SCHOOL OF CHILD & ADOLESCENT HEALTH

UNIVERSITY OF CAPE TOWN

ANNUAL RESEARCH DAYS 2008

Courtesy of J Wilmshurst
With Permission

Programme and Abstract Book

21st & 22nd October

Nursing Education Function Hall, Johnson & Johnson Building

Red Cross Children's Hospital

CPD Points

Tuesday, 21st October 2008 ***4 points***
Wednesday, 22nd October 2008 ***7 points***

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

PROGRAMME AND CONTENTS PAGE

16H30 – 16H45	Primary HIV prevention among young people: Are we fighting a forest fire with teaspoons of water?	R Kareithi	15
16H45 – 17H00	Demographic clinical and allergic characteristics of patients attending the Allergy Clinic	S Karabus	16
17H00 – 17H15	A prospective evaluation of a simple method of inducing and maintaining hypothermia for term infants with Hypoxic Ischaemic Encephelopathy	A Horn	17

Wednesday, 22nd October 2008

Session 3: Chairperson: **P Hartley**

08H30 – 08H45	The incidence of the 22Q11.2 deletion syndrome in children referred to the cardiology service at the Red Cross Children's Hospital, Cape Town, South Africa: A prospective study	R De Decker	18
08H45 – 09H00	A review of the practice of a staged approach for biventricular repair in Red Cross Children's Hospital over the past 6 years: Is the placement of a pulmonary artery band safer in perceived high risk cases	A Geldenhuys	19
09H00 – 09H15	Focus on 2007: A clinical audit of the Red Cross War Memorial Children's Hospital Paediatric Cardiac Surgery Program	R Duffy	20
09H15 – 09H30	A child with restrictive – constrictive disease: The diagnostic conundrum continues	G Comitis	21
09H30 – 09H45	G-CSF does not confer a survival advantage in patients with Burkitt Lymphoma (Group B) treated on the LMB 89 protocol at Red Cross Children's Hospital	M Hendricks	22
09H45 – 10H00	Paediatric acute myeloid leukaemia: The role of transplantation at the Red Cross Children's Hospital	A Davidson	23
10H00– 10H15	Serum immunoglobulin levels in children on treatment for acute lymphoblastic leukaemia (ALL)	A Van Eyssen	24
10H15– 10H30	Malignancies and HIV in children at Tygerberg Hospital	C Stefan	25
10H30 – 11H00	**T E A & POSTERS**		

15H00 – 15H15	Culture-confirmed tuberculosis at Red Cross Children's Hospital	D Moore	38
15H15 – 15H45	**T E A & POSTERS**		
Session 6: Chairperson:		**J Wilmshurst**	
15H45 – 16H00	Clinical practices around children who die at the Red Cross Children's Hospital – An exploration of *responsibility* as central to practice	M Coetzee	39
16H00 – 16H15	Audit of poisoning cases presenting to Red Cross Children's Hospital	K Dacombe	40
16H15 – 16H30	Audit of paediatric blood cultures performed at New Somerset Hospital from 01/09/2005 to 01/09/2006	D Black	41
16H30 – 16H45	Rapid rehydration for dehydration in gastroenteritis: Safety in a busy rehydration unit	A Westwood	42
16H45 – 16H50	***Closing remarks and Junior Research Award***	***G Swingler***	

Poster Presentations **Page No.**

Title: **CONTINUOUS FLOW PERITONEAL DIALYSIS (CFPD) IN CHILDREN: A NEW TECHNIQUE FOR ACUTE RENAL FAILURE IN THE INTENSIVE CARE UNIT.**

Authors: P. Nourse[1,2], R.Raaijmakers[1,2,3], P. Gajjar[1], C.H.Schroder[4], M.I. McCulloch[1] A Argent [1]

Department: [1]Dept of Paediatric Nephrology, Red Cross Children's Hospital, Cape Town, South Africa, [2]Dept of Paediatric Nephrology, Tygerberg Hospital, Cape Town, South Africa [3]Dept of Paediatric Nephrology, Radboud University Nijmegen Medical Centre, The Netherlands, [4]Dept of Paediatrics, Gelre Ziekenhuis Apeldoorn, The Netherlands

Introduction:
Acute renal failure can be treated with peritoneal dialysis (PD), hemodialysis (HD) or continuous venovenous hemofiltration (CVVH), depending on the clinical status of the patient as well as the resources of the hospital. PD can be performed in clinical situations less suitable for HD and CVVH, like hypotension, difficult venous access or coagulation problems. The main disadvantage of PD is the limited efficacy compared to HD and CVVH. With continuous flow peritoneal dialysis clearances and ultrafiltration could be significantly enhanced.

Objective:
To establish a technique for doing CFPD in small children with acute renal failure

Methods:
A pilot study was performed in the ICU in The Red Cross University Hospital in Cape Town in three patients with acute renal failure. The 3rd patient only received CFPD. CFPD was performed with two bedside placed catheters; the first conventionally placed in the midline, the second one placed midway between the superior iliac crest and the umbilicus. After initial filling, dialysate flowrate (100 ml/1.73m2/min) was maintained with an adapted CVVH machine, and ultrafiltration flow rate was set at 2.5 ml/1.73m2/min. After 4 hours the abdomen was drained and UF recalculculated and adjusted if needed.

Results:
In all three patients the technique of CFPD worked well. When compared to conventional PD clearances were improved 3-4 fold . Ultrafiltration was also improved despite using only low glucose concentration. No complications of dialysis occurred. Patient 1 and 2 had recovery of renal function, patient 3 died of ongoing sepsis.

Conclusions:
The technique of CFPD was effective in these three patients with no adverse events. Clearances and ultrafiltration capacity was improved when compared to conventional PD.

Title: **EPIDEMIOLOGY/AETIOLOGY OF ESRF AMONG RENAL TRANSPLANT RECIPIENTS AT RED CROSS CHILDRENS' HOSPITAL, CAPE TOWN**

Authors: Antwi S, Gajjar P, Burger H, Sinclair P, Savage L, Nourse P, Wiggelinkhuizen J, Maythem D, Van Dugteren G, Morrison C, McCulloch M

Department: Dept of Paediatric Nephrology. Red Cross Childrens' Hospital, University of Cape Town, Cape Town

Introduction:
ESRF defines the stage of chronic renal failure at which renal replacement therapy becomes necessary. Available report indicates that renal diseases in children from developing countries are related to preventable conditions largely eradicated from developed countries.

Aim and Method:
Retrospective, folder review of paediatric renal transplant recipients at Red Cross Children Hospital from January 1996 to March 2008 to determine the epidemiology and aetiology of ESRF.

Results:
114 kidney transplantations involving 105 children. 9 cases were re-transplantations.
Gender: 58 (55.2%) males, 47 (44.8%) females
Race: 16 (15.3%) whites, 35 (33.3%) blacks, and 54 (51.4%) mixed race.
Age at transplant: 1 yr 11 mo to 18yrs 5mo (Average 11yr 2 mo).
Weight at transplant: 10kg to 56kg (Average 25.9kg). 20 (19%) patients: 10-15 kg.
Origin of patients: 6 out of 9 provinces with 27.6% coming from eastern province.
Donor type: 29 patients (27.9%) received pre-emptive transplant. 81 (71.0%) out of 114 grafts from cadaveric source, 32 (28%) living related, 1 (1%) living non-related. