) patients had no susceptible antibiotic treatment options available, 7/22 (32%) had one, 4/22 (18%) had two, and 4/22 (18%) patients had three or more options available. Sixteen patients (72%) were treated for their CRE infection using antibiotics, including ciprofloxacin (7/16, 43%), meropenem (6/16, 37%), colistin (2/16, 12%), trimethoprim-sulfamethoxazole (3/16, 18%), and amikacin (1/6, 6%). All indwelling devices (5) were removed, and all patients with intra-abdominal infections (3) had source-control surgery. Eight patients (36%) died in hospital, with 4/8 (50%) on antibiotics to which in vitro susceptibility was demonstrated, and 3/8 (38%) on non-susceptible salvage antibiotic therapy as no other alternatives were available. Five of these patients (63%) cultured *S. marcescens* and 3/8 (37%) *K. pneumoniae*. *S. marcescens,* was cultured from pus (2) and blood culture (3) and only one isolate demonstrated susceptibility to ciprofloxacin, with the remaining samples resistant to all antibiotics for which AST was performed. *K. pneumoniae* was cultured from blood culture (2) and urine (1) and isolates were susceptible to ciprofloxacin, amikacin and colistin, respectively. All eight patients were critically ill and received active critical care in the intensive care unit.

Conclusions:
NDM CRE were increasingly identified in samples sent from children admitted during the study period. Increasing isolation of *S. marcescens* harbouring NDM is of particular concern, as all but one isolate in our study were pan-resistant and *S. marcescens* is intrinsically resistant to colistin, which is commonly used to treat CRE infection. While aminoglycosides, colistin, and fluoroquinolones may retain in vitro activity against some CRE, they may not be as effective in critically ill patients with serious invasive infection. There is a need for effective alternative treatment options, especially in critically ill children with NDM CRE, as this may alter outcomes.

HREC REF: 238/2021

Title: **VULNERABLE MOTHERS' EXPERIENCE OF FEEDING THEIR PRETERM INFANT IN NEONATAL CARE**

Authors: Elanie van Schalkwyk and Dr (PhD) Berna Gerber

Presenter Affiliation: Department of Health and Rehabilitation Sciences, Stellenbosch University

Background:
Worldwide, preterm birth is a rising threat to maternal and child health. The universal challenges of being the mother of a preterm infant, combined with context-specific challenges such as poverty and poor linguistic and cultural representation, bring about risks for both mother and infant. This includes poor maternal mental health; poor mother-infant bonding and attachment; and potential suboptimal developmental outcomes for the infant.

Objective:
This article describes and explains how Afrikaans-speaking mothers living in poverty experienced feeding their preterm infant in neonatal care.

Method:
The study implemented a cross-sectional, qualitative design. Mothers of preterm infants (chronological ages between three and six months) were selected through a purposive sampling method and participated in individual semi-structured interviews. Interviews were conducted one- to three months after the mother-infant dyad was discharged from the same public, tertiary hospital. Nine interviews were thematically analysed. The participants were a vulnerable group about whom little research literature was available.

Results:
Feeding was perceived as a progressive task that worked towards the goal of discharge from hospital. It was stressful due to various factors, but insufficient breastmilk supply was a significant contributor. The hospital setting was perceived as something that added to the participants' anxiety surrounding feeding, but at the same time it had the potential to decrease their anxiety. When the mother-infant dyad was able to breastfeed successfully, it made the participants feel like mothers at last after an extended period of anticipation.

Conclusion:
Feeding their preterm infant was a prominent experience for the mothers, especially while in neonatal care. Mothers need increased guidance and support from the healthcare team providing neonatal care with regards to the task of feeding their infant. These intervention efforts should be sensitive to the hardships vulnerable mothers of preterm infants encounter. This has the potential to improve maternal wellbeing, mother-infant bonding and attachment, and the developmental outcomes of the infant, thereby optimally using the neonatal period.

Keywords: Vulnerable mothers; experiences; feeding; breastfeeding; preterm infants; neonatal care

Title: **CLINICAL FEATURES OF PAEDIATRIC HIV ARTHROPATHY**

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Affiliation: [1]Fort Beaufort Provincial Hospital, Amathole District, Eastern Cape, South Africa; [2]Division of Paediatric Rheumatology, Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, Cape Town, South Africa; [3]University of Cape Town, Rondebosch, Cape Town, South Africa

Introduction:
Advanced HIV infection is associated with an inflammatory arthritis, however few reports have described this disorder in children.

Objectives:
This study aimed to describe the clinical features of HIV arthropathy in a case series of children in South Africa.

Methods:
Retrospective data were collected from HIV-infected children with HIV arthropathy enrolled in a Paediatric Rheumatology clinic in Cape Town, South Africa. Ethical approval was granted by the Human Research Ethics Committee of the University of Cape Town, with a waiver for consent.

Results:
Eleven cases of HIV arthropathy were identified. Cases predominantly affected boys (8/11), and the median age of onset was 10.3 years (IQR 6.9 – 11.6). Most cases presented in the setting of advanced immunosuppression, with a median absolute CD4+ count of 389 cells/uL (IQR 322 – 449) and median CD4+ proportion of 19.5% (IQR 14.8 – 25.0) at presentation. The clinical presentation was variable, with both oligoarthritis (6/11) and polyarthritis (5/11) being prevalent. All cases exhibited large joint involvement, which was usually asymmetrical. In addition, four children had asymmetrical small joint involvement. Associated features included enthesitis (4/11) and dactylitis (1/11). The most consistent laboratory feature was elevated acute phase reactants. Typical ultrasonographic findings were joint effusions and synovial hypertrophy.

Conclusion:
In this series, most cases of HIV arthropathy exhibited asymmetrical large joint oligoarthritis or polyarthritis, and presented in older boys with advanced immunosuppression.

Title: **THE FEEDING AND SWALLOWING IMPACT SURVEY (FS-IS): CROSS-CULTURAL ADAPTATION FOR THE SOUTH AFRICAN CONTEXT**

Authors: Candice Bestenbier, Vivienne Norman and Associate Professor Michelle Pascoe

Presenter Affiliation: Department of Health and Rehabilitation Sciences (CSD), University of Cape Town

Background:
Feeding and swallowing difficulties (FSD) are found in typically developing children and children with complex medical and developmental conditions. These difficulties may have negative health consequences which can be stressful for caregivers as they are required to provide care for their children in the home environment. The Feeding and Swallowing Impact Survey (FS-IS) is a subjective rating scale used to determine the health-related quality of life (HRQoL) of caregivers of children diagnosed with FSD. However, this scale is not yet available in any of the official South African languages (except for English),and has not yet been culturally or linguistically adapted for the South African context.

Research aims:
The study aimed to cross culturally adapt and validate the FS-IS for the South African context by 1) describing the content validity of the FS-IS in a South African context; 2) describing the cultural and linguistic appropriateness of the English, isiXhosa and Afrikaans versions of the FS-IS; and 3) describing the experiences caregivers of children have in caring for their child with FSD using the FS-IS, in a pilot study.

Methodology:
HREC REF: 459/2018. A descriptive exploratory design was used to cross-culturally adapt and pilot the FS-IS, which consists of 3 subsections related to daily activities, worrying and problems with feeding. Five expert speech-language therapist (SLT) participants were identified to review the FS-IS for content validity. The FS-IS was then translated into Afrikaans and isiXhosa using the forward and back translation process. Caregivers (n=15) were identified at feeding clinics to determine the cultural and linguistic appropriateness of the FS-IS in English (n=5), Afrikaans (n=5) and isiXhosa (n=5). Their recommendations were taken into consideration and changes made. The pilot study included caregivers of children with FSD attending feeding clinics at two institutions (n=32) who completed the FS-IS. The participants in the pilot study included parents as primary caregivers (n=28; 88%), grandparents (n=2; 6%), as well as foster parents (n=2; 6%). Thirty-one participants were female with 14 English speaking, 9 isiXhosa and 9 Afrikaans speaking. The caregivers were the primary caregivers of children with a variety of FSD including non-oral feeds, oral feeds with specific modifications and picky or selective eaters.

Results:
The FS-IS was found to have content validity as experts and caregiver participants judged it to be contextually relevant for the South African context. Caregivers considered the items on the FS-IS important, clear and appropriate for speakers of their native language as well as for fellow South African families, with minor changes suggested for the isiXhosa translated version. The tool has high internal consistency (Cronbach's alpha = 0.827) as well as excellent intra and inter-rater reliability (100% agreement). Daily activities that caregiver participants found most difficult included getting help from others (50%, n=16) and leaving their child in the care of others as they are scared to have others feed or take care of their child (62.5%, n=19). The majority of caregiver participants reported concerns related to their child's general health (84%, n=27) and whether they were doing enough to help with their child's FSD (50%, n=16). Few caregivers reported difficulties with feeding, with 87.5% (n=28) reporting no difficulties as a result of the time taken to prepare meals and 72% (n=23) reported no difficulty due to professionals or family having differing opinions about how to feed their child with FSD.

Conclusion:
The results confirm that the FS-IS is a reliable and valid tool for the identification of caregivers with reduced HRQoL related to caring for their child with FSD in a South African context. The adapted and translated FS-IS can therefore be used to identify caregivers who may need additional support or referral for further management from the multidisciplinary team. The results highlighted the complexity of caring for a child with FSD and the effects of the burden of care on caregivers. Early identification of the HRQoL of caregivers will not only benefit the caregivers but also the child they are caring for as the HRQoL of caregivers impacts on the QoL of the child with FSD.

Title: **CHARACTERISATION AND DETERMINANTS OF INFANT NASOPHARYNGEAL BACTERIAL COMMUNITIES IN CHILDREN IN A SOUTH AFRICAN BIRTH COHORT**

Authors: Shantelle Claassen-Weitz, Sugnet Gardner-Lubbe, Kilaza S Mwaikono, Yao Xia, Zar HJ and Nicol MP

Presenter Affiliation: Department of Pathology, University of Cape Town

Background:
Early life nasopharyngeal (NP) bacterial communities are continuously influenced by host and environmental factors and imbalances in these profiles could result in lower respiratory tract infection (LRTI). Most studies have been performed in high-income countries, where exposures are likely to differ from those of low- or lower-middle-income countries (LMICs).

Objective:
We longitudinally studied NP bacterial communities, and determinants from infants in the Drakenstein Child Health Study (DCHS), a South African birth cohort.

Methods:
We analysed NP bacterial profiles from 99 healthy South African infants in the DCHS. We sequenced the V4 region of the 16S rRNA gene from NP specimens collected at monthly intervals during the first year of life. We investigated associations between early life environmental, socio-economic and host factors. NP specimens were grouped into three intervals for statistical analyses: interval A (1-3 months of age), B (4-6 months of age), and C (7-12 months of age). We used Mixed Linear Models (MLMs) to investigate associations between covariates and within-specimen (alpha) diversity. We used analysis of variance (ANOVA) to determine associations between covariates and between-specimen (beta) diversity within-participants. We performed differential abundance testing using Analysis of Composition of Microbiomes (ANCOM2) to determine associations between bacterial taxa and covariates. All analyses were performed by adjusting for confounders.

Results:
NP bacterial profiles from infants were dominated by *Moraxella*, *Haemophilus*, *Corynebacterium*, *Streptococcus*, *Dolosigranulum* and *Staphylococcus*. Within- and between-specimen diversity were highest during the first four months of life. At genus-level, *Corynebacterium* and *Staphylococcus* were dominant colonizers at one month of life, whilst *Moraxella* and *Haemophilus* dominated NP bacterial profiles after four months of life. We showed considerable instability in profiles during the first four months of life, with progression to more stable *Moraxella*- and *Haemophilus*-dominated profiles from six months of life. Participants were likely to shift between *Moraxella*- and *Haemophilus* dominated profiles at subsequent timepoints. Early life determinants included specimen collection season, mode of delivery, gestational age, duration of exclusive breastfeeding, exposure to pets, having older siblings, day-care attendance, household income, maternal tobacco smoke exposure, hospitalisation, tuberculosis isoniazid (TB-INH) prophylaxis and HIV-exposure. Each of these exposures were significantly associated with one or more bacterial taxa previously considered beneficial or detrimental for respiratory health among young children.

Conclusions:
Our findings provide novel insight into the dynamics, and early life determinants, of NP bacterial communities from infants without LRTI from a low resource setting. Compared to previous reports, we detected high relative abundances of *Moraxella* and *Haemophilus* which have previously been associated with risk of respiratory tract infection.

Ethics approval: 585/2015

Funding: Bill & Melinda Gates Foundation, National Institute Health, South African Medical Research Council, Australian National Health and Medical Research Council, L'Oreal-UNESCO For Women in Science South Africa.

Title: **BURDEN AND SEVERITY OF DERANGED ELECTROLYTES AND KIDNEY FUNCTION IN CHILDREN SEEN IN A TERTIARY HOSPITAL IN KANO, NORTHERN NIGERIA**

Authors: Obiagwu P.N., Morrow B, McCulloch M, Argent A.

Presenter Affiliation: Department of Paediatrics and Child Health, University of Cape Town

Introduction:
Electrolyte abnormalities are common in children, and associated with increased risk of morbidity and mortality. Derangements in serum electrolytes, urea and creatinine may be overlooked, especially when laboratory test results are not readily available. This study reviewed serum electrolytes, urea and creatinine results in children on first presentation to Aminu Kano Teaching Hospital (AKTH), Kano, Nigeria over a 6-month period.

Methods:
A retrospective review of serum chemistry results of children presenting for the first time to AKTH and had tests ordered. Data was obtained from the Department of Chemical Pathology of the hospital for inpatients and outpatients. Results missing age, sex and source of sample, as well as repeat tests were excluded. Serum levels of sodium, potassium, chloride and bicarbonate were documented, and compared with established reference ranges. Kidney function was classified as normal, mild, moderate or severe kidney failure based on the elevation of serum creatinine above the upper limits of normal for age and sex. Urea to creatinine ratio was computed when both serum urea and creatinine results were available, and the ratio classified into low, normal and high based on normal values for age.

Results:
Over the study period, 5,574 tests were done with 2,387 of them being repeats. It was not clear if repeats were from 1 or more admissions. 1,278 results had incomplete information. The serum chemistry results of 1909 children (male = 1152, 60.3%) median (IQR) age 42 (11, 93) months were analysed. Of these, 1,248 (65.4%) were admitted, 1,017 (81.5%) being non-surgical admissions. Electrolyte derangements were present in 78.6% of patients, the commonest of which were hyponatraemia in 784 (41.1%), metabolic acidosis in 707 (37.2%), hypochloraemia in 640 (33.5%) and hypokalaemia in 358 (18.9%). Serum urea was elevated in 382 (20.1%) patients including 163 (42.7%) infants. Three hundred and ninety-nine children (24.7%) had serum creatinine levels which were ≥ 1.5 times the upper limit of normal for age. Of these, kidney dysfunction was mild in 169 children (42.4%), moderate in 134 (33.6%) and severe in 96 (24.1%) children. Median values of serum sodium (135.0 vs 137.0), potassium (4.0 vs 4.2), chloride (96.0 vs 98.0), bicarbonate (20.0 vs 21.0), urea (4.0 vs 3.4) and creatinine (54.0 vs 47.0) were significantly different between inpatients and outpatients, $p < 0.05$ in all cases. Urea to creatinine ratio (U:Cr) was deranged in 423 of 1618 (26.1%) of the patients, with low U:Cr ratios more commonly seen in cases with severe kidney impairment (35.4% vs 9.5%; $\chi^2 = 34.34$, $p = 0.000$). The association between the admission status and the number of deranged electrolytes was statistically significant as 58.5% of medical patients with no derangement were admitted while, of those with 4 derangements, 87.0% were admitted ($\chi^2 = 38.004$, $p = 0.000$). This association was not significant in surgical admissions ($\chi^2 = 1.643$, $p = 0.801$).

Conclusion:
Clinically significant derangements in initial serum electrolytes and kidney function are common in children presenting to AKTH, Kano. Routine measurement of serum electrolytes, urea and creatinine may be necessary in sick children, particularly those with severe illnesses requiring admission.

HREC Ethics approval number – 681/2018

Title: **A 15-YEAR RETROSPECTIVE REVIEW OF URODYNAMIC STUDIES IN CHILDREN AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH), CAPE TOWN, SOUTH AFRICA**

Authors: Thembisile Mosalakatane, Ashton Coetzee (Main Supervisor), Anne Wright, Jeanette Raad, Mignon McCulloch, John Lazarus, Justin Howlett, Peter Nourse

Presenter Affiliation: Division of Paediatric Nephrology, Department of Paediatrics and Child Health, University of Cape Town

Background:
Urodynamic study (UDS) has been demonstrated to be useful for the accurate diagnosis of lower urinary tract conditions and, presently, has become the new gold standard in the diagnostic assessment of children with neurogenic lower urinary tract dysfunction (NLUTD). Despite its undeniable diagnostic benefits, the adoption of UDS into clinical practice in Africa has been slow. The purpose of this study is to review the use of invasive urodynamic study in children and to share 15-year experience at a large tertiary care paediatric teaching hospital in South Africa.

Materials and Methods:
A retrospective analysis of more than 1,000 UDS performed between September 2005 and September 2020 was conducted. Patient demographic characteristics, primary diagnosis, indication and urodynamic outcomes were reviewed. Presence of urodynamic high-risk features were documented. A comparison was made between the first and follow-up studies. p- value of ≤ 0.05 was considered statistically significant.

Results:
A total of 1108 studies were analysed with increased trends in the use of UDS observed from 2015. The majority of the studies were performed in males: male 646(58.3%) and female 462(41.7%). They had a median age of 7.0 years (IQR 4.0-11.0) at time of study. UDS referrals were from the Urology department (37.7%), Spinal defects clinic (34.4%), Nephrology (20.8%) and other departments (7.0%). The most common reason for referral was review of medical treatment (36.5%). Spinal dysraphism accounted for 58.3% of conditions seen, followed by PUV (13.8%) and sacral agenesis (5.1%). The majority of the patients were receiving more than one type of bladder treatment (59.1%) at the time of first study. CIC (46.5%) was found to be the most common form of bladder management. 97.5% of studies were performed using transurethral bladder catheterization. The urodynamic diagnosis was normal in 55 (5.0%), neurogenic 820 (74.0%), functional 98 (8.8%) and anatomical 135 (12.2%). With the exception of neurogenic detrusor overactivity ($p=0.48$), there was significant statistical difference between the first study and follow-up study using poor compliance ($p<0.001$), detrusor leak point pressure >30cmHg ($p<0.001$) and detrusor sphincter dyssynergia ($p=0.03$).

Conclusion:
This study has highlighted the additional benefits of UDS over traditional modalities and the importance of early UDS in children with NLUTD. It has also shown that UDS can guide in selecting most appropriate treatments for children with LUTD. UDS has the potential to reduce the overall numbers of patients with lower urinary tract dysfunction from developing renal scaring and ultimately ESKD.

This study has been approved by Human Research Ethics Committee, University of Cape Town (HREC REF: 461/2020) and Research Review Committee, Red Cross War Memorial Children's Hospital (RXH: RCC 239)

Title: **TUBERCULOSIS IN PAEDIATRIC KIDNEY TRANSPLANT RECIPIENTS – A SINGLE CENTRE EXPERIENCE**

Authors: Makanda-Charambira PD[1*], Nourse P[1], Luyckx VA[1], Coetzee A[1], McCulloch MI[1]

Affiliation: [1] Red Cross War Memorial Children's Hospital, University of Cape Town

Background:
Tuberculosis remains a major challenge in transplantation particularly in endemic countries. The incidence, clinical manifestations, and optimal investigations for TB specifically in the paediatric post-transplant population have not yet been adequately studied. This study aimed to describe the incidence, clinical presentation and outcomes of tuberculosis in paediatric kidney transplant recipients and to assess the impact of Isoniazid prophylaxis.

Methods:
Single-centre retrospective descriptive analysis of children who received kidney transplants from 1995-2019. The cohort was stratified according to receipt of isoniazid prophylaxis which began in 2005.

Results:
212 children received a kidney transplant during the study period**.** Median age at transplantation was 11.2 years (IQR: 2.2 – 17.9) and 56% were males. Tuberculosis was diagnosed in 20 (9%) children, with almost two thirds (n=12) occurring within the first year post-transplant. The main presenting symptoms included fever (n=13/20), weight loss (n=12/20) and cough (n=10/20). Tuberculin skin test was positive in four of 20 children. Coinfection with *Ebstein Barr virus, Cytomegalovirus* or *Staphylococcus* was found in five children. Due to interactions an up to three fold increase in calcineurin inhibitor dose was required to maintain therapeutic blood levels. Isoniazid prophylaxis was protective against development of tuberculosis (p=0.04).) and was associated with fewer infections within the first year of transplantation although this was not statistically significant (p = 0.3). Gender, age and type of allograft were not significant risk factors for developing tuberculosis. All the tuberculosis infections were successfully treated. There was graft and patient survival of 100%.

Conclusion:
Kidney transplant recipients have a high risk of tuberculosis. Diagnosis remains a challenge. Frequent and meticulous monitoring of immunosuppression drug levels during treatment of TB is required to avoid loss of patient or graft. Isoniazid prophylaxis protects against development of TB in this population.

(HREC 463/2020)

Title: **ACUTE POST STREPTOCOCCAL GLOMERULONEPHRITIS AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH), CAPE TOWN, SOUTH AFRICA - A FIVE-AND HALF-YEAR DESCRIPTIVE REVIEW**

Authors: Khadija Abugrain (ABGKHA001), Mignon McCulloch, Rudzani Muloiwa, Heloise Buys

Presenter Affiliation: Department of Paediatrics and Child Health, University of Cape Town

Introduction:
Acute post streptococcal glomerulonephritis (APSGN) is an important cause of paediatric hospital admission, parental worry and acute kidney injury because of the accompanying macroscopic haematuria.

Objective:
This retrospective study describes the prevalence of acute post streptococcal glomerulonephritis (APSGN) in children (<14years) admitted to Red Cross War Memorial Children's Hospital, Cape Town, South Africa from January 2015 to June 2020.

Methods:
Potential cases of acute nephritic syndrome were identified from the hospital electronic database. Children aged ≤14 years meeting the inclusion criteria were included. Demographic, clinical features, investigations, management, and outcome data were collected.

Results:
There were 157 cases coded as acute nephritic syndrome, 96 cases met the inclusion criteria and were recruited, their mean age was 7.7 years (SD 3.03). Eighty-nine (93%) cases were confirmed APSGN, and seven (7%) developed rapidly progressive glomerulonephritis with positive streptococcal serology and crescentic glomerulonephritis on kidney biopsy. Average five-year incidence rate of APSGN was 3.6 per 100.000 children in Cape Town.
Cases were more commonly associated with streptococcal skin infections (55%) compared to throat infections (24%). Most children, 95 (99%), presented with haematuria, while proteinuria was noted in 85 (88%) children. Seventy-one (74%) presented with stage 2 hypertension, and 10 (10%) with hypertensive seizures. Serum complement C3 levels were low in 83 (86%) children, 90 (94%) children had elevated anti-DNase-B levels, and 77 (80%) also had elevated ASOT titres at presentation.
Eighty-eight (92%) children received a diuretic agent, 60 (63%) required an anti-hypertensive agent, and 90 (94%) received a penicillin antibiotic for 10 days.
Percutaneous kidney biopsy indicated in eleven (11%) children confirmed type II (immune complex) crescentic glomerulonephritis in seven (64%) biopsies, and four (36%) showed histological features suggestive of post-infectious nephritis.
The median length of hospital stay was 5 days (IQR 3-6 days). There were no deaths. Sixty-one children (63%) with APSGN recovered and almost one third (27%) of the children did not return for follow-up evaluation. Five (5%) progressed to ESKD, three (3%) had persistent proteinuria more than six months after acute presentation, and one (1%) child had persistent hypertension.

Conclusion:
APSGN during childhood remains an important health problem in SA and commonly follows streptococcal skin infection. The outcome is favourable in most subjects; however, our study revealed an important sub-group with crescentic glomerulonephritis who progressed to ESKD.
We recommend active case seeking at primary care level by checking urine dipstick, blood pressure and serum creatinine and better post-discharge follow up.

(HREC: 623/2020)

Key words: Acute post streptococcal glomerulonephritis, APSGN, children, Africa

Title: **IMPACT OF MODERATE TO LATE PRETERM BIRTH ON 5 YEAR LUNG FUNCTION IN A SOUTH AFRICAN BIRTH COHORT**

Authors: Chaya S[1], MacGinty R[1], Jacobs C[1] , Hantos Z [2], Simpson S[3] , Hall GL[3], Zar HJ[1], Gray DM[1]

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Aim:
To investigate the impact of preterm birth on lung function at 5 years in a South African birth cohort, Drakenstein Child Health Study

Methods:
Moderate to late preterm (MLP) (32-37 weeks gestation) and term (>37 weeks GA) infants with lung function at 5 years were included. Measurements included oscillometry, tidal breathing analysis and multiple breath washout (MBW). Infants born <32 weeks GA, HIV infected, or chronic illness were excluded. Regression analysis adjusted for height for age z-score (HAZ) was done

Results:
701 children were included; 106 (15.1%) MLP and 595 (84.9%) term; median (IQR) GA 35 weeks (33,36) and 39 (38,40), height for age z score -0.73(-1.68;0.24) and -0.45(-1.13;0.30) respectively.
At 5 years, MLP lower lung function had higher respiratory system resistance (R), area under the reactance curve (AX) and frequency dependence of R (R6-20) and decreased compliance and reactance (Table1)

Table1: Linear regression of lung function at 5 years

Lung function outcome	Preterm Coefficient (95% CI)	P-value
MBW (n=580)		
FRC* L	-0.01 (-0.05; 0.03)	0.499
LCI*	0.02 (-0.01; 0.04)	0.195
Tidal breathing (n=619)		
Tidal volume mL	-5.46 (-15.19; 4.27)	0.271
tPtef/te* %	-0.02 (-0.08; 0.04)	0.58
Oscillometry (n=588)		
Resistance*	0.09 (0.04; 0.13)	<0.001
Compliance*	-0.11 (-0.18; -0.04)	0.002
Fres (n=438)	1.01 (-0.28; 2.31)	0.125
R6*	0.09 (0.04; 0.14)	0.001
X6	-0.38 (-0.69; -0.06)	0.018
R6-R20	0.38 (0.04-0.72)	0.03
AX	7.76 (3.68; 11.85)	<0.001

Fres: Resonant frequency in Hz; R6: respiratory resistance at 6 Hz; R6-R20: difference between R6 and resistance at 20Hz; X6, respiratory reactance at 6Hz; AX: area under the reactance curve; FRC: functional residual capacity; LCI: lung clearance index; tPtef/te: Peak Total Expiratory Flow to time of Expiration; Units: $hPa.s.L^{-1}$ except compliance $ml.hPa^{-1}$ and AX $hPa.L^{-1}$*Natural log transformation; adjusted for height for age z-score

Conclusion:
Children born MLP have changes in respiratory mechanics at 5 years, but similar lung volumes compared to term born. This may contribute to susceptibility to respiratory illness.

Funding: Gates Foundation OPP1017641, Wellcome Trust 204755/Z/162, ERS CRC Award (CRC-2013-02, INCIRCLE), South African Medical Research Council, Hungarian Scientific Research Fund (#105403, #128701), Harry Crossley Research Grant, UCT departmental travel award

Title: **INSPIRATORY MUSCLE TRAINING IN CHILDREN WITH NEUROMUSCULAR DISEASES: A CROSS-OVER RANDOMISED CONTROLLED TRIAL**

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Affiliation: [1]Department of Physiotherapy, School of Health Care Sciences (Physiotherapy department), Sefako Makgatho Health Sciences University; [2]Department of Health and Rehabilitation Sciences (Division Physiotherapy), University of Cape Town; [3]School of Health Sciences (Physiotherapy), University of Brighton, Eastbourne, United Kingdom; [4]Physiotheray department, Red Cross War Memorial Children's Hospital, Rondebosch; [5]Department of Paediatrics and Child Health, University of Cape Town

Background:
Progressive respiratory muscle weakness and ineffective cough contributes to morbidity and mortality in children with neuromuscular diseases (NMD). Inspiratory muscle training (IMT) aims to preserve or improve respiratory muscle strength and reduce respiratory morbidity.

Objectives:
This study aimed to determine the safety and efficacy of IMT in children with NMD.

Methods:
A randomised cross-over study compared three-month intervention (IMT) with control periods. During the intervention, children with NMD (5-18 years) from two provinces in South Africa performed 30 breaths (at 30% of inspiratory muscle strength (Pimax)) with an electronic threshold device, twice daily. During the control period participants did not perform any IMT.

Results:
Twenty-three participants (median (IQR) age of 12.33 (10.03-14.17) years), mostly male (n=20) and non-ambulant (n=14) were included. No adverse events related to IMT were reported. There was no difference in median patient hospitalisation and respiratory tract infection rates between control and intervention periods (p=0.60; p=0.21). During IMT, Pimax and peak cough flow improved with a mean (SD) of 14.57 (±15.67) cmH_2O and 32.27 (±36.60) L/min, compared to 3.04(±11.93)cmH_2O (p=0.01) and -16.59 (±48.29) L/min (p=0.0005) during the control period. There was no change in spirometry, functional ability and total health-related quality of life scores following intervention. Patient satisfaction with IMT was high (median 8/10 (IQR 5-10)) and adherence was good.

Conclusions:
A three-month IMT programme in children with NMD appears safe, feasible and resulted in significant improvement in respiratory muscle strength and cough efficacy compared to a control period with no IMT.

Ethics approval: Human Research Ethics Committee (UCT): 513/2015

Title: **TREATMENT RESPONSE IN PAEDIATRIC PULMONARY TUBERCULOSIS – A PROSPECTIVE LONGITUDINAL STUDY**

Authors: J.Copelyn, MMed B.Eley, MBChB; H.Cox, PhD; L.Workman, MPH; K. Dheda, PhD; M. Nicol, PhD; H.J.Zar, PhD

Presenter Affiliation: Department of Paediatrics and Child Health, University of Cape Town

Background:
Data are limited on the resolution of symptoms and signs in children treated for pulmonary tuberculosis (PTB) and whether this differs from other lower respiratory tract infections (LRTI).

Objectives:
To longitudinally investigate treatment responses in children with PTB, compare to those with other LRTI, and identify factors associated with persistent symptoms or signs.

Methods:
Children aged ≤15 with features suggestive of PTB were categorized into 3 groups, confirmed PTB, unconfirmed PTB and unlikely PTB. At enrolment and follow up (1, 3 and 6 months) symptoms and signs of PTB were recorded using a standardized questionnaire. Univariable and multivariable logistic regression modelling was done to investigate predictors of persistence of symptoms or signs.

Results:
Included were 427 (21%) with confirmed, 810 (40%) with unconfirmed and 782 (39%) with unlikely PTB. Of those with cough or loss of appetite at baseline, persistence at 3 months was reported in 2.0% (24/1222) and 2.6% (23/886) respectively. Of those with tachypnoea or abnormal auscultatory findings at baseline, persistence at 3 months occurred in 56.7% (410/723) and 27.8% (216/778) respectively. HIV infection and abnormal baseline chest radiography were associated with persistence of signs or symptoms at month 3 [aOR 1.6 (IQR 1.1, 2.3) and aOR 2.3 (IQR 1.5, 3.3) respectively]. The resolution of symptoms and signs was similar across the categories of participants.

Conclusion:
Symptoms resolved rapidly in most children with PTB, but signs resolved more slowly. The timing and pattern of resolution of symptoms and signs was similar in PTB compared to other LRTI.

Ethics approval number: HREC: 827/2019

Title: **THE CLINICAL SPECTRUM, AETIOLOGY AND DISEASE PROGRESSION OF CHILDREN WITH POST-INFECTIOUS BRONCHIOLITIS OBLITERANS AT TERTIARY PAEDIATRIC PULMONOLOGY SERVICE IN CAPE TOWN, SOUTH AFRICA**

Authors: Aamir Yassin, Diane M Gray, Leah Githinji, Marco Zampoli M, Aneesa Vanker

Presenter Affiliation: Division of Paediatric Pulmonology, Department of Paediatrics and Child Health, University of Cape Town

Introduction:
There is limited literature on chronic obstructive airway disease in the paediatric age group. Post-infectious bronchiolitis obliterans (PIBO) is a cause of obstructive airway disease children, with limited data in African children.

Aim:
To describe the clinical spectrum, aetiology, and disease progression of children with post-infectious bronchiolitis obliterans.

Methodology:
This is a cross sectional descriptive study included all patients aged 6 months to 15 years with PIBO attending a tertiary paediatric pulmonology service in Cape Town, South Africa over period of one year (November 2019 to October 2020).

Results:
Fifty-one patients with PIBO were enrolled, 78% were males, median age 60 months (IQR 33-107). The median age at disease presentation was 6 months (IQR 3-12), 80% (n=41) initially presented with cough. Ninety-four percent of patients (n=48) required hospital admission, 76% (n=38) were admitted to ICU, 92% (n=47) required supplemental oxygen therapy and 75% (n=39) required ventilatory support. Reported cigarette smoke exposure was high [47% (n=24)]. Adenovirus was the most common cause of initial infection 64% (n=33). Lung hyperinflation [84% (n=43)] and air trapping [11/14 (78.6%)] were the most common current chest radiographic findings; bronchiectasis in 45% (n=23) of patients. Spirometry showed mixed [41% (n=12)] or obstructive [27% (n=8)]) patterns, mean (SD) FEV_1 z-score -3.3(±1.4), FVC z-scores -2.4(±1.6) and FEV_1/FVC z-score -3.1(±2.4). Corticosteroids were used during initial presentation in [92% (n=47)] of patients. Eighty six percent (n= 44) of patients required two or more hospital admissions. Cough [43% (n=22)] and wheeze [39% (n=20)]) were the commonest reported current symptoms. Lung function impairment was associated with younger age at first presentation and recurrent hospital admissions. Children with higher BMI at presentation had higher FEV_1/FVC z-score in later life. Improvement of symptoms over time was reported among 82% (n=42) of patients.

Conclusion:
PIBO is a relatively common cause of chronic lung disease in South African children, with adenovirus being the commonest preceding illness. Symptoms of airway obstruction persist over time, but showed improvement with treatment, which included corticosteroids.

Title: **CLASS-1 *CFTR* MUTATION GENOTYPE AND OUTCOME IN BLACK AFRICAN CHILDREN WITH CYSTIC FIBROSIS (CF) IN SOUTH AFRICA (SA)**

Authors: Verstraete J[1], Frauendorf M[2] and Zampoli M[1, 3]; **Contributing authors**: SA CF registry Steering Committee

Affiliations: [1]Department of Paediatrics and Child Health, University of Cape Town; [2]Milpark Netcare Hospital, Johannesburg; 3) MRC Unit Child and Adolescent Health, University of Cape Town

Introduction:
Most Caucasian and mixed race people with cystic fibrosis (CF) in South Africa (SA) have at least one copy of minimal function p.Phe508del mutation and are therefore eligible for triple combination CFTR modulator therapy. In contrast, no CFTR modulator is effective for 3120+1G >A, a class I minimal function mutation reported to be common in people with African ancestry. This study aimed to describe the genotype of black African children with CF in SA, and compare diagnosis and clinical characteristics with SA children homozygous for p.Phe508del.

Methods:
A retrospective study was conducted using data from the SA CF Registry (SACFR) captured by December 2019. Demographic and diagnosis information including CFTR mutations of children < 18 year with CF were identified. Annual review data, for 2018, on microbiology, complications, therapies, nutrition [WHO weight for age z-score (WAZ)] and pulmonary function outcome [forced expiratory volume in once second, percentage predicted (FEV1pp)] was compared in black Africans and children homozygous for p.Phe508del.

Results:
Forty-five black African and 123 children homozygous for p.Phe508del were identified representing 62% (168/270) of the SACFR paediatric population. Median age in black Africans was younger than children homozygous for p.Phe508del [6.6 years (IQR 3.1 -10.4) vs. 10.5 years (IQR 6.5 -14.0); p<0,001]. Among black Africans, 3120+1G >A mutation was most common, homozygous in 28 (62%) and heterozygous in 11 (25%). More black Africans were diagnosed under 1 year of age [n=37 (82%) vs. n=77 (62%); p=0.016]. Malnutrition at diagnosis was more common in black Africans [mean WAZ -4.6 (SD 1.47) vs. WAZ -2.0 (SD 1.92); p<0.001] and fewer presented with meconium ileus [n=3 (6%) vs. n=28 (23%); p=0.031]. Socio-economic factors differed significantly between groups: household cigarette smoke exposure [n=27 (22%) vs. n=2 (4%); p=0.015], and access to private health care [n=82 (67%) vs. n=5 (11%); p<0.001] was more common in children homozygous with p.Phe508del. In contrast, more black African children did not have access to running water or electricity [n=8 (18%) vs. 0; p<0.001] and received a social welfare grant [17 (38%) vs. 9 (7%); p<0.001]. Black African children did not have significantly different pulmonary function [median FEV1pp 85.6 (IQR 51.7 -94.6) vs. 87.4 (IQR 74.8 – 102.6); p=0.270], nutrition [mean (SD) BMI z-scores [-0.24 (1.38) vs. -0.19 (1.05); p=0.820], nor P.aeruginosa infection [n=16 (40%) vs. n=38 (34%); p=0.469].

Conclusion:
The majority of black African children with CF in SA are homozygous with a class I minimal function CFTR mutation and will not benefit from triple combination CFTR modulator therapies. Despite disparity in socioeconomic circumstances, outcomes in CF disease are similar to children homozygous for p.Phe508del.

Funding: CFF Research Grant (ZAMPOL19K0); Harry Crossley Foundation, Molly McNeal Family trust; Ethics approval: UCT FHS HREC 032/2019; Conflicts of interest: None; Acknowledgement: We would like to acknowledge the SACFR steering committee for their data contribution; Other Presentations: This work was presented as a poster presentation at the virtual CIPP June 2021

Title: **EARLY CHILDHOOD VIOLENCE EXPOSURE PATTERNS IN THE DRAKENSTEIN CHILD HEALTH STUDY (DCHS)**

Authors: Lucinda Tsunga, Marilyn Lake, Sarah Halligan, Susan Malcolm-Smith, Nadia Hoffman, Jon Heron, Heather Zar, Abigail Fraser, Kirsten A Donald, Dan Stein

Presenter Affiliation: Department of Paediatrics and Child Health, University of Cape Town

Introduction:
The prevalence of interpersonal violence in South Africa is amongst the highest in the world. Its age-standardized homicide rates of 64.8 per 100 000 are higher than the global average by a factor of seven (Norman et al., 2007). In addition, the estimated related health burden of violence against children is concerning, the estimated economic value of disability-adjusted life years lost to violence against children (both fatal and nonfatal) in 2015 was totalled ZAR173 billion (US $13.5 billion)—or 4.3% of the country's gross domestic product (GDP) that year (Fang et al., 2017). Yet little is known about the exact patterns of violence exposure perpetrated against children in their day-to-day lives in early life.

The objective of this study was to characterize early childhood violence exposure patterns in 3-6-year-old children in a community, located in the Drakenstein sub-district, a peri-urban area in Western Cape, South Africa as measured by the Child Exposure to Community Violence Checklist (CECV). The study particularly focused on the prevalence of specific forms of violence in this cohort in the pre-school years.

Methods:
The DCHS is a longitudinal, prospective cohort study investigating the early-life determinants of child health in two peri-urban communities in the Western Cape. Violence exposure data was collected using the CECV, at three time points, when the child was 3.5 years, 4.5 years and 6 years of age. The CECV is a parent-report measure comprising 35 items integrating the hearing about, witnessing or experiencing violence. We created four theoretical subscales from the CECV items to characterise violence exposure patterns in this cohort, namely, *Witnessing Community Violence, Community Victimisation, Witnessing Domestic Violence, and Domestic Victimization,* based on other studies that have used this measure (Hinsberger et al., 2016; Kaminer, Du Plessis, et al., 2013; Kaminer, Hardy, et al., 2013). The CECV version used in the study was adapted to the South African population (Bruwer et al., 2008; Fincham et al., 2009). All statistical analysis was performed using R Statistical Software (version 4.0.2) and R Studio (version 1.3.1073).

Results:
Although a total of 1143 mother-infant dyads were enrolled in the study, in the current analyses, the count of participants at each time point was 528 (53%) at 3.5 years, 748 (75%) at 4.5 years and 357 (36%) at 6 years. The difference in sample sizes is due to late CECV data collection initiation, participant retention, and ongoing CECV data collection at the 6-year time point.

The prevalence rates at each time point (3.5, 4.5 and 6 years) indicate that Witnessing Community Violence was the most prevalent trauma (62%, 67% and 69%, respectively) followed by Domestic Victimisation (23%, 23% and 30%, respectively), Witnessing Domestic Violence (28%, 24% and 20%, respectively) and Community Victimisation (8%, 9% and 12%, respectively).

Conclusions:
Children in our sample were exposed to various forms of violence, through direct and indirect experiences. These findings further highlight the high levels of violence exposure in South African children, raising concerns for the effects on development. Furthermore, according, the concept of Developmental Origins of Health and Disease (DOHaD) environmental insults in early life can contribute to long-term risk of non-communicable diseases important in low- and middle-income countries such as South Africa where poverty, malnutrition, poor sanitation and infections are still prevalent.

Ethics approval number: HREC REF 465/2021
This is new research and the primary author (Lucinda Tsunga) has been active in the Conception or design of the work, Data collection as well as Data analysis and interpretation of the work above.

Title: **HOW CHILDREN MAKE MEANING OF SEXUAL TRAUMA: TOWARDS DECOLONISED AFRICAN-CENTERED CHILD-CENTRIC PSYCHOLOGICAL INTERVENTIONS**

Presenter: Dr Neziswa Titi (neziswa.titi@uct.ac.za)

Affiliation: Children's Institute, University of Cape Town

Objective:
The study aimed to determine and provide an in-depth understanding of how children make sense of experienced sexual violence and trauma through African-centred and child-centric theorising. The intersectional oppressions of race, class, gender *and age* undergirded the framework with feminism as a salient theme. The framework offered perspective for the reshape of contextual and developmentally appropriate psychological trauma interventions. The study positioned children as knowledge producers who can offer insights and deeper understanding on lived experiences. The study addressed alienating praxis due to colonial, inherently biased, unresponsive, and adult-centric orientation as these pertain to the discipline of psychology. The study further provides a contextual analysis of locale and Apartheid history in understanding sexual trauma.

Methods:
The study was situated within the qualitative interpretivist paradigm using participatory child-centric art-based life story research. Recruitment was through child welfare organisations and minimized re-victimisation. Ongoing child assent was sought while African and institutional protocol alongside child-rights required negotiation and self-reflexivity.

Results:
The study presents the narratives of 16 children between the ages of 9 and 11 years who experienced sexual violence and trauma, within poly-victimisation, and live in South African townships. Main themes include the abnormality of life in townships and collective witnessing and -healing.

Conclusion:
The study offers a conceptual framework for decolonising African-centred and child-centric interventions for Black children and highlights the centrality of language in psychology praxis. Recommendations include macro-level strategies for policymakers pertaining to GBV interventions for improved child safety and strategies for decolonising understandings of the impact of sexual violence.

Ethics number: HSHDC/863/2018

This research has been presented on different platforms but not at the department of Paediatrics and Child Health annual research day

Title: **VALIDATING RAPID POINT-OF-CARE STREP A TEST ACCURACY IN SUB-SAHARAN AFRICA: PILOT RESULTS FROM TWO SITES**

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Background:
Rheumatic Heart Disease (RHD) is a preventable chronic condition which evolves from an untreated Group A Streptococcus (Strep A) bacterial infection. Without treatment, an immune response can occur, damaging organs of the body especially the heart (Acute Rheumatic Fever, ARF). If Strep A pharyngitis is promptly diagnosed and treated with antibiotics, ARF and subsequently RHD, is unlikely to develop.
Rapid point-of-care (POC) tests have been developed for timely Strep A diagnosis and could prove advantageous given the constraints associated with throat cultures in resource-scarce RHD endemic regions such as Africa. In this report, we present two rapid POC Strep A test kits (Sure-Vue™ Signature and BinaxNOW®) used in at-risk populations in Uganda and South Africa, validated against polymerase chain reaction (PCR) and culture results.

