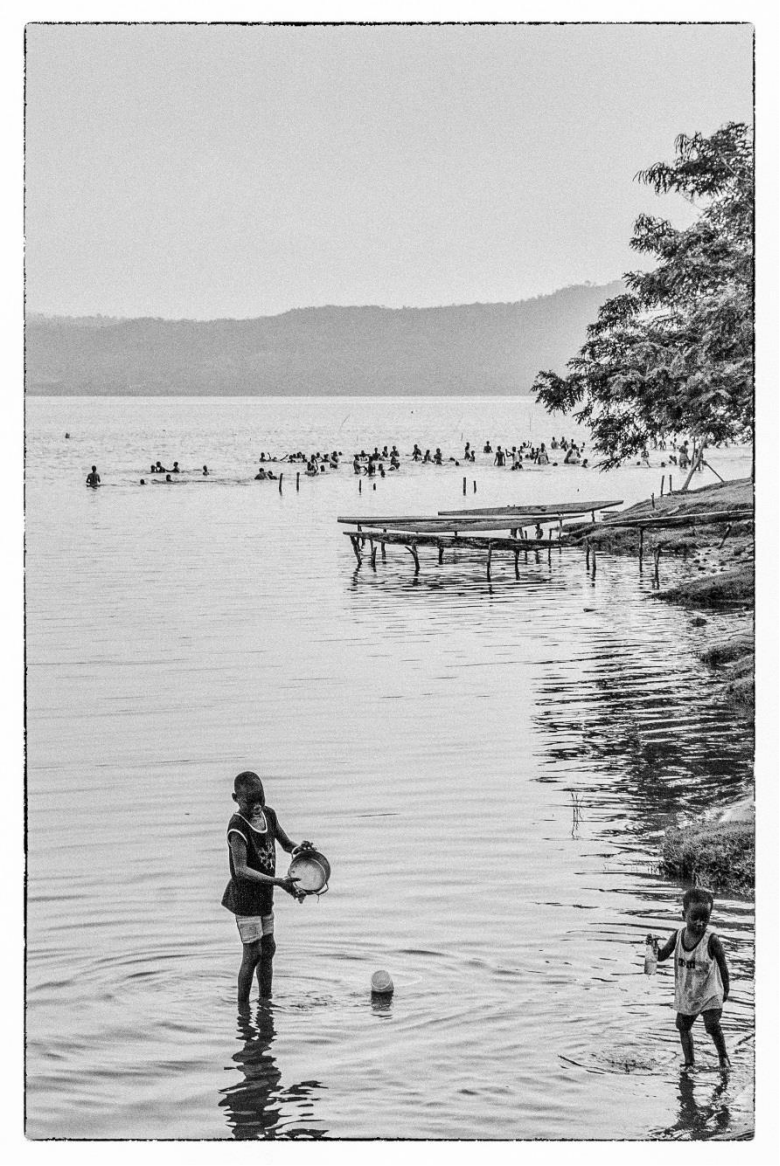
Department of Paediatrics & Child Health

ANNUAL RESEARCH DAYS 2019



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Programme and Abstract Book

29th & 30th October
D3 Lecture Theatre, D Floor
Red Cross War Memorial Children's Hospital

CPD Points for Tuesday, 29 October 2019 and Wednesday, 30 October 2019

Please sign the attendance registers on both days to claim your points.

PROGRAMME AND CONTENTS PAGE

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16H00 – 16H30	Mini-plenary: "*Compensation, Reward or Perverse Incentive? The tricky topic of research participant payment."*	B. Morrow	

Wednesday, 30 October 2019

Session 3: Chairperson: L. Githinji

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Poster Presentations **Page No.**

Title: **A PROSPECTIVE STUDY TO ASSESS THE VALUE OF LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY IN THE MANAGEMENT OF PAEDIATRIC POISONING AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL**

Authors: Norbertta Washaya[1,2], Alicia Evans[3,4], Rudzani Muloiwa[2,4], Peter Smith[3,4] and Heloise Buys[1,2]

Affiliation: [1] Division of Ambulatory and Emergency Paediatrics, Red Cross War Memorial Children's Hospital, Cape Town, South Africa; [2]Department of Paediatrics and Child Health, University of Cape Town, South Africa; [3]Division of Clinical Pharmacology, University of Cape Town, South Africa; [4]Groote Schuur Hospital, Cape Town, South Africa

Introduction:
There is a paucity of data on the role of investigations, specifically, liquid chromatography-tandem mass spectrometry (MS), in the management of paediatric poisoning in low- and middle-income countries.

Objective:
To assess the value of MS in the management of paediatric poisoning at Red Cross War Memorial Children's Hospital (RCWMCH).

Methods:
152 children admitted with suspected poisoning between 1 January 2017 and 31 December 2017, were recruited. All patients had a urine and/or blood sample sent for MS toxicology; 73 had routine toxicology: 31 had point-of-care urine drug screen (POC-UDS), 27 had National Health Laboratory Services (NHLS) tests and 15 had both POC-UDS & NHLS tests. Routine toxicology was done at the treating clinician's discretion. Data collected included demographics, clinical features, investigations, management and outcome and these were described using conventional descriptive and inferential statistics.

Results:
Of the 152 children, with a median age of 39 (IQR 25 -61) months, 93 (61%) presented with a history of ingesting a known substance, 20 (13%) reported an unknown substance and 39(26%) had no history of ingestion. MS was positive in 62% (24/39) of the patients who had no history of ingestion, 35% (7/20) in those who ingested an unknown substance and 45% (42/93) of those who ingested a known substance. In this last group, MS identified the known substance in 27/42 (64%) cases but found a different substance in 15/42 (36%) cases. MS was able to detect multiple drugs in 37 children. No children died. Individualized social interventions were instituted in all patients with reported ingestion and in those with MS-confirmed poisoning.

Conclusion:
MS is an expensive test and should be used judiciously in managing paediatric poisoning; it is useful in identifying cases of occult poisoning, in patients who have ingested more than one toxin, and may be of use when targeted at child protection.

Ethics Approval number: HREC 742/2016

Retrospective part of this study was presented on the 1st of November 2017 Annual Research Days

Title: **DROPOUT RATE OF CHILDREN WITH ESRD FROM CHRONIC PD AND ASSOCIATED FACTORS; A TEN YEAR REVIEW AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH), SOUTH AFRICA**

Authors: Aujo JC, Coetzee A, Masu A, Nourse PJ, McCulloch MI

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Objectives:
Chronic Peritoneal Dialysis(PD) is the preferred method of renal replacement therapy in most centers treating children with end stage renal failure. Despite improvements in PD technique, complications still arise that warrant a switch to hemodialysis. In this study we sought to investigate the dropout rate from chronic PD at Red Cross hospital as well as describe the factors associated with this drop out.

Methods:
This was a retrospective descriptive study, carried out in the renal ward, E2, of RCWMCH in Cape Town. All patients who were started on chronic PD during the ten year study period were included in the study. Eligible participants were identified from the renal transplant waiting lists over the study period.
Drop out was defined as:

- permanent switch to HD or
- death from PD related complications

Patient folders were retrieved for extraction of relevant data.

Outcome measures:
Time from initiation of chronic PD to drop out, proportion dropping out during the study period. Data regarding factors associated with drop out were also extracted from the files. These included: age, BMI at PD initiation and discontinuation, membrane characteristics, peritonitis episodes, episodes of catheter malfunction, symptoms at PD termination, laboratory results at termination, compliance record, primary care taker's level of education and occupation, distance from RCWMCH.

Results:
Fifty two children were enrolled into the study. Overall, 15/52 (28.8%) dropped out during the study period. Most of them dropped out within the first 1-2 yrs of being on PD. After logistic regression analysis the only significant associated factor was >1 episode of peritonitis.

Conclusion:
RCWMCH practices a PD first approach which enables children to be dialyzed at home. In this study, it was shown that there was a 28.8% dropout rate which was related to > 1 episode of peritonitis. Ongoing education and training in the prevention of peritonitis to these patients and their carers, is important in maintaining these children on PD.

Ethics number- HREC REF: 018/2019

Title: **A SINGLE AGXT VARIANT ACCOUNTS FOR THE MAJORITY OF PRIMARY HYPEROXALURIA CASES IN BLACK SOUTH AFRICAN PATIENTS**

Authors: Kashief Khan, Adrian D Marais, Fierdoz Omar ,Chambrez Zauchenberger, Matthew Koekemoer, Surita Meldau

Affiliation: Division of Chemical Pathology / Human Genetics, University of Cape Town (Presenter)

Objectives:
Primary hyperoxaluria type 1 (PH1), an autosomal recessive disorder due to deficient alanine-glyoxylate aminotransferase (AGT) is caused by mutations in the *AGXT* gene. The consequent elevated oxalate concentration causes calcium oxalate crystals in the kidney and other organs.
The objectives of this study were to (1) audit *AGXT* investigations since 2013, and (2) determine the frequency of commonly encountered variants in the local Black population.

Methods:
Results from all *AGXT* referrals since 2013 were retrieved and positive genetic findings were reviewed. DNA from 581 Western Cape black South African newborns was screened by restriction enzyme analysis to establish the frequency of the commonest variant.

Results:
Nineteen (83%) of the 23 diagnostic requests were positive for PH1 of which 17 (90%) carried the AGXT(NM_000030.3):c.335C>A (p.A112D) pathogenic variant (14 homozygotes). The majority of p.A112D positive cases originated from Gauteng (71%), but 24% came from KwaZulu-Natal.
The p.A112D variant was detected in 1 of the 581 controls; yielding a carrier prevalence of 0.00172 (95%CI:-0.0016165-0.0050587).

Conclusion:
The high prevalence of the c.335C>A(p.A112D) variant in black South African PH1 patients suggests that this is a common variant in this population group. The Western Cape carrier frequency may not be representative of Gauteng and KwaZulu-Natal but nevertheless confirms the occurrence of this variant in the black population. Genetic testing for this variant in black South African PH1 patients therefore is a cost-effective initial diagnostic test with follow-on further analysis if warranted.

HREC REF: 464/2014

Title: **INFECTIVE ENDOCARDITIS IN INFANTS AND CHILDREN IN THE WESTERN CAPE, SOUTH AFRICA: A RETROSPECTIVE ANALYSIS**

Authors: Mark L Willoughby, Wisdom Basera, Susan R Perkins, George AM Comitis, Barend Fourie, John B. Lawrenson, Liesl J Zühlke

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Infective endocarditis is a microbial infection of the endothelial surface of the heart, predominantly the heart valves, that is associated with high mortality and morbidity. Few contemporary data exist regarding affected children in our context.

Aims and Objectives:
We aimed to describe the profile and treatment outcomes of infant and childhood endocarditis at our facilities in order to optimize decision making with regards to the management of these patients.

Methods:
This is a retrospective analysis of infants and children with endocarditis at two public-sector hospitals in the Western Cape Province of South Africa over a 5-year period. Patients with "definite" and "possible" endocarditis according to Modified Duke Criteria were included in the review.

Results:
Forty-nine patients were identified for inclusion, 29 had underlying congenital heart disease as a predisposing condition; 64% of patients met "definite" and 36% "possible" criteria. The in-hospital mortality rate was 20%; 53% of patients underwent surgery with a post-operative mortality rate of 7.7%. The median interval from diagnosis to surgery was 20 days (interquartile range 9-47 days). Valve replacement occurred in 28% and valve repair in 58%. There was a significant reduction in valvular dysfunction in patients undergoing surgery and only a marginal improvement in patients treated medically. Overall, 43% of patients had some degree of residual valvular dysfunction.

Conclusion:
Endocarditis is a serious disease with a high in-hospital mortality and presents challenges in making an accurate diagnosis. Despite a significant reduction in valvular dysfunction, a portion of patients had residual valvular dysfunction. Early surgery is associated with a lower mortality rate, but a higher rate of valve replacement when compared to delayed surgery.

HREC REF: 539/2018 (University of Cape Town)
HREC REF: N19/01/017_RECIP_UCT_539/2018 (Stellenbosch University)

Title: **LESSONS FROM THE ADOLESCENTS RECEIVING CONTINUOUS CARE FOR CHILDHOOD-ONSET CHRONIC CONDITIONS (ADOLE7C) STUDY- TRANSITION OF OVERAGE PATIENTS AT A PAEDIATRIC CARDIOLOGY OUTPATIENT CLINIC**

Authors: Alexia Joachim[1], Eloise Hendricks[2], Cameron Hendricks[1], Susan Perkins[1], Ewa-Lena Bratt[3,4], Bongani Mayosi[5#], Philip Moons[6], Liesl Zühlke[1,2]

Affiliations: [1]Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, University of Cape Town; [2]Division of Paediatric Cardiology, Red Cross War Memorial Children's Hospital, Provincial Administration of the Western Cape; [3]Institute of Health and Care Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden; [4]Department of Paediatric Cardiology, The Queen Silvia Children's Hospital, Gothenburg, Sweden; [5]The Deanery, Faculty of Health Science, University of Cape Town, Groote Schuur Hospital, Observatory, Cape Town, South Africa; [#] deceased; [6]Department of Public Health and Primary Care, KU Leuven, University of Leuven, Belgium

Background:
The Adolescents Receiving Continuous Care For Childhood-Onset Chronic Conditions (ADOLE7C)- project aims to identify risk factors for care gaps for patients with congenital and rheumatic heart disease. As much as 47% of cardiac patients experience gaps in continuous care or are lost to follow up as they reach adulthood. The project is being conducted at six sites in Sweden and two in South Africa, Red Cross War Memorial Children's Hospital and Dora Nginza Hospital in Port Elizabeth. Transfer is a process which includes preparation, review of clinical findings and finally transfer to adult services. This includes establishing administrative processes and productive relationships with the local receiving facilities in order to improve the referral process.

Objective:
As part of the study, we aimed to identifying overage patients still in care at the outpatient paediatric cardiac clinic, to review their clinical status and to map their transfer and transition plans.

Methods:
We identified all over-age (>13 years) patients in the outpatient cardiology service at Red Cross Hospital between 1 January 2017 until 30 April 2019. Patients attend a designated adolescent clinic at which time they were reviewed for transitional care (preparation for transfer) or readiness for transfer to the grown-up congenital heart disease (GUCH) clinic. Reasons for staying in paediatric care were also identified.

Results:
In the period 2017 to present, over 30% (n=340) of our outpatient paediatric cardiology service were overage. Their ages ranged from 13 to 25 years. Patient residences were Cape Town metropole (78.8%), Western Cape outside of Cape Town metropole (20.3%), outside of Western Cape (0.9%). After detailed review of each patient, patients were assigned in the following ways: 43.3% were still within the paediatric cardiology service, 40.3% formally transferred, 13.5% discharged, 0.9% (3 patients) were in shared care with the palliative service and 2.1% have died. Of those still in the paediatric cardiology service n=147, 4% (8 patients) were awaiting surgery and one was awaiting cardiac catherization, 68.7% were in regular follow-up, 5.4% were prepared for discharge but awaiting a letter or date and 21% were lost to follow-up. Of note compared to patients born in 1991-1994, only 9.1% of the entire cohort of overage patients were now lost to follow-up, as opposed to over 80%.

Conclusions:
For the first time, our unit has mapped transfer and transition for our overage paediatric cardiology patients. In total 56,7% of overage patients (constituting over 30% of the clinic) between 1 January 2017 until 30 April 2019 have either died, been transferred, discharged or are in shared care with palliative care. Our dedicated transitional clinic now has formalised discharges, shared care and facilitated referrals, designed to improve outcomes for these patients.

Ethics approval number – UCT HREC #765/2016

Title: **A RETROSPECTIVE DESCRIPTION OF PRIMARY IMMUNODEFICIENCY DISEASES AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL, CAPE TOWN, SOUTH AFRICA, 1975 – 2017**

Authors: S Moodley, MB ChB, DCH (SA), Dip HIV Man (SA), FCPaed (SA); E Goddard, MB ChB, PhD, MMed (Paed), FCPaed (SA), Cert Paed Gastro (SA); M Levin, MB ChB, FCPaed (SA), MMed (Paed), Diploma Allergy (SA), PhD; C Scott, MB ChB, FCPaed (SA), Grad Cert Paed Rheum (UWA); A van Eyssen, MB ChB, DCH (SA), FCPaed (SA), CMO Paed (SA); A Davidson, MB ChB, DCH (SA), FCPaed (SA), CMO Paed (SA), MPhil; R De Decker, MSc, MB ChB, DCH (UK), FCPaed (SA), Cert Med Genet (SA); JM Wilmshurst, MB BS, MRCP, FCPaed, MD; A Spitaels, MB ChB, DCH, FCPaed (SA); B Eley, MB ChB, FCPaed (SA), BSc Hons

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Background:
The primary immunodeficiency diseases (PIDs) constitute a diverse and ever-expanding group of inborn errors affecting a wide range of immune functions. They are not well documented in Sub-Saharan Africa. An important barrier to care is limited awareness of PIDs and their management among health care professionals. This fascinating spectrum of diseases is rapidly expanding worldwide, and not as rare as we think. Genetic characterization and newborn screening for primary Immunodeficiency diseases (PIDs) may be the gold standard in the first world setting but are neither practical nor feasible for our doctors. Yet, other low and middle income countries in the world have also established reasonable services and created registries for children with PIDs, including other African countries.

Objective:
To describe the spectrum of PIDs at a tertiary paediatric hospital.

Methods:
A retrospective descriptive study of PIDs diagnosed at Red Cross War Memorial Children's Hospital, Cape Town, South Africa between 1975 and 2017 was undertaken.

Results:
252 children with PIDs were identified, spanning 8 of the 9 categories listed in the 2017 classification of the International Union of Immunological Societies. Predominantly antibody deficiencies, combined immunodeficiencies with associated syndromic features, and immunodeficiencies affecting cellular and humoral immunity accounted for 79% of all PIDs. The mean age (standard deviation) at diagnosis was 46 (50) months and the male to female ratio was 1.5:1. A history of parental consanguinity was present in 3 children (1.2%). Recurrent infection was the most prevalent presenting phenotype, manifesting in 70.2% of the patients. Genetic or chromosomal confirmation was obtained in 42/252 (16.7%) of the children. Common interventions used to prevent infection were antimicrobial prophylaxis and immunoglobulin replacement therapy, administered to 37.7% and 36.9% of the patients respectively. Six of seven children who underwent haematopoietic stem cell transplantation (HSCT) had successful outcomes. The 7th patient died 2 months post-HSCT from overwhelming infection. Although we could not account for the children lost to follow up during the study period, 53 (21.0%) deaths were confirmed.

Conclusions:
Several challenges exist in the recognition and treatment of children with PIDs in our setting. These include limited access to genetic diagnostics and HSCT. Sub-optimal treatment options contribute to the overall mortality of PIDs in South Africa. Greater awareness among clinicians treating children and more laboratory diagnostic capacity are needed to increase the recognition PIDs among children in South Africa. The treatment options that are available in South Africa are unevenly distributed. Hence, treatment capacity should be expanded throughout the country, especially advanced interventions such as HSCT. Ongoing reporting of registries such as ours and increased community awareness should strengthen the lobby for greater investment in rare diseases such as the PIDs.

HREC REF: 191/2017

Title: **THE DIAGNOSTIC UTILITY OF SEQUENTIAL RESPIRATORY SPECIMEN TESTING AND CHARACTERIZATION OF TREATED PULMONARY TUBERCULOSIS IN CHILDREN AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH), CAPE TOWN**

Authors: Enimil A[1], Nuttall J[1], Centner C[2,3], Beylis N[2,3], Eley B[1]

Affiliation: [1]Paediatric Infectious Diseases Unit, Red Cross War Memorial Children's Hospital and Department of Paediatrics and Child Health, University of Cape Town, Cape Town, South Africa; [2]Division of Microbiology, University of Cape Town, South Africa; [3]National Health Laboratory Service, Groote Schuur Hospital and Greenpoint

Introduction:
Diagnosing pulmonary tuberculosis (PTB) in children is challenging due to the difficulty in obtaining representative respiratory specimens and paucibacillary disease. To improve sensitivity particularly in children and extra-pulmonary specimens, Xpert Ultra MTB/RIF (XU) was introduced in February 2018, replacing the Xpert MTB/RIF (XP) test. This study measured the incremental yield (IY) of testing sequential respiratory specimens and compared the clinical, laboratory and radiological findings of children with confirmed PTB (XU and/or TB culture (TBC) positive) and those with unconfirmed PTB (XU and TBC negative).

Methods:
Children investigated and treated for PTB in routine clinical practice at RCWMCH between February and October 2018 were identified from the National Health Laboratory Service and pharmacy databases. Descriptive and inferential statistics were used to analyze the data. P-values < 0.05 were considered statistically significant. The IY results of XU and TBC were presented as absolute numbers and percentages

Results:
There were 165 respiratory specimens submitted to the laboratory from 110 children. 37.3% of children had a positive XU result on testing a single respiratory specimen. Testing a second sequential respiratory specimen with XU provided an additional 5/46 (10.9%) positive XU cases. 44.5% of children had a positive XU and/or TBC result (confirmed cases) on testing a single respiratory specimen. Testing a second sequential respiratory specimen with XU and TBC provided an additional 3/46 (6.5%) confirmed cases. There was no IY from testing a third sequential respiratory specimen using XU and TBC.
Other results of the 110 children treated for PTB are summarized below:

Variables	Confirmed PTB n=54	Unconfirmed PTB n=56	P-value
Median age (IQR), years	2.33(1.00-4.90)	2.74(1.75-5.08)	0.24
HIV infection, n/N (%)	8/54(13)	6/56(10.7)	0.71
Mass z-score <-2, n/N (%)	22/54(40.7)	13/56(23.2)	***0.049***
History of cough, n/N (%)	27/52(51.9)	40/54(74.1)	***0.018***
Reported weight loss, n/N (%)	26/51(51)	22/55(40)	0.25
History of contact with PTB patient	20/54(37)	24/56(42.9)	0.53
Mantoux >10 mm, n/N (%)	10/15(66.7)	16/20(80)	0.451
Positive XU, n/N (%)	47/54(87)	0/56(0)	-
Positive TB culture, n/N (%)	39/54(72.7)	0/56(0)	-
Anaemia (Hb <10 g/dL), n/N (%)	35/54 (67.3)	19/52 (36.5)	***0.002***
Microcytic anaemia, n/N (%)	23/28(82.1)	8/22(36.4)	***0.001***
Median (IQR), C-reactive protein (mg/L)	78(37.5-116)	68(34.2-153)	0.9
Radiology findings, n/N (%): -			
Airway opacification	28/52(53.8)	31/55(56.4)	0.79
Intrathoracic lymphadenopathy,	24/54(44.4)	20/56(35.7)	0.35
Airway compression	8/51(15.7)	5/55(9.1)	0.38
Pleural effusion	5/52(9.6)	8/55(14.5)	0.55

Conclusion:
In this initial exploratory analysis, history of cough was commoner in unconfirmed PTB, while moderate or severe underweight, low haemoglobin and microcytic anaemia were more frequent in confirmed PTB cases.
Even though the sample size is small and respiratory specimen types varied, this study suggests that the cost-benefit implications of performing XU and/or TBC testing on sequential respiratory specimens in routine paediatric clinical care warrants further investigation.
HREC REF: 049/2019

Title: **MANAGEMENT OF CHILDREN WITH BACTERIAL MENINGITIS: CHALLENGES WITH DIAGNOSIS OF HEARING LOSS IN A LOW-TO-MID-INCOME COUNTRY**

Presenter: Nikki Tromp

Affiliation: Audiology, Red Cross War Memorial Children's Hospital

Background:
Internationally, infectious diseases remain the greatest cause of morbidity among young children. The burden of infectious disease such as bacterial meningitis is particularly high in low-to-mid income countries (LMICs). South Africa has a high prevalence of bacterial meningitis (BM), especially in children under the age of five. BM is also one of the commonest causes of acquired hearing loss in children. There is currently no universally accepted protocol for the audiological management of children diagnosed with BM.

Objective:
This study aimed to explore the audiological management of children diagnosed with BM at a tertiary hospital in the Western Cape, South Africa.

Methods:
A retrospective folder review of children aged 0-6 years old who were diagnosed and treated for BM and unspecified meningitis at Red Cross War Memorial Children's Hospital between May 2016 and May 2018 was conducted. Demographic and audiological data were recorded on a self-developed data abstraction form and data were analysed descriptively.

Results:
A total of 291 folders of patients diagnosed with BM and unspecified meningitis were accessed for review. Of those, 40/291 (13.7%) children diagnosed with BM or unspecified meningitis were referred to audiology. Average referral time to audiology was 15 days (SD = 24 days) and each patient attended an average of only 2 audiology appointments. There were no standard audiological protocols used to assess the children referred for hearing evaluation. Two children were diagnosed with BM-related hearing loss and received audiological intervention.

Conclusions:
A small proportion of children diagnosed with BM or unspecified meningitis were referred to audiology and children were seen late post diagnosis of meningitis. Those referred did not adhere to the recommended number of follow up audiological visits. There is a need for a closer collaborative work between medical personnel and audiologists to ensure that children diagnosed with BM get the required audiological management.

HREC REF: 298/2018

Title: **THE MICROBIOME OF UNPASTEURISED AND FERMENTED MILK PRODUCTS: A STUDY FROM RURAL SOUTH AFRICA**

Presenter: Dr Pieter J de Waal; (Mentor: Professor Mike Levin; Centre of Proteomic and Genomic Research: Professor Shane Murray; Bioinformatician: Katie Lennard)

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Background:
The rapid rise in allergic diseases has been linked to urbanization and westernization. Recent observational studies indicate a significantly lower prevalence of allergic disease in children exposed to farming environments during the ante- and post-natal period. Consumption of unpasteurised- and fermented cow's milk has been hypothesized as independent protective factors against allergy. Lack of microbial diversity and low levels of lactic acid producing probiotics in infant's diets may be predisposing factors to developing atopic eczema, allergic sensitisation and asthma. In South Africa, rural communities with a low prevalence of allergy consume unpasteurised and traditional fermented milk products.

Objective:
To characterise and compare the microbiome of differently sourced and processed cow's milk samples, viz. fresh unpasteurised milk from urban and rural settings, and to also compare home-made and commercially produced fermented milk.

Methods:
In March 2019 fresh urban cow's milk, fresh rural cow's milk, homemade fermented milk ('*amasi*') and commercially bought fermented milk were collected. Freshly lactated cow's milk (unpasteurized), was collected from rural Eastern Cape and urban Cape Town. Homemade fermented cow's milk (unpasteurized) was collected from the rural Eastern Cape. Three different commercial brands of fermented cow's milk were bought. Samples were frozen immediately after collection and transported for analysis at the Centre of Proteomic and Genomic Research (CPGR), Anzio Road, Cape Town for 16S rRNA-gene analysis. The DADA2-microbiomic pipeline was used to identify and compare the relative abundance of OTU's (Operational Taxonomic Units). Biomathematics were applied to determine the Shannon- and Simpson alpha-diversity indexes and to calculate the Bray-Curtis distance between the sample groups.

Results:
Both Simpson- and Shannon alpha diversity were highest in fresh unpasteurised milk, lower in homemade fermented milk and markedly lower in commercially fermented milk samples. Principal component analysis revealed marked homogeneity in commercial fermented milk samples, some clustering of urban sourced fresh milk samples, but marked differences between the milk samples obtained in rural settings. The commercially fermented products were dominated by lactic acid producing *Firmicutes* (genus *Lactococcus,* especially *Lactococcus Lactis AB100803* and genus *Leuconostococcus*). Although homemade fermented milk comprised approximately 50% *Firmicutes* (predominantly *Lactococci*), it also contained a large proportion of *Proteobacteriaciae* (predominantly *Citrobacter* and *Kluverya*). Fresh milk from urban cows comprised a mixture of *Firmicutes*, *Actinobacteria*, *Bacteriodetes* and *Proteobacteria*. Fresh milk from rural cows differed markedly from each other, one resembling milk from urban cows, and the other comprising almost entirely *Proteobacteria*, predominantly *Salmonella* species – it also appeared more diverse that commercially fermented milk. Potential pathogens were identified in one of the rural cow's milk samples, and the homemade '*amasi*'.

Conclusion:
Unpasteurised milk samples differ markedly depending on the source, possibly due to factors involved in the collection and storage of these samples. Fermented milk comprises a markedly different microbiome than unpasteurised milk, regardless of the source of milk (pasteurised or not; homemade or mass-produced). Commercially available fermented pasteurised milk is highly similar and contain bacteria postulated to protect against allergies, however fermenting unpasteurised milk, does not reliably replicate the microbial composition of commercially available preparations. Home-made milk has higher diversity than commercially available fermented milks. As it is currently unknown which organisms may have a protective effect, and whether diversity of organisms is an important factor for protection, it is difficult to say which of these factors should be afforded a higher value. Ingestion of unpasteurised milk, whether fermented or not, may have possible adverse health outcomes.

Animal Ethics approval number: 018_033

Title: **INDOOR POLLUTION OR TOBACCO SMOKE EXPOSURE AND LUNG FUNCTION AT 3 YEARS IN AN AFRICAN BIRTH COHORT**

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Introduction:
Postnatal exposure to indoor air pollution(IAP) and environmental tobacco smoke(ETS) in early childhood has been associated with reduced lung function in childhood

Objective:
To assess the impact of postnatal IAP and ETS on lung function and bronchodilator response(BDR)at 3 years

Methods:
Children enrolled in the Drakenstein Child Health Study,had lung function tested at 6 weeks and 3 years using standard and intra-breath measures of oscillometry.BDR was measured at 3 years.Indoor air pollutants(PM10,benzene) were measured in homes at 4-6 months postnatally.ETS was assessed by highest infant urine cotinine during 2 years

Results:
347 children were tested at 6 weeks and 3 years; BDR was successful in 224(65%): 114(50.7%)male,110(48.9%)Black African,mean(SD)BMI z-score 0.39(1.2).The mean(SD) resistance(R_{10})and reactance at 10 Hz(X_{10}) was 12.9(3.4) hPa.L.s^{-1}and-3.7(2.1)hPa.L.s^{1} respectively and post BD administration,R_{10}post 11.0(2.7) hPa.L.s^{-1} and X_{10}post-2.8(1.5) hPa.L.s^{-1}.Children exposed to high levels of ETS had higher R_{10}(R_{10}post:3.0 hPa.L.s^{-1};p<0.01; CI1.4,4.5) and lower X_{10}(X_{10}:-1.6 hPa.L.s^{-1};p=0.04;CI-3.0,-0.1 and X_{10}post: -1.3;p=0.03;CI-2.4,-0.15)compared to unexposed children; adjusted for 6 week lung function.After BD,children exposed to high levels of PM10 had higher R_{10}(R_{10} at end inspiration:1.6 hPa.L.s^{-1};p=0.048;CI 0.2,3.1)and lower X_{10}(X_{10}:-1.4 hPa.L.s^{-1};p=0.01;CI-2.4,-0.3 and X_{10} at end inspiratory:-2.1hPa.L.s^{-1};p<0.01;CI-3.4,-0.8)

Conclusions:
High exposure to ETS or IAP in early life is associated with impaired lung function at 3 years, adjusted for 6-week lung function. The effect of IAP was most notable after bronchodilator, highlighting lung development restriction

HREC REF: 423/2012

Title: **RISK FACTORS ASSOCIATED WITH SEVERITY OF PNEUMONIA AMONG CHILDREN IN A BIRTH COHORT IN SOUTH AFRICA**

Authors: David M le Roux[1, 2], Mark P Nicol[3], Heather J Zar[1]

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Objective:
To determine if risk factors of severe outcome of pneumonia (death or admission to intensive care unit (ICU)) can be determined amongst children in a birth cohort outside Cape Town, South Africa, who were admitted to hospital for pneumonia.

Methods:
Pregnant women living in a peri-urban area of South Africa were enrolled in a birth cohort, the Drakenstein Child Health Study; mother-infant pairs were followed for 2 years. Pneumonia episodes were identified and outcomes documented. Pneumonia was diagnosed according to World Health Organization (WHO) clinical case definitions; chest radiographs were reported with WHO standardized criteria. Risk factors for severe pneumonia were calculated using logistic regression.

Results:
From August 2012 to March 2017, there were 851 pneumonia events in the first 2 years of life, of which 169 were hospitalised. There were 3 deaths (0.3% of total pneumonia cases, 1.7% of hospitalized cases). Of 176 hospitalized cases, 14 (8%) were admitted to ICU, 6 (3%) received continuous positive airway pressure (CPAP) and 8 (5%) required intubation and mechanical ventilation, 1 of whom died. There were 2 pneumonia deaths prior to ICU transfer. 162 (92%) had chest radiographs reported; C reactive protein (CRP) result was available for 140/176 (80%) of hospitalized pneumonia events.

In adjusted regression, radiographic consolidation (adjusted odds ratio (aOR) 8.33, 95% confidence interval (CI) 2.07 – 33.44); age <2 months (aOR 5.31, 95% CI 1.57 – 17.96) and preterm birth (aOR 3.28, 95% CI 1.00 – 10.79) were significantly associated with fatal / ICU pneumonia. In an adjusted regression model that excluded chest radiography, age <2 months (aOR 3.87, 95%CI 1.23 – 12.10), preterm birth (aOR 3.61, 95% CI 1.14 – 11.39) and hypoxia (aOR 3.30, 95% CI 1.06 – 10.31) were significant. Underweight for age, stunting and raised CRP were not significantly associated with severe outcomes.

Conclusion:
Radiographic consolidation was the strongest individual predictor of death or ICU admission; as chest radiography is not widely available in low and middle income countries, the regression model excluding chest radiography showed young age, preterm birth and hypoxia were most strongly associated with death or ICU admission. Preterm delivery is a relatively easy marker for front-line health care workers to identify, and does not require accurate measurement of weight or length of an acutely ill child. Oxygen saturation monitoring is critical to identify children at risk. Significant risk factors for severe outcomes of childhood pneumonia can be identified from simple clinical parameters at presentation.

Ethical approval: University of Cape Town, HREC 401/2009; 651/2013

Title: **PREVALENCE AND CHARACTERIZATION OF *HAEMOPHILUS INFLUENZAE* IN THE NASOPHARYNX OF YOUNG CHILDREN, SOUTH AFRICA**

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Background:
Haemophilus influenzae, a coloniser of the nasopharynx (NP), is capable of causing infections such as otitis media, pneumonia and meningitis in young children. *H. influenzae* may be encapsulated (serotypes a-f) or unencapsulated (non-typeable, NTHi). It is unknown whether children are colonized by a single strain, or sequentially by multiple strains of *H. influenzae.* We investigated the longitudinal changes in the prevalence and diversity of *H. influenzae* in the nasopharynx of healthy infants using phenotypic and whole genome sequencing (WGS) data.

Methods:
We included 137 children participating in a birth cohort, in Cape Town, South Africa (Drakenstein Child Health Study) between 2012 and 2013. Nasopharyngeal swabs were collected at birth and fortnightly thereafter for the first year of life, with additional sampling at 18 and 24 months. *H. influenzae* isolates were confirmed with molecular identification. Molecular typing was performed to classify isolates as one of six serotypes or non typeable. WGS was performed on the Illumina HiSeq platform. Genotypes were assigned using MLST and clonal complex data.

Results:
A total of 3616 nasopharyngeal samples were collected. None of the children were colonised at birth. *H. influenzae* prevalence at 2 weeks of age was 1.9% (2/106), reaching a peak of 54.5% (72/132) at 24 weeks of age. NTHi accounted for 92.5% (1286/1391), with serotypeable 7.5% (105/1391). Serotype a,b,c,e and f accounted for 0.2%, 1.9%, 1.5%, 1.8% and 1.9% respectively. At the species level, a total of 321 acquisitions were seen in the first year of life. Recurrent episodes of colonisation were observed; mean first colonisation duration was 12 weeks. At the genotype level (using MLST and clonal complex data), there were 689 acquisitions and mean first colonisation duration was 5.6 weeks.

Conclusions:
NTHi accounted for the vast majority of *H. influenzae* isolates in this cohort. Incorporation of genotype data allowed us to obtain a more accurate estimate of number of acquisitions and carriage duration. Carriage with *H. influenzae* in infancy is more dynamic than previously appreciated.

HREC REF: 747/2015

Title: **LUNG FUNCTION DETERMINANTS AND MORTALITY OF CHILDREN AND ADOLESCENTS WITH CYSTIC FIBROSIS IN SOUTH AFRICA 2007-2016**

Authors: Natalie Vandenbroucke; Marco Zampoli; Brenda Morrow

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Objectives:
Cystic fibrosis (CF) is one of the commonest inherited disorders in South Africa, affecting all population groups. Progressive pulmonary disease with declining forced expiratory volume in one second (FEV1) is the main predictor of morbidity and mortality in individuals with CF.
This study aimed to describe the change in lung function, nutritional status and mortality of children and adolescents with CF, attending the Red Cross War Memorial Children's Hospital (RCWMCH) CF Clinic and to identify factors associated with poor pulmonary function outcomes.

Methods:
A retrospective study was conducted of the clinical records and best annual pulmonary function tests, with matched body mass index (BMI), of children between 5 and 18 completed years of age attending the RCWMCH CF clinic in Cape Town, South Africa, between January 2007 and December 2016.

Results:
A total of 143 study participants (51.4% male; median age at diagnosis 5.5 months) were included. Population mean FEV1 and body mass index (BMI) Z scores improved from -2.5 ± 1.70 to -1.9 ± 1.70 ($p = 0.1$) and from -0.7 ± 1.2 to -0.4 ± 1.2 ($p = 0.3$) respectively from 2007 to 2016. FEV1 Z score declined by an average of 0.17 per year of age and this was mirrored by an average decline in BMI Z scores of 0.07 for each year of advancing age. FEV1 decline was greater in patients who died compared to those who survived ($p = 0.03$). Of the factors postulated to influence lung function decline, there was no significant correlation between FEV1 at any age and age of diagnosis, sex, ethnicity, genotype, geographical location, pancreatic status, or Methicillin-resistant *S. aureus* or *Aspergillus spp.* infection. Participants who were ever infected or colonised with *P. Aeruginosa* had consistently lower FEV1, however this difference only became significant at certain ages. On multiple stepwise regression analysis, only FEV1 at age 6 was found to be a significant independent predictor of mortality (adjusted odds ratio (95% CI) 0.5 (0.3 – 0.8); $p = 0.005$).

Conclusion:
Pulmonary function of children with cystic fibrosis improved non-significantly over the 10-year study period. FEV1 at age 6 was identified as an independent predictor for CF-related mortality. Therefore it is essential to improve early diagnosis, management and pulmonary function measurement in young children with CF.

HREC Rec/Ref: 830/2017

This is new research, which has not been presented previously.

Title: **EVERY BREATH COUNTS! INSPIRATORY MUSCLE TRAINING IN CHILDREN WITH NEUROMUSCULAR DISEASES: A CROSS-OVER STUDY**

Authors: Anri Human[1,2], MPhysT; Lieselotte Corten[3] PhD; Brenda M. Morrow[4], PhD

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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; reduce pulmonary morbidity and improve health-related quality of life.

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

Methods:
A randomised cross-over study design was used to compare three-month intervention (IMT) and control periods. During the intervention period, participants 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:
Preliminary results of the first 10 participants (n=9 male; median (IQR) age 12.3 (10.1-14.3) years) are presented. Six participants were non-ambulant; none received daytime ventilation; and one received nocturnal non-invasive ventilation. No adverse events related to IMT were reported. Median (IQR) Pimax and peak cough flow improved by 11.5 (-4.0 to 26.0) cmH_2O and 30 (-10 to 80) L/min in the intervention group, compared to -5 (-12.0 to 3.0) cmH_2O ($p = 0.04$) and -30 (-40 to -10) L/min ($p = 0.02$) respectively during the control period. There was no change in spirometry or motor function. Order assignment did not affect results. Patient satisfaction with IMT was extremely high, scoring 10 (IQR 8-10) on a 10-point scale.

Conclusions:
A three-month IMT programme in children with NMD appears safe and well-tolerated, with significant improvement in respiratory muscle strength and cough efficacy.

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

This research has been presented at the International Physiotherapy Congress (WCPT) in May 2019.

Title: **INFECTIOUS MORBIDITY OF BREASTFED, HIV-EXPOSED UNINFECTED INFANTS UNDER CONDITIONS OF UNIVERSAL ANTIRETROVIRAL THERAPY IN SOUTH AFRICA: A PROSPECTIVE STUDY**

Authors: Stanzi M le Roux, MBChB, MPH[1]; Elaine J Abrams, MD[2,3]; Kirsten A Donald, FCPaed(SA), PhD[4,5,6]; Kirsty Brittain, PhD, MPH[1,7]; Tamsin K Phillips, PhD, MPH [1,7]; Allison Zerbe, MPH[2]; David M le Roux, FCPaed (SA), MPH [4,8] Max Kroon, FCPaed (SA)[4,9]; and Landon Myer, MBChB, PhD[1,7]

Affiliation: Division of Epidemiology & Biostatistics, University of Cape Town (Presenter)

Objective:
In the absence of maternal antiretroviral therapy (ART) and breastfeeding, HIV-exposed uninfected (HEU) infants experience greater infectious morbidity than HIV-unexposed (HU) infants. We hypothesised that with universal maternal ART, breastfed HEU and HU infants experience similar morbidity.

Methods:
We recruited and prospectively followed HIV-uninfected, and HIV-infected pregnant women initiating ART (without CD4 cell count restrictions) through delivery and with breastfeeding infants for ≥12 months in Cape Town, South Africa. At study visits (< 7 days; 6 weeks; 3-monthly from 3-12 months) mothers reported child feeding and 2-week prevalence of respiratory illness and diarrhoea. We abstracted hospitalization and laboratory data from routine health records. We compared infectious morbidity between HEU and HU infants using incidence rate ratios (IRR, Poisson regression) for infection-related hospitalization, and prevalence ratios (PR, modified Poisson regression) for longitudinal prevalence of infectious illness; variances were adjusted for clustering throughout.

Results:
Mother-infant pairs (n=410 HU, n=459 HEU; pre-ART median CD4 count, 354 cells/μL; HIV viral load, HIV-VL 4·0 $\log_{10}$ copies/mL; gestation, 22 weeks) were followed for median 12 months. Overall, 475 all-cause admissions occurred in 378 children; primary diagnosis was infection-related in 155 (33%) of 475 admissions. HEU (vs HU) infants experienced more infection-related hospitalisations between 7 days and 3 months (incidence/100 child-years, cy: 34·2 [95% CI 24·4-47·9] vs 9·8 [95% CI 5·1-18·8]; IRR 3·50 [95% CI 1·64-8·30], but rates were similar in other age intervals. Rates for HEU infants with healthier mothers (n=84; ART initiation <24 weeks' gestation, CD4 count>350 cells/μL, HIV-VL<4·0 $\log_{10}$ copies/mL: 15·88/100cy [95% CI 5·12-49·23]) approximated those of HU infants (IRR vs HU, 1·62 [95% CI 0·44-6·00]); HEU infants of mothers with late ART initiation and advanced disease had the highest rates (n=44; ART≥24 weeks' gestation, CD4 count≤350 cells/μL, HIV-VL≥4·0 $\log_{10}$ copies/mL: 40·44/100cy [95% CI 15·18-107·74]; IRR vs HU, 4·14 [95% CI 1·27-13·44]). Reduced rates were seen among exclusively breastfed, timely-vaccinated HEU infants (n=165; 16·82/100cy [95% CI 5·08-18·78]; IRR vs HU, 1·72 [95% CI 0·53-5·59]). In the first 6 months of follow-up, HEU (vs HU) infants had higher prevalence of respiratory infection (aPR 4.69, 95% CI 2.42-9.10) and diarrhoea (aPR 2.93, 95% CI 1.70-5.05); after 6 months, associations were ameliorated for respiratory infection (aPR 1.68, 95% CI 1.03-2.75) and absent for diarrhoea (aPR 0.76, 95% CI 0.59-0.98). Prevalence of infectious illness in the first 6 months was highest among HEU infants of mothers with late ART initiation and advanced disease stage who had delayed vaccination and were not exclusively breastfed, but associations waned thereafter.

Conclusions:
Despite ART in pregnancy, breastfed HEU versus HU infants had transiently increased infectious morbidity risks in early infancy. Differences were driven by advanced maternal disease with late ART initiation, alongside suboptimal breastfeeding and vaccination. Interventions that increase early diagnosis and treatment, optimize vaccination rates and promote successful breastfeeding should be prioritized to improve HEU child health.

Ethics approval: UCT-HREC: 567/2014, 451/2012

Title: **RETROSPECTIVE REVIEW OF THE MESO-PORTAL BYPASS (MESO-REX SHUNT) FOR EXTRAHEPATIC PORTAL VEIN OCCLUSION (EHPVO) IN CHILDREN**

Authors: Omar Khamag, Alp Numanoglu

Affiliation: Division of Paediatric Surgery, University of Cape Town

Introduction:
Portal hypertension (PH) caused by EHPVO occurs when the site of block is in the portal vein before the blood reaches the liver. It accounts for almost 70% of paediatric patients with PH and is also the most common cause of upper gastrointestinal (GIT) bleeding in children. Meso-Rex shunt is a treatment option in certain clinical contexts.

Aim:
To describe patients presented with EHPVO and long-term outcome of Meso-Rex bypass in preventing further upper GIT Variceal bleeding as an indicator of resolved PH.

Objective:
What is the clinical impact of the Mesorex bay-pass procedure on Children with (EHPVO) presented with symptomatic portal hypertension?

Methods:
A retrospective folder review on all patients presented to Red Cross War Memorial Children's Hospital with EHPVO between January 2001 and December 2018.

Results:
22 patients were identified with EHPVO, 9 females and 13 males. All children presented with upper GIT Variceal bleeding. Six patients had portal vein thrombosis post liver transplantation.
Rex vein was assessed preoperatively with ultrasound, CT, MRI angiograms or wedged hepatic vein portography. Four children had a non-patent Rex vein and went directly into a Warren shunt, 18 children underwent Rex shunt surgery. Left internal jugular vein used as a conduit in 17 and the great saphenous vein used in one. Mean age at surgery was 6 years (2-13). One patient had a graft thrombosis day one post Rex shunt surgery and subsequently received a spleno-adrenal shunt. Seventeen children were followed up clinically and with portal ultrasound for an average of 125 months (17 – 222). On follow up 16 children had no further variceal bleeding, one presented with two further episodes during early follow up despite having a patent shunt. Seventeen shunts remained patent.

Conclusions:
Meso-Rex shunt re-established hepatopetal portal blood flow, offered an effective solution to manage PH secondary to EHPVO and should be considered as the definitive intervention.

HREC REF: 107/2019

Title: **A PROFILE OF PAEDIATRIC TB MASTOIDITIS: A CASE SERIES**

Authors: Din.T, Banderker.E, Peer.S

Affiliation: Division of Otolaryngology**,** University of Cape Town (Presenter)

Introduction:
TB is endemic in South Africa. Children have a higher chance of developing Extra-Pulmonary Tuberculosis (EPTB) than adults. We aim to profile the clinical characteristics of four children presenting with TB mastoiditis.

Methods:
Retrospective folder review of clinical and radiological information.

Results:
All 4 children were under 5 years old, all presented with the triad of otalgia, purulent otorrhoea and post-auricular swelling. Mean duration of symptoms were 7 days (range 3 -14 days). One child presented with constitutional symptoms of TB, another child presented with disseminated TB. A third child had an OME at presentation. CT temporal bones demonstrated extensive bony destruction of the mastoid air cells with opacification and demineralised ossicles in all cases. Two children had intracranial extension (1 extra-dural abscess, 1 subdural abcess) that was addressed surgically. Emergency incision and drainage of post-auricular abscess with cortical mastoidectomy was performed in all cases. AFBs were detected on PCR in 2/4 cases, the remaining 2 cases were confirmed only on culture. Histology detected caseating granulomatous inflammation highly suggestive of TB in all cases. Audiometry was done in three cases. 2/3 demonstrated conductive hearing loss, the remaining child had mixed hearing loss. Anti-TB therapy was commenced in all. Mean follow up was 12.3 months with resolution of symptoms obtained in all.

Conclusion:
TB mastoiditis presents as a typical complicated bacterial mastoiditis, but is locally more destructive with a higher likelihood of intracranial involvement, that can affect a child's cognitive development. Children do not typically present with constitutional symptoms, therefore tissue biopsies are needed for histology, microscopy, culture and sensitivity; reliance on PCR alone may be futile. The awareness of TB mastoiditis needs to be emphasized especially in endemic regions. Fast-tracked referrals to tertiary facilities, early imaging and prompt treatment significantly reduce disease morbidity.

HREC REF: 298/2017

Title: **COULD A GLUCOCORTICOID RECEPTOR POLYMORPHISM BE PROTECTIVE AGAINST HYPOTHALAMIC-PITUITARY-ADRENAL AXIS SUPPRESSION IN ASTHMATIC CHILDREN ON CORTICOSTEROIDS?**

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Affiliation: [1]Computational Biology, Department of Integrative Biomedical Science, UCT; [2]Central Analytical Facility, Stellenbosch University; [3]Division of Epidemiology and Biostatistics, School of Public Health, UCT; [4]Paediatric Endocrine Unit, Department of Paediatrics and Child Health, Stellenbosch University

Background:
Homozygotes for the single nucleotide polymorphisms (SNPs) rs242941 and rs1876828 of the corticotrophin-releasing hormone receptor 1 (CRHR1) gene were previously associated with lower stimulated and basal cortisol levels respectively in asthmatic children on inhaled corticosteroids. Heterozygotes for rs41423247 of the glucocorticoid receptor (NR3C1) gene were found to have higher basal cortisol levels.

Objectives:
To determine whether the SNPs rs242941 and rs1876828 of the CRHR1, and rs41423247 of the NR3C1 gene are associated with hypothalamic-pituitary-adrenal suppression (HPAS) in asthmatic school children on corticosteroids.

Methods:
DNA was extracted from saliva obtained from 96 asthmatic children, 5.2-15.6 years old, treated with inhaled and nasal corticosteroids, who had previously undergone basal cortisol (C) and metyrapone testing. HPAS was diagnosed if C was <83 nmol/l or the post-metyrapone ACTH (PACTH) level <106 pg/ml. Thirty-six children were classified as suppressed. Non-suppressed children were sub-classified according to their PACTH into a middle (106-319 pg/ml) and a high (>319 pg/ml) ACTH response group, comprising 29 and 31 subjects respectively. TaqMan PCR assays were utilized for genotyping. ANOVA, linear, logistic and multinomial logistic regression analysis were performed.

Results:
Only rs41423247 was associated with HPAS ($p = 0.005$). Mean difference of PACTH of the CC compared to GG genotype was 278.5 (19.5-537) pg/ml while the difference of GC compared to GG genotype was 143.5 (11.6-275.5) pg/ml; ($p=0.030$ and 0.032 respectively). The C allele of this SNP is less likely to be associated with HPAS (odds ratio [OR] = 0.38 [0.18-0.82]) and appears to be dominant (OR = 0.33 [0.13-0.83]). On linear regression, the effect was both additive ($b = 137.7$, $SE = 42.7$, $p = 0.002$) and dominant ($b = 162.0$, $SE = 53.0$, $p = 0.003$). Dominance was confirmed on logistic regression ($p = 0.032$).

Conclusions:
rs41423247 (CC) of the NR3C1 gene was associated with higher PACTH levels and is less likely to be associated with HPAS.

HREC REF: 069/2019

Title: **DEMOGRAPHIC AND AETIOLOGICAL FACTORS OF PAEDIATRIC STATUS EPILEPTICUS AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL**

Authors: J Wilmshurst; H Buys; S Chingwali-Nsanta

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Background:
Status epilepticus is a common medical neurological emergency in childhood which is serious and often life threatening. Status epilepticus is defined as a continuous seizure for more than five minutes without an arresting phase or more than one seizure without regaining consciousness in between. Stopping the seizure is key to minimizing hypoxic ischemic brain damage and averting death. Rapid identification of the aetiology is also critical for treatment outcome. There is paucity of data with regard to aetiology and demographics of affected children in resource limited countries, hence the study.
This study is part of a larger study titled: Childhood convulsive status epilepticus- in search of an optimal drug management in a resource limited setting.

Objective:
To understand the demographics and describe the common causes of convulsive status epilepticus in our paediatric population and classify it according to the International League Against Epilepsy criteria.

Methods:
A cross-sectional study with data collected prospectively and retrospectively in children presenting to the medical emergency unit at Red Cross War Memorial Children's Hospital in convulsive status epilepticus. The data were captured using a secure online platform (REDCap®) and exported to excel and analysed using Stata.

Results:
Of 144 children, 53% were male. Their median age was 28.3(14.3-70.7) months: 20.1% (29) were < 1year,52.8% (76) were 1-5years, and 23.6% (34) aged 5-12years, and 3.5 % (5) more than 12 years. There were 51/139 (36.7%) children who were moderate-severely underweight-for-age. Three percent (5/142) of children were HIV-infected (all on antiretroviral treatment),11.9% (17/144) were HIV-exposed. Sixty (44.1%) children were brought by ambulance, with 35 children having received a benzodiazepine agent pre-hospital.
In their past medical history, 15.3% (22/144) had cerebral palsy;38.6% (54/140) had developmental delay; 8.5% (12/141) had a history of tuberculosis all of whom completed treatment, with 33.3%(4/12) being tuberculous meningitis; Of 137 children,59 (43.1%) had a prior history of seizures and 52(38%) were known to have epilepsy. Of 35 children with epilepsy 8(22.9%) of the caregivers reported non-compliance to administering anti-seizure medication.

Semiology:
65.7% (92/144) of children had generalised convulsive seizures and 18.8% (27/144) were focal evolving into bilateral CSE and 15.4% (22/144) were unknown.

Aetiology (ILAE):
54.9% (79/144) were secondary to an acute infective cause; 13 (9%) had an electroclinical syndrome; 22/144 (15.3%) were remote and 30/144 (20.8%) were unknown. There were 63/144 (43.8%) children who had a recorded tympanic membrane temperature of ≥38°C.
From the emergency room, 9.2% (13/144) of cases were admitted to ICU. Imaging (CT or MRI) was undertaken for 71/144 (49.3%) of the patients with 30/71(42.2%) being abnormal, of whom 4/71(5.6%) had neurocyticercosis,3/71(4.2%) edema,2/71(2.8%) infarction and other 20/71(28.2%). We do acknowledge limitation of the CSF data currently. There were no deaths in this cohort.

Conclusion:
Acute infections are a common cause of status in our setting with the highest proportion of children presenting in the infantile age range, this is concordant with other studies, but our results show a higher percentage of infective causes. Whilst we were unable to measure time to intervene, we can estimate that it is prolonged in most cases, based on the majority of patients having to self present and only a quarter receiving pre-hospital intervention with benzodiazepines.

HREC Ref : 297/2005

Title: **DISABILITY DUE TO PAIN AND HEALTH RELATED QUALITY OF LIFE IN ADOLESCENTS WITH CEREBRAL PALSY AND TYPICALLY DEVELOPING PEERS**

Authors: R Salie[1] | | MM Eken[2] | AG Fieggen[1] | K Donald [3] | NG Langerak[1]

Affiliation: [1]Neuroscience Institute and Division of Neurosurgery, University of Cape Town, South Africa; [2]Division of Orthopaedic Surgery, Stellenbosch University, South Africa; [3]Department of Paediatric and Child Health, Red Cross War Memorial Children's Hospital

Objective:
Cerebral Palsy (CP) is one of the most common causes of physical disability in childhood and as the child with CP grows into adulthood, pain is one of the main complications reported. However, it has not been determined what effect the pain may have on daily life. Therefore, the aim of this study was to determine (1) the difference in level of disability due to pain and Health related Quality of Life (HrQoL) between adolescents with CP and matched typically developing (TD) peers in Cape Town, South Africa and (2) whether there is an association with the level of disability and the HrQol of adolescents with CP versus personal characteristics (Gross Motor Function Classification System (GMFCS), socio-economic-status (SES) and Body Mass Index (BMI)).

Methods:
Thirty-one adolescents with CP and 31 TD adolescents matched for age, gender, BMI and SES were included in this cross-sectional study. An interview was conducted to gather background information and the Oswestry Disability Index 2.0 (ODI) was completed to determine level of disability due to leg and/or back pain. The SF-36 was used to measure HrQol, providing both a mental (MCS) and physical (PCS) score. Mann-Whitney U scores were calculated to determine differences in ODI and SF-36 between the two cohorts, and Spearman rho correlations to determine associations for adolescents with CP only (significance set at $p<0.05$).

Results:
Both cohorts comprised of 15 males (48%) and 16 females (52%). The adolescents with CP had a median (interquartile ranges (IQR)) age of 17.7 (16.5 – 18.5) years, a median BMI of 20 (18 - 24) and a SES ranging from low to high (1.25 (1.0 – 1.75)). As planned, the TD cohort was closely matched with a median age of 17.2 (16.9-18.1), a median BMI of 21 (19-25) and SES 1.25 (0.8-25). In addition, adolescents with CP were classified in GFMCS level I (n=6), II (n=9), III (n=6), IV (n=5) and V (n=5). Adolescents with CP showed significantly higher ODI scores ($p=0.010$; Figure 1A) and lower SF-36 PCS scores ($p<0.001$; Figure 1B) compared to TD adolescents, while no difference was observed for SF-36 MCS scores (Figure 1B). GMFCS was associated with ODI ($r =0.561$; $p=0.001$) and SF-36 (MCS: $r =0.423$; $p=0.018$; PCS: $r = -0.594$; $p<0.001$), while no correlations were found with BMI and SES.

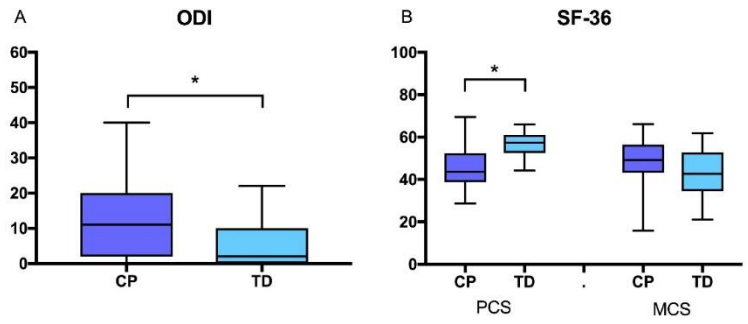

Figure 1. Box and whiskerplots of ODI (1A) and SF-36 (B) scores presented for adolescents with CP and TD adolescents

HREC REF: 014/2017

Title: **PLASMA GLUTAMINE AMONG CRITICALLY ILL CHILDREN**

Authors: Wilson J[1], Morrow B[2], Nel DG[3] & Blaauw R[1]

Affiliation: [1] Division of Human Nutrition, Stellenbosch University, Cape Town, South Africa; [2] Department of Paediatrics, University of Cape Town, Cape Town, South Africa; [3] Centre for Statistical Consultation, Stellenbosch University, South Africa

Background and objectives:
Glutamine is considered essential during critical illness and supplementation is common. Recent concerns over safety highlight the need for focused research on plasma glutamine in specific populations, notably critically ill children. The aim of this study was to describe plasma glutamine levels among critically ill children and to explore associations with clinical condition, nutritional parameters and clinical outcome.

Methods:
This cross-sectional study investigated plasma glutamine levels in patients admitted to a Paediatric Intensive Care Unit (PICU) over a one-month period. Plasma glutamine was measured on admission and day two (D2) of PICU stay. Data on diagnosis, severity of disease, presence of infection, anthropometry, nutritional intake, and clinical outcome were captured.

Results:
Of the 76 patients, (median age 19 months, IQR 3.6-64.8 months, 71% male, 47% post-operative cardiac patients, median PIM3 -4.23, IQR -4.74--3.21), most had normal plasma glutamine on admission and D2 (77.6%; median 556.5 umol/l, IQR 459.5- 664.5 umol/l vs. 67.5%; 529.0 umol/l, IQR 356.0-716.0 umol/l). Admission plasma glutamine varied significantly amongst diagnostic groups ($p = 0.020$), with trauma patients at the lowest and medical patients at the highest end. Plasma glutamine was positively, but non-significantly, associated with length of hospital stay (LOS) ($r= 0.23$, $p = 0.067$) and mortality risk ($r= 0.22$, $p = 0.052$), and patients who died tended to have higher plasma glutamine on D2 ($p = 0.057$).

Conclusions:
Seventy-eight percent of patients had a normal plasma glutamine at PICU admission. Although significant differences were identified amongst diagnostic groups, glutamine was not significantly related to LOS or mortality.

Ethics approval numbers:
University of Stellenbosch: S16/05/085
University of Cape Town: 681/2016

Title: **PRENATAL ALCOHOL EXPOSURE IMPACTS CONVERSATIONAL TURN-TAKING BETWEEN YOUNG CHILDREN AND THEIR MOTHERS IN A SOUTH AFRICAN BIRTH COHORT STUDY**

Authors: Gaironeesa Hendricks, Kirsten A. Donald, Tawanda Chivese, Heather J. Zar, Dan J. Stein, Susan Malcolm-Smith

Affiliation: Department of Psychiatry & Mental Health, University of Cape Town (Presenter)

Introduction:
Previous studies have demonstrated that prenatal alcohol exposure (PAE) is associated with a range of impairments, however, few studies report on the conversational patterns of mothers and their children in this group. No previous studies have explored the association between PAE and conversational turn-taking, yet, an investigation of this aspect is important for successful language and social interactions. In this study, we aimed to compare the conversational turn-taking between mothers and their alcohol exposed children to those between mothers and their unexposed children at the age of 42 months as part of a South African birth cohort, the Drakenstein Child Health Study.

Methods:
Conversational turn-taking was video-audio recorded from 90 face-to-face, mother-child dyadic interactions for 10 minutes each. Thirty children had PAE and 60 were unexposed controls. Unexposed control dyads were matched for maternal age, education and clinic site in a 1:2 ratio.

Results:
Children with PAE had significantly higher median scores than their unexposed counterparts for percentage child overlapping utterances (median scores-13.20 (IQR 6.12-24.17) vs; 5.64 (IQR 0-16.32), $p = 0.016$). There was a trend toward significance for percentage maternal overlapping utterances (median scores-14.81 (IQR 8.06-24.79) vs; 7.70 (IQR 1.91-18.71), $p = 0.057$). After multiple logistic regression and adjusting for sociodemographic and psychosocial confounders, PAE was significantly associated with child overlapping utterances (OR = 3.25, CI 0.98-10.76, $p = 0.050$), and showed a trend toward significance for child utterances preceded by long pauses (OR = 0.30, 95%CI 0.08-1.06, $p = 0.061$).

Discussion:
Our findings offer new and important insight into the association between PAE and conversational turn-taking in the mother-child dyad. We show that overlapping utterances of children with PAE are substantially affected at pre-school age. Clinicians should consider strategies of improving turn-taking strategies in this vulnerable group.

Keywords:
Prenatal alcohol exposure$_1$, Conversational turn-taking$_2$, Mother-child dyad$_3$, South Africa$_4$

HREC REF: 338/2017

Title: **PATTERNS OF CONTACTS WITH TERTIARY HOSPITAL SERVICES BY CHILDREN WITH AUTISM SPECTRUM DISORDER IN SOUTH AFRICA, A COMPARISON WITH GLOBAL DEVELOPMENTAL DELAY**

Authors: Oringe Florence[1], Donald Kirsten A[1,2]

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

Objective:
The aim of this study was to compare the patterns of hospital contact of children with autism spectrum disorder (ASD) and those with global developmental delays (GDD).

Methods:
We conducted a descriptive cross-sectional pilot study of service use by preschool children with a diagnosis of ASD and GDD (non-ASD), attending services at the developmental clinic, at the Red Cross War Memorial Children's Hospital, South Africa. We reviewed medical records of consecutive children attending services over a two-week period. We excluded those with ADHD and Down syndrome. The primary outcome was frequency of hospital contact in the preceding year, covering core therapy, specialist visits, emergency department visits, and auxiliary services (audiology, dietician, counsellor and social workers). The secondary outcome was frequency of comorbid medical conditions. We compared means of frequency of hospital contact between the 2 groups. Ethical approval was obtained from the University of Cape Town Human Research Ethics committee.

Results:
Forty-one medical records were reviewed of which, 14 had ASD and 27 had GDD. The male to female ratio was 3:1. The mean age for ASD vs GDD group was 62 vs 58 months (p=0.08). Comorbid medical conditions were documented in 4(28.5%) children with ASD and 17(62.9%) with GDD. The leading co-morbid conditions and emergency department visits were seizures (19.5%) and respiratory infections (14.6%) respectively. Comparing ASD vs GDD, the mean total hospital visits were 7.9 vs 4.4, where therapy services were 3.7 vs 2.2, specialist visits were 3.7 vs 2.8, auxiliary services were 1.0 vs 0.8 and emergency department visits were 0.6 vs 0.4. The mean number of hospital admissions were 0.4 vs 0.2. None of these differences were statistically significant.

Conclusion:
This pilot study suggests a trend towards higher hospital visits in ASD group, despite lower prevalence of documented co-morbid medical conditions. An extended study will further explore this, in order to develop clearer service guidelines to optimize care for children with these conditions.

HREC REF: 397/2019

Title: **THE ASSOCIATION OF MATERNAL HIV STATUS DURING PREGNANCY ON LONGITUDINAL NEURO-IMMUNE REGULATION, AND NEURODEVELOPMENT IN SOUTH AFRICAN HIV-EXPOSED UNINFECTED CHILDREN**

Authors: Tatum Sevenoaks; Dr Pieter Naudé, Prof Kirsty Donald, Prof Dan Stein (Supervisors)

Affiliation: Department of Psychiatry & Mental Health, University of Cape Town (Presenter)

Introduction:
It has long been established that the Human Immunodeficiency virus (HIV) and its effects, such as its impact on the immune system and then the numerous consequences on other biological systems including the central nervous system (CNS), have had a significant impact worldwide. This is particularly relevant in South Africa, where the prevalence of HIV infected adults remains high. However, with the improved access to antiretroviral therapy (ART), more children are now being born uninfected with HIV while still being exposed to the virus in utero. Exposure to HIV in utero may still negatively affect the developing brain of these children. However, the biological mechanisms involved in the neurodevelopmental outcomes in HEU children are still largely unknown. Evidence from clinical studies showed that HEU children have an altered immune regulation compared to unexposed counterparts, and this is hypothesized to play a role in neurodevelopmental outcomes in HEU children. The aim of this study was to evaluate the longitudinal relationship between HIV positive pregnant mothers, the immune system and the neurodevelopmental outcomes in HEU children.

Methods:
This study was performed in a sub-sample of the Drakenstein Child Health Study, a South African birth cohort of 1000 mother-infant pairs. This sub-study included mothers at ≈26 weeks gestation (n=267) and their infants at 4-10 weeks (n=222) and at 20-28 months (n=267). Maternal HIV status was determined at ≈26 weeks gestation. This sub-study included n=77 HIV uninfected unexposed children and n=190 HEU children. Serum inflammatory markers (Granulocyte-macrophage colony-stimulating factor (GM CSF), Interferon-γ (INF-γ), Interleukin IL-1β, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12p70, IL-13, tumour necrosis factor-α (TNF-α), neutrophil gelatinase-associated lipocalin (NGAL/Lcn2) and metalloproteinase-9 (MMP-9)) were analyzed in all study participants with a multiplex bead array and ELISA. The Bayley Scales of Infant and Toddler Development (Bayley-III) was used to assess *the neurodevelopmental domains: cognitive*, motor, language, social-emotional behaviour and adaptive behaviour at 24 months of age.

Results:
HIV+ mothers had significantly lower levels of the inflammatory markers GM-CSF and MMP9 compared to mothers without HIV. Serum IFN-γ and IL-1β levels were significantly higher in HUU infants at 4-6 weeks compared to HEU infants. At 20-28 months of age, HUU children proved to have significantly higher serum levels of the inflammatory markers IFNg, IL-1β, IL-2 and IL-4 compared with HEU children. Increased levels of the inflammatory markers; GM-CSF, IFN-γ, IL-10, IL12p70, IL-1β, IL-2, IL-4, IL-6 and Lcn2 in HEU infants at 4-10 weeks of age predicted impaired motor neurodevelopment at 24 months of age.

Conclusion:
This is the first study to evaluate the longitudinal associations of immune markers with neurodevelopment in HEU children. Our results show that maternal HIV infection was associated with lower levels of inflammatory markers in mothers and their children. Our results further indicate that an altered immune status in HEU infants, specifically at the earliest stages of life, predicted impaired motor function in the first 2 years. These findings may provide further insights in the involvement of the immune regulation linking maternal HIV status and neurodevelopment in South African HEU children.

HREC REF: 648/2018

Title: **NEUROIMAGING YOUNG CHILDREN WITHOUT SEDATION AND EARLY BRAIN DEVELOPMENT IN A SOUTH AFRICAN BIRTH COHORT STUDY**

Authors: Catherine J Wedderburn[1,2,3], Sivenesi Subramoney[1], Shunmay Yeung[2], JP Fouche[4], Shantanu H. Joshi[5], Katherine L. Narr[5], Andrea M Rehman[6], Annerine Roos[7], Jonathan Ipser[3,4], Frances C Robertson[8,9], Nynke A Groenewold[3,4], Diana M Gibb[10], Heather J Zar[1,11], Dan J Stein[3,4,12], Kirsten A Donald[1,3]

Affiliation: [1]Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital and UCT, SA; [2]London School of Hygiene & Tropical Medicine (LSHTM), UK; [3]Neuroscience Institute, UCT, SA; [4]Department of Psychiatry, UCT, SA; [5]Departments of Neurology, Psychiatry and Biobehavioral Sciences, UCLA, USA; [6]MRC Tropical Epidemiology Group, LSHTM, UK; [7]SU/UCT MRC Unit on Risk and Resilience in Mental Disorders, Department of Psychiatry, Stellenbosch University, SA; [8]Division of Biomedical Engineering, UCT, SA; [9]Cape Universities Brain Imaging Centre (CUBIC), SA; [10]MRC Clinical Trials Unit, University College London, UK; [11]SAMRC, Unit on Child & Adolescent Health, SA; [12]SU/UCT MRC Unit on Risk and Resilience in Mental Disorders, UCT, SA.

Background:
Magnetic resonance imaging (MRI) in young children is a valuable tool for investigating early brain development and the neurobiological mechanisms underlying developmental risk and resilience. However, beyond early infancy, paediatric MR imaging is challenging due to motion, particularly in children under 5 years. While sedation and anaesthesia are frequently used in clinical practice to minimise movement, this may not be ethical in research. Sub-Saharan Africa has the highest proportion of children at risk of developmental delay worldwide, yet in this region there is limited neuroimaging research focusing on the neurobiology of such impairment.

Objective:
Our study aimed to demonstrate feasibility of paediatric multimodal MRI at age 2-3 years without sedation, and to explore the relationship between cortical structure and neurodevelopment.

Methods:
A total of 239 children from the Drakenstein Child Health Study, a large observational South African birth cohort, were recruited for neuroimaging at 2-3 years of age. Scans were conducted during natural sleep utilising locally developed techniques. Neuroimaging was performed on a 3-Tesla Siemens Skyra whole body MRI scanner at the Cape Universities Brain Imaging Centre. T1-MEMPRAGE and T2-weighted structural imaging, resting state functional MRI (fMRI), diffusion tensor imaging and magnetic resonance spectroscopy sequences were included. Child neurodevelopment was assessed using the Bayley-III Scales of Infant and Toddler Development at 2 years of age. Cognitive and language development were compared with cortical surface area and thickness in an exploratory analysis.

Results:
Following 23 pilot scans, 216 children underwent scanning and T1-weighted images were obtained from 167/216 (77%) of children (mean age 34.4 months, 58.8% male). Of those children with a T1-weighted scan, 163/167 (98%) had an fMRI sequence, 156/167 (93%) had magnetic resonance spectroscopy, 143/167 (86%) had diffusion tensor imaging and 100/167 (60%) slept through the full 5 sequences. Cortical surface area within frontal and cingulate regions of interest, and cortical thickness in the frontal region, associated with cognition. Cortical surface area in temporal, frontal and cingulate regions, and cortical thickness in frontal and parietal regions associated with language development.

Conclusions:
To our knowledge this is one of the first MRI studies of children aged 2-3 years without sedation in a sub-Saharan African setting. Our study demonstrates the feasibility of neuroimaging young children during natural sleep. Furthermore, our results indicate that morphological changes in heteromodal association regions associate with cognitive and language development at this young age, enhancing understanding of the interplay between brain structure and function during brain maturation.
HREC REF: 525/2012

Title: **FACTORIAL VALIDITY OF THE MOLTENO ADAPTED SCALE IN CHILDREN WITH NEURODEVELOPMENTAL DISORDERS**

Authors: Michal R. Zieff, Michelle Hoogenhout, Serini Murugasen, Victoria de Menil, Elise Robinson, and Kirsten A. Donald

Affiliation: Department of Paediatrics & Child Health, University of Cape Town

Background and objective:
Developmental assessment tools are frequently used to assess child development in the early years. Because such tests play an important role in various decision-making processes, it is of great importance that they are valid. The Molteno Adapted Scale ("Molteno") is a locally-developed tool designed to establish a child's general development in the first years of life. The tool assesses four domains of development, namely gross motor, fine motor, language, and personal-social, using well-recognised developmental milestones. Although the Molteno is used frequently in clinical settings in the Western Cape, little is known about its validity for use with children who have developmental disorders. The present study aimed to examine the factorial validity of the four Molteno subscales (corresponding to the four developmental domains) in a sample of children with atypical development.

Design and methods:
This sub-study is embedded in the NeuroDev South Africa study, which aims to examine the genetic and phenotypic characteristics of children with neurodevelopmental disorders in the Western Cape. Participants were recruited from Developmental, Genetic and Neurology Clinics at Red Cross War Memorial Children's Hospital and Tygerberg Hospital. The Molteno was administered to 152 children (age range 2-12 years; M = 4.84, SD = 1.93) with a prior diagnosis of one or more DSM-5 neurodevelopmental disorders (e.g. Global Developmental Delay, Autism Spectrum Disorder, etc.). Principal component analyses were conducted to determine whether items in a subscale load onto a single factor (i.e., measure the same underlying construct). Within each subscale, items in the different age brackets were analysed separately. Due to the small number of items in each age bracket, items pertaining to typical development at the second- and third-year levels were grouped together, as were items at the fourth- and fifth-year levels.

Results:
In the Gross Motor, Language, and Personal-Social subscales, items at both the second- and third-year levels and at the fourth- and fifth-year levels loaded strongly onto single components, indicating that the items measure one underlying construct. All component loadings in these domains were consistently high (> .70), with the highest average loading found in the Language subscale (M = .90, SD = .05). In the Gross Motor subscale, the items with the highest component loadings were "hops on one leg 2-5 times" (.87) and "hops on one leg 20 times" (.88) at the different age levels respectively, suggesting that hopping tasks may be particularly good indicators of gross motor development. In the Fine Motor subscale, two out of nine items at the second- and third-year levels (e.g., "builds a gate using blocks") loaded strongly onto a second component, suggesting that these items are tapping into a different underlying construct. At the second- and third-year age levels, the formboard tasks were the best indicators of fine motor development.

Conclusions:
This study makes two important contributions. First, the findings suggest that when used with children with developmental disorders, the Molteno Adapted Scale has good factorial validity. Overall, items within each subscale appear to be tapping into the same underlying construct, barring a few items in the Fine Motor domain. Second, at the item level, the results shed light on specific items that may be better or poorer indicators of development in this sub-group of children. These findings are useful for clinicians conducting developmental assessments in resource-constrained settings with children who have difficulties sustaining attention and/or motivation.

HREC REFERENCE NUMBER: 367/2019

Title: **SUBCORTICAL VOLUME CHANGES AND BEHAVIOUR IN TWO-YEAR OLD INFANTS AFTER PRENATAL TOBACCO EXPOSURE**

Authors: Nehpal Singh, Dr. Annerine Roos (Supervisor), Prof Kirsten Donald (Co-Supervisor)

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

Background and Rationale:
Limited studies on prenatal tobacco exposure (PTE) have shown brain alterations and neurodevelopmental issues in children at school-age, but much less is known about underlying brain structure and development during the early years following PTE. The first two years of life is a crucial period for establishing brain connections and growth of brain regions essential for functioning. The aim of this study was to determine how PTE may be associated with brain structure and development in two-year old infants.

Methods:
Data on behaviour and cognition (using the Bayley scales of infant and toddler development III) and structural MRI data were acquired at 2 years for this project as part of the Drakenstein Child Health Study (DCHS) (Donald *et al*., 2018). Mothers were identified by means of structured maternal self-report on smoking behaviour and nicotine exposure was confirmed by urine cotinine assessment. Freesurfer was used to determine volume and cortical thickness of brain regions; and group differences in brain measures and associations of brain measures with development was explored.

Results:
The sample included 23 infants with PTE and 24 unexposed healthy controls. Infant characteristics such as gestational age in weeks, birth weight, age and weight at scan were compared between groups. Exposed vs non-exposed infants had a smaller weight at scan (p= 0.029). Amygdala and putamen volumes were found to be significantly increased in the PTE group compared to the unexposed group (p= 0.03 and 0.04, respectively). There were no differences in cortical thickness by group. Putamen volume was positively correlated with adaptive behaviour (Spearman's r = 0.4379, p = 0.04). Findings persisted even after controlling for smoking and sex status.

Conclusion:
Our findings, showing increased volumes of limbic and striatal regions, adds to previous evidence on the neural effects that PTE may have during the early developmental years. The amygdala is part of the emotion regulation system which may have implications for emotional development. The putamen regulates different types of learning and movement, which coincides with our finding of an association between adaptive behaviour and putamen volume. Further study is needed to determine the relevance of these changes, also using longitudinal designs that consider the trajectory of brain structure and functional development.

This study has received ethical approval from the Human Research Ethics committee of UCT (HREC Ref no 400/2019). It is a sub-study from the parent study part of the DCHS (Donald *et al*., 2018; UCT Ethics Ref no 525/2012).

Title: **INTEGRATING THE PREVENTION AND CONTROL OF RHEUMATIC HEART DISEASE INTO COUNTRY HEALTH SYSTEMS: A SYSTEMATIC REVIEW**

Authors: Jessica Abrams, David Watkins, Leila Abdullahi, Mark Engel, Liesl Zühlke

Affiliation: Department of Paediatrics & Child Health, University of Cape Town (Presenter)

Introduction:
Rheumatic heart disease (RHD), a sequel to Strep A pharyngitis and acute rheumatic fever (ARF), is a significant cause of morbidity and mortality among disadvantaged populations. Following on a 2018 World Health Assembly Resolution on RHD, an evidence-based approach is needed to guide the implementation of RHD programmes that are integrated into national health systems. We assessed the effectiveness of programmes targeting RHD prevention and control according to the extent and nature of integration into the health system, with a view to inform best practice and identify key gaps in knowledge.

Methods:
We searched electronic databases and grey literature, complemented by hand searching, in order to identify studies reporting on prevention and control programmes for populations at risk for Strep A pharyngitis, ARF, and/or RHD. Eligible studies were published in English between 1990 and 2017. RHD programme integration was analysed according to an established framework; programme effectiveness data were extracted and analysed using a results-chain framework. A meta-analysis was performed on secondary prophylaxis adherence. Quality of studies was assessed using peer-reviewed checklists (CASP and PRISM).

Results:
The search yielded 658 publications, from which five observational studies met with the inclusion criteria. Studies were similar in extent and nature (health system function) of integration; none of the programmes was completely integrated or non-integrated. A single study reported on the impact of the programme. Secondary prophylaxis adherence improved among partially integrated RHD programmes (RR, 1.18 [95% CI, 1.03 to 1.36], 3 studies, n=618). Risk of bias was low in two studies, and indeterminable in the remaining three studies.

Conclusions:
There is evidence that partially integrated RHD programmes are beneficial for a number of study outcomes. This review provides a starting point for the design and implementation of future RHD programmes by outlining current best practice for integration and identifying key gaps in knowledge.

Title: **MORBIDITY AND MORTALITY OF PAEDIATRIC POISONINGS AT A CHILDREN'S HOSPITAL IN SOUTH AFRICA**

Authors: Kate Balme and Cindy Stephen

Affiliation: Department of Paediatrics Poisons Information Centre, Red Cross War Memorial Children's Hospital and University of Cape Town, Cape Town, South Africa

Objective:
According to the WHO World report on child injury prevention, poisoning comprises a significant component of injury-related disease, and poisoned children in low- and middle-income countries are four time mores likely to die than those in high-income countries. [1] The few South African paediatric publications show similarities in age-group and causative substances, but reveal a paucity of data on morbidity and mortality. [2-4]

Methods:
Cases were identified by review of the Red Cross War Memorial Children's Hospital (RCWMCH) Poisons Information Centre Clinical Poisonings Database records from 2003 to 2017.