Methods:
The South African cohort was recruited over 5 months, from a community clinic in peri-urban Cape Town. A throat swab specimen for culture as well as for the BinaxNOW® rapid test, was taken from consenting participants, not having been on antibiotic treatment in the preceding 14 days.

The Uganda cohort was recruited from a four-week primary school-based prospective cohort in Gulu and Mbarara Districts. During the active surveillance period, all children attending the school were asked to present for evaluation. A history, clinical examination, and swab for culture, PCR, and the Sure-Vue™ Signature rapid test were completed. Sensitivity and specificity analysis were performed on the Uganda data.

Results:
Participants were aged between 6 and 16 years. In the Cape Town cohort (N=48), all rapid tests were negative, of which five culture results were positive for Strep A. In the Uganda cohort (N=311), 113 (36.3%) rapid tests were positive; however, a lower positivity among culture (23,7.4%) and PCR (24, 7.7%) were observed. Compared to culture, the Sure-Vue™ Signature Strep A test showed a sensitivity of 48% and specificity of 65% in the Ugandan cohort; the positive and negative predictive values were 10% and 94%, respectively.

Conclusion:
This brief report provides evidence that current rapid POC tests for Strep A perform poorly in sub-Sahara, thus necessitating confirmatory testing with culture or PCR. While laboratory reliability could have played a role, these results are likely attributable to global regional variation in Strep A genetic markers.

Title: **ADVERSE OUTCOMES OF FEBRILE NEUTROPAENIA AND VALIDATION OF A RISK SCORE IN ONCOLOGY PATIENTS ON CHEMOTHERAPY AT THE RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL: A THREE YEAR RETROSPECTIVE STUDY**

Authors: Motunrayo Adekunle,[1] Alan Davidson,[1] Marc Hendricks.[1] (Presenter: Motunrayo Adekunle, Senior Registrar, Paediatric Oncology (motunbamm@yahoo.com). Cell phone: +27781838734)

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Background:
Febrile neutropaenia (FN) is the commonest acute complication of cancer treatment in children. Approximately 50% of children on chemotherapy will develop at least one episode of FN. Outpatient management of individuals at low risk has been reported to reduce cost of care, improve health quality of life, and risk of nosocomial infection.

Aims:
To identify adverse outcomes as well as validate a tool for risk stratification based on adverse outcomes in a cohort of children treated for cancer at Red Cross War Memorial Children's Hospital.

Methodology:
A retrospective cohort study from 1st January 2017 to 31st December 2019. The study population comprised children with confirmed cancer diagnoses on chemotherapy. Risk factors for adverse outcomes were identified and the Swiss Paediatric Oncology Group (SPOG) FN risk index assessed for predictive value in this cohort. Ethical approval was obtained from Faculty of Health Sciences, Human Research Ethics Committee (HREC REF: 351/2020).

Results:
In all, 256 new cases of cancer were seen within the study period and 179 patients had chemotherapy. A total of 267 FN episodes occurred amongst patients that had chemotherapy. Independent predictors of adverse outcomes were AML ($p = 0.001$), CVAD in situ ($p = 0.019$) and severe neutropaenia ($p = 0.005$). Validation of the tool using the traditional cut-off of 9 for adverse outcomes demonstrated a sensitivity and specificity of 52.3% and 62.0% respectively. Using a lower cut-off of 7.5, a higher negative predicted value (71 vs 58%) was demonstrated in our cohort.

Conclusion:
A lower cut-off using the SPOG FN risk index best predicted adverse outcomes in our cohort.

Keywords: Febrile neutropaenia, cancer, chemotherapy, children, risk factors, adverse outcomes.

Title: **THE BURDEN OF HUMAN CORONAVIRUS INFECTION IN CHILDREN HOSPITALISED WITH SEVERE LOWER RESPIRATORY TRACT INFECTION IN CAPE TOWN, SOUTH AFRICA (2012 – 2013)**

Authors: Abdulmumuni S. Aliyu[1], Adelaide N. Masu[1], Benjamin M. Kagina[2], Rudzani Muloiwa[1]

Affiliation: [1]Department of Paediatrics and Child Health, University of Cape Town, South Africa; [2]Department of Family Medicine and Public Health, University of Cape Town South Africa

Introduction:
In order to better understand the epidemiology and burden of human coronaviruses - NL63, HKU1, OC43 and 229E in South Africa, their role in the aetiology of childhood pneumonia needs to be described.

Methods:
We used data collected between September 2012 – September 2013 from children aged <13 years with lower respiratory illness at Red Cross War Memorial Children's Hospital. Respiratory samples including a nasopharyngeal swab (NP) and induced sputum (IS) were taken and tested for the four strains of coronaviruses using FTD33 multiplex real-time PCR.

Results:
A total of 460 respiratory samples were analysed. Of these, 258 (56.0%) were male and 19 (4.1%) HIV infected. The median age of the children was 8 (IQR 4-18) months.
Nasopharyngeal (NP) samples were obtained from 460 children while induced sputum (IS) was not available for six children due to sample loss prior to analysis, leaving 454 available for analysis. A total of 42 (9.1%, 95% CI 6.7- 12.1%) participants tested positive for HCoV in at least one of the two specimens. PCR was able to detect a total of 35 (7.7%) cases from the 454 tested IS specimens compared to 23 (5.0%) detected out of 460 NP samples.
The commonest detected HCoVs were coronavirus OC43 with 20 (4.3%) detected from either specimen followed by coronavirus NL63 or coronavirus HKU detected in 14 (3.0%) and 10 (2.2%) of positive test samples, respectively. The least common virus detected HCoV was coronavirus 229E detected in both positive test samples of one participant.
Overall HCoVs were detected in 23 (8.9%) of boys compared to 19 (9.1%) of the girls who returned a positive test; p=0.856. The overall age distribution of children with PCR detected HCoVs was similar to that of children with a negative result with median age of 10 (IQR 5- 16) months and median of 8 (IQR 4- 19) months, respectively; p=0.535. Prevalence of HCoV was 11/192 (5.7%), 23/153 (15.0%) and 8/115 (7.0%) in children <6 months old, 6-18 months and over 18 months respectively; p=0.008.

Conclusion:
Children aged 6 to 18 months had double the risk of other age groups.

Keywords: South Africa, Human Coronaviruses, Childhood Pneumonia

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Title: **PERFORMANCE OF THE EQ-5D-Y-3L INTERVIEWER ADMINISTERED VERSION IN YOUNG CHILDREN AGED 5-7-YEARS**

Authors: Razia Amien, Des Scott, Janine Verstraete

Presenter Affiliation: Division of Physiotherapy, Department of Health and Rehabilitation Sciences, University of Cape Town

Background:
The EQ-5D-Y-3L is a patient reported outcome measure recommended for children aged 8-12-years. It measures health across five dimensions; Mobility, Looking After Myself, Usual Activities, Pain or Discomfort and Worried, Sad or Unhappy. General health is rated on a Visual Analogue Scale from 0-100. An interviewer administered version has been developed which is anticipated to lower the age range of completion. The aim of this study was to determine the performance of the EQ-5D-Y-3L interviewer administered version in children aged 5-7-years compared to children aged 8-10-years.

Methods:
Children aged 5-10-years (n=388) were recruited in two age groups, 5-7-years (n=177) and 8-10-years (n=211). Children were recruited across four known condition groups: chronic respiratory illnesses, acute orthopaedic conditions, functional disabilities and from the general population. All children completed the EQ-5D-Y-3L, Moods and Feelings Questionnaire (MFQ), Faces Pain Scale-Revised (FPS-R) and the researcher scored their functional ability on a functional independence measure (WeeFIM). Test-retest of the EQ-5D-Y-3L was done 48 hours later and assessed using Cohen's kappa (k). Response options of the EQ-5D-Y-3L dimensions were analysed for differences in health states between age groups. The time taken to complete the instrument was recorded and compared between age groups using the Mann-Whitney U test. Spearman's Rho Correlation was computed to assess convergent validity of the EQ-5D-Y-3L compared to the MFQ, FPS-R and WeeFIM. Correlations between age groups were compared with r to z transformations.

Results:
There were significantly higher reports of problems in the Looking After Myself dimension in the 5-7-year-olds (55%) compared to the 8-10-year-olds (28%) ($x^2=31.021$; $p=0.000$). Younger children took significantly longer to complete the EQ-5D-Y-3L (Mann-Whitney U=8389.5; p=<0.001). Known-group validity was found at dimension level with children receiving orthopaedic management reporting more problems on physical dimensions and a significantly lower utility score across both age groups. Convergent validity between Looking After Myself and WeeFIM items of self-care showed moderate to high correlations for both age groups with a significantly higher correlation in the 8-10-year olds for dressing upper (z=2.24; p=0.013) and lower body (z= 2.78; p=0.003) and self-care total (z=2.01; p=0.022). There were low to moderate correlations between the other dimensions and corresponding items of the MFQ, FPS-R and WeeFIM. There were fair to moderate levels of test-retest reliability across age groups with pain or discomfort showing more stability in the 5-7-year-olds compared to 8-10-year-olds.

Conclusion:
The EQ-5D-Y-3L is valid and reliable for measuring health in children aged 5-7-years. The performance of the measure was similar to children aged 8-10-years although there was more report of problems with the dimension of Looking After Myself this was attributed to developmental difficulty as younger children required help with advanced dressing activities such as buttons and shoelaces. The measure took less than 5 minutes to administer, and young children were able to reliably report on their health. It is recommended that EQ-5D-Y-3L be included in children from 5-years in routine clinical practice and in clinical trials.

Ethics Reference: HREC 369/2020

Title: **STREAMLINING REFERRAL DECISIONS FOR CHILDHOOD POISONING: EXPERIENCES FROM A TERTIARY CHILDREN'S HOSPITAL IN CAPE TOWN, SOUTH AFRICA**

Authors: Kate Balme and Cindy Stephen

Affiliation: Red Cross War Memorial Children's Hospital Poisons Information Centre; Department of Paediatrics and Child Health, Faculty of Health Sciences, University of Cape Town

Objectives:
The objectives of this study are two-fold; firstly, to report on updated paediatric poisoning figures from Red Cross War Memorial Children's Hospital (RCWMCH), and secondly, to better understand this specific patient population, paying particular attention to poison subgroups and clinical severity, in order to contribute suggestions for streamlining local triage and referral criteria for paediatric poisoning.

Methods:
A retrospective review of children presenting to RCWMCH with toxin exposure or poisoning between January 2009 and December 2019 was performed. Data were extracted from the Poisons Information Centre's Clinical Poisonings Database.

Results:
There were 3699 incidents, which involved 3662 patients; 3011 (81%) patients were under 5 years (median 29 months, IQR 19 to 49 months), and 2061 (56%) were male. There was a slight decline in overall numbers over the 11-year period.
The majority (n=2542, 69%) were referred, with significantly more moderate to severe poisonings in the referral group ($p < 0.001$).
Medications were the most common single toxin group (n=1270, 38%), followed by handyman/ industrial products (n=889, 27%; includes paraffin 568, 64%), household products (n=451, 14%), and pesticides (n=445, 13%). Comparison of the four large groups showed significant differences in both the referral patterns and clinical severity of patients, with pesticides and handyman/industrial products (mostly paraffin, n=486/568, 86%) having a greater proportion of referrals ($p < 0.001$), and pesticides significantly more moderate to severe poisonings and deaths ($p < 0.001$).
The medication subgroups caused significantly differing clinical severity; neuropsychiatric medications (n=350, 28%), anticonvulsants (n=157, 12%), mineral supplements (n=84, 7%), and substances of abuse (n=47, 4%), had a larger proportion of moderate to severe poisonings ($p < 0.001$).
There were 132 moderate to severe pesticide poisonings (30%), all of which were due to cholinergic and formamidine pesticides.
Biological toxins were a small group (n=55, 2%), when compared to the larger groups, but also had a significant proportion of moderate to severe poisonings (n=17, 31%, $p<0.001$).

Conclusion:
It is apparent that certain medication subgroups (such as neuropsychiatric medications, anticonvulsants, iron and substances of abuse), pesticides (especially cholinergics and formamidine) and biological toxins should be flagged early for referral to receive higher levels of care, irrespective of their clinical presentation, as a more severe clinical course is anticipated. The goal is to improve patient outcomes as well as optimize the use of limited resources.

Title: **RENOGRAM IMAGE CHARACTERISTICS AND THE REPRODUCIBILITY OF DIFFERENTIAL RENAL FUNCTION MEASUREMENT**

Authors: Anita Brink, Michael Levin, Elena Libhaber, and Michael D Mann[1]

Presenter Affiliation: Radiation Medicine, Red Cross War Memorial Children's Hospital

Objective:
Patient factors such as age and glomerular filtration rate (GFR), have been implicated as causes for poor reproducibility of differential renal function (DRF) estimates on ^{99m}Tc-mercaptoacetyltriglycine (^{99m}Tc-MAG3) renography. This study aim to investigate factors associated with the reproducibility of DRF measurements.

Methods:
The association between age, GFR and imaged derived characteristics and reproducibility DRF estimates calculated using the area under the curve and the Rutland Patlak method was analysed for cohort 1 (n=127). The association between these variables and reproducibility of DRF was tested with univariate linear regression. The univariate linear regression results were used to plan the multiple linear regression combinations.
The associations between variables identified and reproducibility of DRF values were then tested in a second cohort (n=227).

Results:
The R^2-values for goodness-to-fit for the multiple regression models ranged from 0.17 to 0.49.
Left kidney to background ratio (*KTBR*) was significant in all the multiple linear regression combinations ($p < 0.05$). *Right KTBR, right renal margins well defined, right renal margins poorly visualised, time visualisation right calyces* and *age* were significant in most combinations. The reproducibility of DRF measurement was decreased when the KTBR was ≤ 2.

Conclusion:
KTBR, right renal margins well defined, time visualisation right calyces and *age* predicted reproducibility for the measurement of DRF on ^{99m}Tc-MAG3 renograms.
The KTBR should be incorporated into the renal processing software as a quality control step. The DRF values should be interpreted with caution if the KTBR is ≤ 2.0.

Declarations: The authors declare that they have no conflict of interest.
Ethical approval: University of Cape Town Human ethics committee, HREC reference number 097/2013.

Title: **OSTEOSARCOMA OUTCOMES FOR PATIENTS DIAGNOSED AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH): 1995-2017**

Authors: Helder De Quintal[1], Alan Davidson[1], Marc Hendricks[1], Brenda Morrow[1]

Affiliation: [1]Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital and University of Cape Town

Objective:
To determine the outcomes and predictors of survival in paediatric osteosarcoma.

Methods:
This was a retrospective analysis of the medical records of patients ≤13 years diagnosed with biopsy-proven osteosarcoma at RCWMCH between January 1995 and December 2017.

Results:
There were 44 patients (23 males and 21 females). Mean age was 9.9 years (range 4.8-13.8 years). The most common histological sub-type was conventional osteosarcoma (n=37, 84%). The most common primary site was the long bones around the knee (n=36, 82%). Thirty-two (73%) had localised disease and 12 (27%) had metastatic disease. Metastatic sites included pleuropulmonary (n=8, 18%), skeletal (n=1, 2%) and combined (n=3, 7%).
All thirty-two patients with localised disease received a 2-drug neoadjuvant regimen (cisplatin/doxorubicin). Six of the twelve with metastatic disease received an additional 3 drugs (ifosphamide/etoposide/carboplatin), 2 refused treatment and 3 died prior to neoadjuvant chemotherapy. Twenty-four (55%) had limb-salvage, 13 (30%) had amputation and 7 (16%) did not undergo surgery.
Post-operative histological review revealed 12 (39%) good responders (necrosis ≥95%) and 19 (61%) poor responders (necrosis <95%). Good responders continued the same regimen post-surgery. Nine (47%) of the poor responders received high-dose methotrexate (HDMTX). Ten (53%) of the poor responders did not receive HDMTX, mainly due to them being treated prior to the incorporation of HDMTX to standard protocols.
There were no significant treatment delays. Mean time from neoadjuvant chemotherapy to surgery was 71.5 days (range 65-90) and 17 days (range 1-24) from surgery to the recommencement of adjuvant treatment.
Twenty-five (57%) were alive and disease free, 18 (41%) died of disease and 1 (2%) died of treatment-related toxicity. The Kaplan-Meier overall survival (OS) was 51%. The OS for localised disease was 66% and metastatic disease 17% (p=0.0006). Gender, age, tumour location, histological subtype and percentage necrosis were not significant predictors of survival. Considering localised disease, poor responders (n=17) had comparable survival to good responders (n=10), OS 67% and 69%, respectively (p=0.94). Poor responders who received HDMTX (n=8) had a survival rate of 53% and those who did not (n=9) had a survival rate of 78% (p=0.67).

Conclusions:
Outcomes for osteosarcoma at RCWMCH were reasonable for localised disease, however, outcomes for metastatic disease were dismal and remained a key predictor of poor survival. Outcomes for poor-responders with localised disease were not improved by the addition of HDMTX. Significantly, the rate of toxic-related death was low, presenting scope to intensify treatment.

Ethics: HREC 258/2020
New research.