Results:
There were a total of 5867 cases; the majority were under 5 years (n=4904, 84%). A single toxin was implicated in 5347 cases (91%). Of these, kerosene was the most common specific substance (n=1206, 23%) and medications the largest group of substances (n=1942, 36%), followed by pesticides (n=662, 12%) and household products (n=652, 12%). Most patients (n=4459, 83%) were asymptomatic or mildly symptomatic (Poisoning Severity Score (PSS) ≤1). Children with moderate and severe poisonings (n=880; PSS ≥2) had a median hospital stay of 3 days (range 0-69 days) and included 16 deaths (0.3%) due to pesticides (n=8), medications (n=6) and kerosene (n=2). Further analysis of this subgroup (PSS ≥2) by substance and median hospital stay showed that pesticides (n=270, 4 days) caused greater toxicity than medications (n=270, 1 day), kerosene (n=181, 1 day) and household products (n=57, 1 day).

Conclusion:
The increased morbidity and mortality of paediatric pesticide poisonings exposes the need for appropriate medical training in the management of such poisonings. Furthermore, the large proportion of kerosene and pesticide cases, advocates for continued commitment towards socioeconomic upliftment of the South African population at large.

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Poster presented at European Association of Poisons Centres and Clinical Toxicologists (EAPCCT) annual conference in Naples Italy (May 2019). Abstract published in associated journal, Clinical Toxicology. Ref: Balme K, Stephen C. Morbidity and mortality of paediatric poisonings at a children's hospital in South Africa. Clin Toxicol (Phila) 2019;57(6):544-545. (Abstract 263)

Ethics: HREC REF 490/2008

Title: **AN AUDIT OF THE INTRODUCTION OF A PAEDIATRIC EARLY WARNING SYSTEM (PEWS) AT RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL (RCWMCH)**

Authors: Bastian C, Ramplin C, Hendricks Y, Weakley M, Xoli N, Blows Z, Franken M, McCulloch M.

Affiliation: Nursing Administration, PGWC (Presenter)

Introduction:
Paediatric patients require regular observation to ensure early detection of deterioration. PEWS is a scoring system that helps nurses assess paediatric patients objectively using vital signs in any paediatric setting.
Internationally, PEWS implementation has provided evidence that early detection of patients at risk can improve patient outcomes by assisting in averting cardiac arrests and admissions to ICU.
This project was initiated at RCWMCH through the Resus Review Committee.

Objective:
Review of introduction of PEWS scoring system at RCWMCH which assessing the patient's clinical status and indicating a response to specific signs.

Methods:
Pilot trial done in different wards (4) in 2017 followed by review of the PEWS form.
Audit of introduction of PEWS instrument using 9 simple physiological parameters forming the basis of the scoring system adapted from an international system and adapted to a South African context.

- To identify signs that may indicate increased risk of patient deterioration and respond quickly so that the need for patient resuscitations is reduced.
- To avoid preventable deaths.
- To generate clear, timeous and accurate communication to multidisciplinary team.
- To prevent patient harm.
- To standardized an observation tool in the entire hospital.

Results:
Review period March 2018 – June 2019. Documentation standards found 196 PEWS forms correctly completed out of 198 audited.
Parameters included Respiratory Rate, Oxygen therapy, Heart Rate, AVPU score, Oxygen saturations, Glasgow Coma Score(GCS), Blood Pressure and Pain Scale. Of these GCS and Pain Scales were found not to be completed.
Escalation was compliant with both doctors and nurses responding to triggers improving communication
Clinical picture showed variances within parameters reflected in clinical notes of doctors or nurses.
Forty Eight "Red Box" resuscitation events occurring within office hours in 29 cases, 17h30 – 19h00 in 10 cases and 23h00 – 02h00 in 9 cases.

Conclusions:
The PEWS chart which has been modified to suit a South African Context, as a supporting tool, has been introduced with good completion compliance and has assisted us in recognising the sick child early, acting timeously and reducing resuscitations.

Title: **PHENOTYPING CRANIOSYNOSTOSIS IN THE SOUTH AFRICAN POPULATION**

Authors: I. Crous[1], JMN. Enslin[2] and K. Fieggen[1]

Affiliation: [1]Division of Human Genetics, University of Cape Town; [2]Division of Neurosurgery, Red Cross War Memorial Children's Hospital

Objectives: What is Craniosynostosis?
Craniosynostosis describes the premature fusion of the sutures of the skull, which results in restricted growth potential of the skull bones. Compensatory growth subsequently occurs in the dimensions not restricted by fusion and causes progressive distortion in the skull shape. Craniosynostosis can either occur in isolation or as part of a syndrome. In syndromic cases there are usually other dysmorphic features and/or developmental abnormalities. There are important associations and complications that occur with these conditions including sensory, respiratory and neurological functional impairment. It is therefore an important condition to detect and treat appropriately early.

Although both genetic services and a dedicated craniofacial clinic have been running at Red Cross War Memorial Children's Hospital (RCWMCH) for around 3 decades, craniosynostosis in the South African population is not well delineated.

Methods:
This study has two parts:

- A retrospective review of hospital records over a 5-year period (January 2014 to December 2018) of children diagnosed with craniosynostosis through the genetic or craniofacial clinics at RCWMH was conducted. Twenty two individuals were enrolled thus far
- A prospective detailed phenotyping study of all patients attending the craniofacial clinic between May and July 2019 was conducted. Two individuals have been identify thus far.

Information noted on a standardised data capture sheet and added to an electronic database for further analysis.

Results:
The study has just commenced but preliminary results on the demographic profile, diagnoses, surgical interventions and clinical phenotype for half of the prospective cohort and most of the retrospective cohort will be presented.

Conclusion:

- Craniosynostosis is described worldwide and many cases are reported in European literature.
- It is not well described in South Africa and the rest of the African continent.
- Accurate phenotyping of patients with craniosynostosis will contribute to better understanding in the African context.
- A multidisciplinary approach, including consultation with a Medical Geneticist, may improve health outcomes.
- Molecular Genetic diagnoses guides early management and may infer prognosis

HREC REF: 774/2018

Title: **PARENTAL PERSPECTIVES REGARDING THE RETURN OF GENOMIC FINDINGS IN NEURODEVELOPMENTAL DISORDERS – A SOUTH AFRICAN STUDY**

Authors: Diedericks, A.; Laing, N.; Donald, K.A.; de Vries, J.

Affiliation: Division of Human Genetics, Department of Pathology, University of Cape Town (Presenter)

Introduction:
There is a lack of policies and research regarding the disclosure of results in genomic research, especially in South Africa. Challenges remain regarding the disclosure of genomic research results to research participants and their families, which may partly be addressed by considering parental and participants' preferences. This study serves as a sub-study to the NeuroDev study of South Africa; which is performing genotyping and exome sequencing on children with Neurodevelopmental disorders in the Western Cape; and will investigate a feedback of findings method pertaining to the needs and preferences of the patient community.

Research Question:
How NeuroDev research participants consenting to the return of positive individual NDD-related genetic results understand what they have consented to

Subjects and Methods:
- Pragmatic qualitative approach
- 15 - 20 semi-structured, in-depth interviews with the parents of the children participating in the NeuroDev study
- Thematic analysis used to analyze data generated

Results:
- Participants failed to understand how and what would be tested for in the blood even after consenting for bloods to be taken and for storage for future use;
- Less than half understood that the study is looking for a cause for *all* neurodevelopmental disorders;
- Therapeutic misconception - some believed that the study would bring answers about their child's condition or increase awareness, others hoped for the increase in resources.

Discussion/Conclusion:
- Many concepts of informed consent were understood by the research participants, however certain elements regarding the study (such as genetic concepts, feedback of results and perceived benefits) created confusion.
- There is participant need to be involved in the genomic research process with full disclosure as events unfold.
- Participants understood basic concepts of genetics, however, heredity remains a complicated topic.
- Genetics education is needed within the South African community to ensure fully informed consent in genomic research.

HREC REF: 784/2018

Title: **THE INTERGENERATIONAL IMPACT OF CHILD SEXUAL ABUSE AMONG MOTHERS IN SOUTH AFRICA: A SYSTEMATIC REVIEW (Preliminary findings)**

Authors: Natasha Hendricks[1] and Prof. Shanaaz Mathews[1]

Affiliation: [1]Children's Institute, University of Cape Town, Cape Town, South Africa

Background:
Child sexual abuse (CSA) is a global phenomenon and endemic in South Africa. CSA has been associated with a range of health and psycho-social problems affecting women over their lifespan. Limited studies in low to middle-income countries focus on the intergenerational impact of CSA and its impact on the next generation.

Objective:
To review the current international and national published knowledge surrounding the intergenerational impact of mothers' experiences of CSA and its effects on motherhood in South Africa and other low to middle-income countries.

Method:
A systematic review of literature was conducted using electronic databases; PubMed, Ebscohost and Google Scholar, to identify journal articles as well as masters and doctoral dissertations, published between 1998 to 2018. Search strategies using controlled vocabulary and key MESH terms including intergenerational transmission or intergenerational impact, child sexual abuse, child sexual assault, child sexual victimization, rape, motherhood, mothering, parenting and parenting practises as well as child*, mother* and parent*. Boolean operators "AND" and "OR" were used to combine the terms. For inclusion in this review, studies had to a) be peer-reviewed b) contain empirical data c) provide information about the intergenerational impact of mothers who have experienced child sexual abuse d) include female adult participants who were mothers e) be published in English and f) be a masters or doctoral dissertation.

Results:
A total of 562 records were identified of which only 26 studies were included for data extraction. Most studies were from high-income countries with only one master's dissertation from South Africa, a low to middle-income country. The initial findings show that mothers who are survivors of CSA are more likely to have a child who has also experienced CSA. Most studies indicate that mothers who have a history of CSA are at an increased risk of practicing negative parenting styles including corporal punishment, experiencing parental dissatisfaction, depression and anxiety during motherhood.

Conclusion:
Mothers' CSA experiences had a harmful effect on both mother and child. Further research is needed to explore the complex intergenerational impacts of CSA on experience of mothering and their children, particularly in low-socioeconomic and marginalized communities, in order to inform interventions to reduce the intergenerational impact of CSA.

Title: **THE USE OF MULTISTRAIN PROBIOTICS IN PREVENTING LATE ONSET SEPSIS IN INBORN NEONATES <1200G**

Authors: G. Lupton-Smith, M. Abrahams, I Els-Goussard

Affiliation: Neonatal ICU, George Provincial Hospital (Presenter)

Objective:
To determine the incidence of

- Late onset sepsis
- Deaths due to sepsis
- Resistance pattern of causative organisms

In neonates receiving multi-strain probiotics in the NICU of a developing country, in which strict sepsis control guidelines and a single strain probiotic has been in use since June 2017.

Method:
A prospective longitudinal study over a 6 month period (February — July 2019) in a neonatal intensive care unit in a secondary level hospital in the Western Cape, South Africa. All neonates admitted to the NICU with birth weight 88g-1200g were included. The participants received 0.075ml of Labinic Drops ™, a triple strain probiotic, per day, for minimum one week duration, or until weighing 1200g. All neonates were critically observed daily for signs of late-onset sepsis defined as

- A positive blood, urine and/or cerebro-spinal fluid culture, and
- Suggestive infective markers (WCC and CRP)
- Occurring >72 hours after birth

In cases of a positive culture, the resistance patterns were analysed and compared to those documented prior to the introduction of Labinic Drops ™.

Results:
31 Neonates (11% of NICU admissions during the 6 month period) met our inclusion criteria. The mean weight was 1008g with the majority of participants being male (58%) and 73% born via Caesarian Section.
A decrease in both sepsis episodes and deaths due to late onset sepsis was observed since introducing Labinic Drops™. With a 7 times decrease in the number of sepsis episodes from 2016 (in the same population over February-July 2016) and deaths decreasing from 5 to a single death in the same population for the same period as above. A significant reduction in the incidence of ESNL Klebsiella as well as a number and variety of other bacteria cultured was observed. During the study period, 1 positive culture was documented, for a Klebsiella pneumoniae sensitive to our second line treatment (Piptaz and Amikacin). In previous years (from 2016) we documented up to 4 ESBL KlebsiellaSpecies in the same period for the same population.

Conclusion:
Despite an increase of 6% in total deliveries at George Hospital since 2016, there has been a decrease in the incidence of sepsis. Since introducing Labinic Drops™, we have observed not only a decrease in sepsis episodes, but in deaths and the resistance patterns of the organisms cultured.
No cases of Necrotising Enterocolitis and no adverse effects of Labinic Drops™ were reported during our study period.
Multistrain Probiotics are a cost effective and safe food additive in a resource limited setting. We recommend that they should be included in NICU Sepsis Control Guidelines and Practices.
Short comings identified were the small sample size and limited time period. Future studies should focus on overcoming these pitfalls, neonates with birth weights >1200g and additional interventions to reduce sepsis in the NICU.
We are continuing our data collection and study period until February 2020 in order to gain more insight and increase our sample size.

Title: **EXPLORING CAREGIVERS' EXPERIENCES, PERSPECTIVES AND EXPECTATIONS FOR PRECISION MEDICINE IN EPILEPSY IN SOUTH AFRICA**

Authors: Irene Muchada, A/Prof Karen Fieggen, Nakita Laing, Dr Elin Haf Davies

Affiliation: Department of Pathology, University of Cape Town (Presenter)

Objective:
The current study, conducted in a resource limited South African public sector setting, sought to explore caregivers' experiences, perceptions and expectations towards the Precision Management of Epilepsy (PME) initiatives for optimising care for children with epilepsy, including the experience of the technology used. The PME project, which is focusing on individualising care using remote monitoring mobile health technology and genetic and pharmacogenomic testing, is underway at the University of Cape Town and the feasibility and acceptability of such initiatives, especially the technology, has not been investigated. Feasibility and acceptability of new innovations is dependent on caregivers whose role in managing epilepsy is indispensable. This sub-study aims to better understand the caregivers' perceptions and expectations of the PME initiatives in the care of children with epilepsy, to inform the feasibility of implementing these initiatives in SA.

Methods:
Ethical approval was obtained from UCT for this qualitative study (HREC 775/2018). Twelve participants were purposively recruited from a cohort of 50 caregivers to children with refractory epilepsy attending the epilepsy clinic services at Red Cross War Memorial Children's Hospital in Cape Town, SA and in the PME study. Face to face semi-structured interviews were conducted and themes were extracted using thematic framework approach.

Results:
The knowledge of cause of epilepsy was limited for most participants whose perceptions as to the cause varied from medical to spiritual to traditional. The poor seizure control even when the child is on medication has resulted in an ongoing desperate search for sources of cure in the hope for finding the right medication(s) and dose and has impacted on adherence to medication. Despite having consented to take part, most of the participants showed a lack of understanding of what the PME was about. However, most of them felt that if properly implemented, these measures would be beneficial in caring for children with epilepsy. The devices introduced new feelings and challenges. The four themes which emerged were: 1) Cause of epilepsy; 2) The need for healing; 3) PME and the devices; 4) Feasibility.

Conclusions:
The cause of epilepsy was generally misunderstood, and caregivers felt that PME could help unlock the unknown cause of the refractory epileptic seizures. Most caregivers harbour insecurities about the treatments' efficacy profile and are in constant search for optimal therapy. Adherence to medication was central to the controlling of seizures though it was inconsistent for most. The devices, particularly the phone, was perceived to be helpful especially in improving adherence, but they created an additional burden for many participants.

HREC REF: 775/2018

Title: **CONNECTING THE DOTS: ALLAN-HERNDON-DUDLEY SYNDROME**

Authors: A. Roos, K. Barrow, A. Ramcharan, C. Spencer

Affiliation: Division of Human Genetics, University of Cape Town (Presenter)

Introduction:
Allan-Herndon-Dudley syndrome (OMIM #300523) is a rare X-linked disorder caused by mutations in the *SLC16A2* gene. Clinical features include severe cognitive delay, hypotonia in infancy and progressive spasticity of the extremities. Abnormal thyroid functions tests (TFT's) comprising of normal to slightly increased thyroid-stimulating hormone (TSH), low to normal thyroxine (T4), and increased triiodothyronine (T3), are pathognomonic of this condition.

Case report:
A seventeen-month-old boy with global developmental delay and spastic cerebral palsy was referred for genetic evaluation due to a family history of a four-year-old male sibling who had been diagnosed with severe spastic cerebral palsy. They shared a similar clinical phenotype including microcephaly, truncal hypotonia and increased tone in both upper and lower limbs. TFT's in the proband indicated a normal TSH, a low T4 and a high T3, which strongly supported a diagnosis of Allan-Herndon-Dudley syndrome.

Discussion:
The family history, clinical features and distinctive thyroid functions are compatible with a clinical diagnosis of Allan-Herndon-Dudley syndrome. An accurate diagnosis is invaluable in the management and prognosis of this child and his brother. Equally, the X-linked inheritance has significant implications for at risk family members. This case illustrates the importance of a thorough history and clinical examination, including review of all previous biochemistry testing when assessing a patient. This is especially relevant in rare genetic conditions, but forms the basis of good clinical practice.

Title: **A 3-YEAR ANALYSIS OF SNAKEBITE REPORTED TO THE SOUTH AFRICAN POISONS INFORMATION SERVICE: 2015-2018**

Authors: Cindy Stephen[1], Kyle Ragins[2], Kate Balme[1], Cherylynn Wium[3]

Affiliation: [1]Poisons Information Centre, Red Cross War Memorial Children's Hospital and Faculty of Health Sciences, University of Cape Town, South Africa; [2]Department of Emergency Medicine, University of California, Los Angeles, United States of America; [3]Tygerberg Poisons Information Centre, Division Clinical Pharmacology, Stellenbosch University, Cape Town, South Africa

Objective:
Snakebite was listed by the World Health Organisation as a neglected tropical disease in 2009 yet it remains a significant cause of human suffering, disability and death.[1] In sub-Saharan Africa, comprehensive epidemiological data are scarce. This study aims to provide an analysis of snakebite cases reported to South Africa's largest database of poisons calls over a 3-year period.

Methods:
The Poisons Information Helpline (PIH) of the Western Cape is a combined service provided by two Poisons Information Centres in Cape Town, South Africa. It provides a 24-hour, 7 days-a-week hotline that can be reached by members of the general public and health professionals throughout South Africa for help with managing poisonings. All call data from June 2015 to May 2018 were retrospectively analysed for calls related to snakebite.

Results:
During the 3-year period, 28,561 patient-related poisoning calls were received by the PIH of which 777 (2.7%), described snakebite. The majority of patients were male (69.2%; n=538) and the mean age was 29 years. Most snake bites occurred in summer (43.5%; n=338).
The exact identity of the snake was known in 209 calls (26.9%). With respect to clinical presentation, 28.4% (n=221) of patients showed signs of cytotoxic envenomation, 10.4% (n-81) of neurotoxic, and 4.2% (n=33) of haemotoxic envenomation. Snake venom ophthalmia was recorded in 72 calls (9.3%). The clinical severity of envenomation was graded as moderate in 22.8% and severe in 4.0%. Two deaths were reported, both due to the Cape cobra (*Naja nivea).* Antivenom administration was advised in 95 calls (12.2%).

Conclusion:
This study summarises a large number of snakebite calls reported to the PIH in South Africa. Although poisons centre call data has inherent limitations, this study contributes valuable data not previously described. Further research is needed to fully ascertain the epidemiology of snakebite in South Africa.

References:

1. Williams D, Gutiérrez JM, Harrison R, et al. The Global Snake Bite Initiative: an antidote for snake bite. Lancet. 2010 Jan 2;375(9708):89-91

Ethics: HREC REF R014/2014

Mini-oral presentation of abstract given at the 17th Annual Scientific Conference of the Asia Pacific Association of Medical Toxicology (APAMT) annual conference in Bali, Indonesia (November 2018).

Title: **AN ANALYSIS OF PESTICIDE EXPOSURES REPORTED TO THE SOUTH AFRICAN POISONS INFORMATION SERVICE OVER A 3-YEAR PERIOD**

Authors: Cindy Stephen[1], Kyle Ragins[2], Farahnaz Mohamed[1], Catharina Du Plessis[3]

Affiliation: [1]Poisons Information Centre, Red Cross War Memorial Children's Hospital and Faculty of Health Sciences, University of Cape Town, South Africa; [2]Department of Emergency Medicine, University of California, Los Angeles, United States of America; [3]Tygerberg Poisons Information Centre, Division of Clinical Pharmacology, Stellenbosch University, Cape Town, South Africa

Objective:
Only 10 poison information centres are recognised by the World Health Organisation in sub-Saharan Africa (SSA). As a result, relatively little is known about the characteristics of calls received by poison information centres (PICs) in SSA or the epidemiology of poisonings as a source of morbidity and mortality in the region.[1] This study provides an analysis of the largest known database of calls to PICs in South Africa to determine the burden of calls related to pesticide exposures.

Methods:
The Poisons Information Helpline (PIH) of the Western Cape is a combined service provided by two PICs in Cape Town, South Africa. It provides a 24-hour, 7 days-a-week hotline that can be reached by members of the general public and health professionals throughout South Africa for help with managing poisonings. All call data from June 2015 to May 2018 were retrospectively analysed for calls related to pesticides.

Results:
During the 3-year period, 28,561 human-related poisoning calls were received by the PIH. Of these, 3,724 (13.0%) described poisonings with insecticides or rodenticides, while 453 (1.6%) described poisoning with herbicides or fungicides.
Over one-third of pesticide exposures were intentional (34.1%, n=1,390), and 17.8.% (n=248) were teenagers.
Cholinergic pesticides accounted for 17.3% (n=704) of calls, followed by anticoagulants (14.7%, n=600). Pyrethroids were also frequently identified (10.0%, n=407). Although paraquat was only identified in 1.3% (n=53) of calls, most deaths were recorded due to this herbicide.

Conclusion:
This epidemiological description of pesticide exposures reported to PICs in South Africa indicates that pesticide exposures constitute a substantial percentage of the call burden received by the PIH. Additional research is needed to determine if these numbers are typical of PIC data in other SSA countries and whether regulatory efforts have been effective in reducing pesticide poisonings in low- and middle-income countries.

References:

1. Balme K, Roberts JC, Glasstone M, et al. Pesticide poisonings at a tertiary children's hospital in South Africa: an increasing problem. Clin Toxicol (Phila). 2010 Nov;48(9):928-34.

Ethics: HREC REF R014/2014

Poster presented at the 17th Annual Scientific Conference of the Asia Pacific Association of Medical Toxicology (APAMT) annual conference in Bali, Indonesia (November 2018).

Title: **CHILDHOOD POISONING EXPOSURES IN SOUTH AFRICA: A REVIEW OF CALLS TO THE POISONS INFORMATION HELPLINE OF THE WESTERN CAPE 2015-2016**

Authors: Cindy Stephen[1], Farahnaz Mohamed[1], Kate Balme[1], Carine Marks[3]

Affiliation: [1]Department of Paediatrics Poisons Information Centre, Red Cross War Memorial Children's Hospital and University of Cape Town, South Africa; [3]Tygerberg Poisons Information Centre, Division Clinical Pharmacology, Stellenbosch University, Cape Town, South Africa

Objective:
Childhood poisoning accounts for 4% of injury-related childhood deaths and 11% of childhood injury-related morbidity. In low-and-middle-income countries, the death rate is estimated at four times higher than in high-income countries.[1] Poison centre call data is an important source of information for health planning and is essential to the toxicovigilance role of poisons centres.[2] Such call data are scarce worldwide, particularly in the developing world.[3] In June 2015, emergency poisoning telephone services at the Poisons Information Centre (PIC) in Red Cross War Memorial Children's Hospital (RCWMCH) and the Tygerberg PIC were combined to create the Poisons Information Helpline of the Western Cape (PIH). This telephone service operates 24-hours throughout South Africa and is available to both medical personnel and the public.

Methods:
Call data are entered real time into the custom designed AfriTox® TeleLog database which uses FileMaker® software. Calls are categorised as patient-related (human or animal exposure), general (poisoning information) and non-PIH (unrelated to poisoning).

Results:
The PIH received 10515 calls during the first 12 months of operation. Calls were received from all nine provinces within South Africa. Over 60% of calls were received after-hours (61%, n= 6 425) and the busiest months were November to January.
Of the total calls, 82% (n=8432) were human patient-related calls and the majority of callers were medical personnel (66%, n=5592). Over half the calls came from state hospitals (56%, n=3124), a quarter (23% , n=1260) from private hospitals, and the remainder from CHCs, private practitioners and other health facilities.
Children under five years accounted for 48% (n=4004) of patient-related calls. The most common exposures were to pharmaceuticals (38%, n=1565), followed by household products (16%, n=674) and pesticides (13%, n=529). Regarding outcomes, 30% (n=1172) of callers were advised to provide medical observation and for 36% (n=1428) home observation was advised. In 14% (n-540) of calls, no further management was required.

Conclusion:
Childhood poison exposures account for almost half of all calls received on national PIH. The exposure profile of these patients can be well described using the AfriTox® TeleLog, which has become a valuable source of real-time poisoning data in South Africa.

References:

1. World report on child injury prevention 2008. WHO & UNICEF. Eds. Margie Peden et al.
2. World Health Organization Poisons Centre Training Manual: Trainer Version, WHO 2013
3. Balme K, Roberts JC, Glasstone M, et al. The changing trends of childhood poisoning at a tertiary children's hospital in South Africa. S Afr Med J 2012; 102:142-6.

Ethics: HREC REF R014/2014

Poster presented at 7th Child Health Priorities Conference in Cape Town, South Africa (December 2016).

Title: **SINGLE CENTRE EXPERIENCE OF CONGENITALLY CORRECTED TRANSPOSITION OF THE GREAT ARTERIES OVER 17 YEARS**

Authors: Lenise C. Swanson[1], John B. Lawrenson[2], George A. Comitis[1], Andre Brooks[3], Liesl J. Zühlke[1,4]

Affiliation: Division of Paediatric Cardiology, University of Cape Town (Presenter)

Introduction:
Congenitally corrected transposition of the great arteries (ccTGA) is a rare and complex cardiac anomaly characterized by a combination of discordant atrioventricular and ventriculo-arterial connections.

Objective:
To describe the most-commonly associated cardiac defects, management strategies and outcomes of patients with congenitally corrected transposition of the great arteries in Cape Town as well as to identify patients needing additional intervention.

Methods:
We reviewed all patients diagnosed with congenitally corrected transposition of the great arteries between 1 January 2000 and 31 August 2017.

Results:
Thirty-six patients were identified (19 male, 52,8%). The median age at presentation was 5,0 months (interquartile range 1.45 – 19.24 months). The chief presenting complaints were cyanosis (52.8%), murmurs (50.0%) and respiratory distress (19.4%). Ventricular septal defects (80.5%), pulmonary stenosis (50.0%) and PDA (30.5%) were the most commonly associated cardiac lesions. Eleven patients were suitable for biventricular repair for which five double switch operations and one Senning-Rastelli were performed. One patient is awaiting a Senning-Rastelli procedure. Five patients have undergone pulmonary banding procedures only. Nine patients had been selected for the univentricular pathway, with four Glenn shunts and three Fontan operations completed. Two patients had central shunts only. Four patients (11.1%) were considered to be inoperable due to the complexity of their cardiac anatomy. Complete heart block was present in three patients (8.3%) and two patients required permanent pacemaker implantation. In total, 11 patients (30.5%) had not been seen for >24 months.

Conclusion:
We demonstrate a varied surgical approach to patients with congenitally corrected transposition of the great arteries over almost two decades. While surgical procedures have shown to be successful, long-term follow-up is necessary to monitor for late onset complications. This remains a challenge in our setting.

Human Research Ethics Committee Reference number 840/2017