Title: **IN-HOSPITAL NEONATAL MORTALITY IN A LEVEL-TWO HOSPITAL IN CAPE TOWN, SOUTH AFRICA**

Authors: C Gabriels[1,2], DM le Roux[1, 3]

Affiliation: [1]Department of Paediatrics and Child and Health, University of Cape Town; [2]Department of Paediatrics, Mitchells Plain District Hospital; [3]Department of Paediatrics, New Somerset Hospital

Objectives:
Neonatal mortality is one of the major contributors to under-5 mortality in South Africa; neonatal mortality has decreased more slowly than total under-5 mortality, and now contributes an increasing proportion of all under-5 deaths. South African research has described interventions to decrease neonatal mortality, including introduction of high flow nasal cannula oxygen (HFNC). However, there is little evidence regarding the impact of these interventions on neonatal mortality outside of tertiary academic centres, where most neonatal care in South Africa is being delivered. For these reasons, we aimed to investigate neonatal mortality in a level 2 neonatal unit in Cape Town, South Africa, over an 8 year period.

Methods:
New Somerset Hospital (NSH) is a level 2 hospital in Cape Town, South Africa. A database of all neonatal deaths (NND) was maintained by the lead consultant in the neonatal unit; the database included all neonates who died either on-site at New Somerset Hospital, or after transfer to a level 3 facility. This data was retrospectively analyzed; all deaths in the first 28 days of life were included. Categorical variables were compared with percentages and proportions; continuous variables were presented as median and interquartile range (IQR), and compared with Mann-Whitney U test.

Results:
Neonatal deaths from 2011 to 2018 were analyzed, with the exclusion of 2014, due to incomplete data capturing for several months of that year. There were 8166 admissions to the neonatal unit. There were 296 neonatal deaths associated with NSH; 219 (74%) were inborn. Most of the deaths (221, 75%) occurred at NSH. Median birthweight of neonates who demised was 1140g (IQR 790 – 2420); median gestation was 29 weeks (IQR 25 – 38), with no significant difference between inborn and outborn (p=0.86). Immaturity was the most common cause of death (132/296, 45%), followed by hypoxia (67/296, 23%) and infection-related (61/296, 21%). Rate of neonatal deaths decreased from 45 per 1000 admissions in 2011 to 28 per 1000 admissions in 2018; this was largely driven by decreased deaths from immaturity. Mean number of deaths due to immaturity before 2014 (25.3 per year) was significantly less than mean number of deaths after 2014 (14.0 per year, p=0.01). All other causes of death remained approximately constant throughout the study period.

Conclusion:
We observed decreased neonatal mortality due to immaturity among both inborn and outborn neonates during the study period. It is possible that changes of practice, including the introduction of high flow nasal cannula oxygen in 2014, may have affected neonatal mortality rates in our unit.

Ethics approval:
Database: HREC-REC 391/2011
The study was approved by UCT Human Research Ethics Committee (HREC REF 71/2019)

Title: **STRENGTHENING ANTIBIOTIC STEWARDSHIP AT THE NEONATAL UNIT OF MOWBRARY MATERNITY HOSPITAL**

Presenter: Martha Mkony

Affiliation: Neonatology, Department of Paediatrics and Child Health, University of Cape Town

Objective:
To assess antibiotics stewardship in the neonatal unit at Mowbray maternity Hospital.

Methods:
To assess antibiotics stewardship, a cross sectional prospective survey was for a period of 4 months from November 2020 to June 2021, by reviewing patients' folders using a validated WHO questionnaire. We observed hand washing hygiene (HH) behaviours of doctors and nurses during the day and night shifts. We also conducted in-depth interviews to a few staff members to better understand their views on antibiotics stewardship and handwashing hygiene in the unit. After the first audit feedback was provided to the team. This was followed by training on handwashing hygiene which was conducted by the infection prevention nurse.

Results:
A total 246 patients' folders were reviewed during the study period. Of the folders reviewed 36 (14.6%) babies were on antibiotics, of which 97% were adherent to the guidelines. The treatment guideline was found to be accessible to all the doctors in the unit. Overall HH was 83.7% and this increased to 100% HH after aseptic procedure. The factors that contributed to high percentages of HH include a strong support to the senior staffs and nurse managers and also availability of disinfectants and posters to remind about handwashing through-out the unit.

Conclusions:
MMH has a strong antibiotics stewardship and HH washing culture. Nursing staff indicated a need for in-service training and the introduction of both antibiotics stewardship and handwashing hygiene during orientation of new staff to the unit.

Ethics approval number – 613/2020
The research is part of my MPhil neonatology and have been involved in the writing of the proposal, data collection and analysis.

Title: **THE CHARACTERIZATION OF LOWE SYNDROME IN A SOUTH AFRICAN FAMILY**

Authors: Rizqa Sulaiman-Baradien[1], Careni Spencer[1], Gloudi Agenbag[2], Ambroise Wonkam[1]

Affiliation: [1]Division of Human Genetics, Department of Medicine, University of Cape Town, Groote Schuur Hospital; [2]Division of Human Genetics, Department of Pathology, University of Cape Town

Introduction:
Oculocerebrorenal or Lowe Syndrome (OMIM #309000) is an X-linked recessive condition characterized by a triad of congenital cataracts, proximal renal tubular dysfunction, and variablecentral nervous system involvement. Nearly all affected boys will be hemizygous for a pathogenic variant in the *OCRL* gene. The objectives of this research are to provide a clinical and molecular characterization of three affected boys with Lowe Syndrome.

Methods:
This is a case series describing the clinical and biochemical features, as well as the molecular findings of the three affected males. The three children were recruited from the Red Cross War Memorial Children's hospital Genetic clinic.

Results:
The three probands, two brothers and a maternal male cousin, presented with failure to thrive,typical facial features (frontal bossing, deep set eyes and fair complexion) and congenital cataracts. They all had evidence of proximal renal tubular dysfunction.
Extracted DNA was sequenced and a novel single base deletion, c.2615delC, in the *OCRL* genewas identified. This variant in exon 24 causes a frameshift and extends the protein by six aminoacids. Segregation analysis supports this variant as being causative in this family and it is classified as "pathogenic".

Conclusion:
This research describes the phenotypic and molecular features of three males with Lowe Syndrome. In keeping with cases in the literature, they presented with congenital cataracts followed by renal dysfunction later in infancy and childhood. Access to genetic testing in South Africa is limited in the public health care system and careful clinical phenotyping is essential to allow for appropriate management and surveillance. Furthermore, a molecular diagnosis of Lowe Syndrome allows accurateрecurrence risk, carrier screening and also possibly prenatal diagnosis. To the best of our knowledge this is the first description of its kind in South African.

Title: **BRONCHIOLITIS OBLITERANS ORGANISING PNEUMONIA IN A YOUNG CHILD ASSOCIATED WITH RESPIRATORY SYNCYTIAL VIRUS: A CASE REPORT**

Authors: Norbertta Washaya[1], Shivani Singh[2], Komala Pillay[2], and Marco Zampoli[1]

Affiliation: [1]Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, University of Cape Town, Cape Town, South Africa; [2]Division of Anatomical Pathology, Department of Pathology, Red Cross War Memorial Children's Hospital, University of Cape Town, Cape Town, South Africa

Introduction:
Bronchiolitis obliterans organising pneumonia (BOOP) is a rare form of idiopathic interstitial lung disease in children. Standard treatment and follow up guidelines in children for BOOP are extrapolated from adults. We describe a case of BOOP in a child with successful treatment and good outcome which adds knowledge to literature on BOOP in children.

Case summary:
A previously well, 2.5-year-old male presented with a 2-month history of worsening cough, shortness of breath and weight loss . He first presented similarly two months prior with respiratory syncytial virus (RSV) and rhinovirus associated pneumonia. He was HIV exposed but uninfected. He had no history of neonatal respiratory distress and no family history of respiratory illnesses. Except for household tobacco smoke exposure, no other environmental exposures were reported.
On physical examination, he was hypoxic in room air (SpO2 82%) and tachypnoeic (80 bpm). Bronchial breath sounds were noted on auscultation, worse on the right. Cardiac examination was normal and there were no signs of pulmonary hypertension. He was not clubbed, and no signs of systemic illness were present.
Chest x-ray demonstrated bilateral diffuse air space opacification . CT chest showed bilateral extensive confluent consolidation with interspersed and surrounding areas of ground glass opacification . Lung biopsy was performed and demonstrated a BOOP pattern with fibrosis.
He was treated with empiric broad spectrum antibiotics; IVI methylprednisone pulse 10mg/kg for three days; chloroquine, low-dose azithromycin; inhaled corticosteroids, cotrimoxazole and isoniazid prophylaxis and domiciliary oxygen.
He was readmitted four weeks later with an exacerbation associated with worsening hypoxia and with parainfluenza type 1-4 and rhinovirus. A third 3 -day methylprednisolone pulse of 10mg/kg was given followed by additional oral prednisone dose of 1mg/kg/day three times weekly. He was reviewed six weeks later and noted to have SpO2 97% in room air with significant resolution of disease on chest radiograph.

Conclusion:
This case reports the partial resolution of BOOP in a young child with previous RSV infection, who showed good response to systemic corticosteroids and other immune modulating agents. Further research to determine the aetiology and optimal treatment of BOOP in children is needed.

Poster presented at *CIPP* XX / 20th International Congress on Pediatric *Pulmonology* (June 24-27, 2021)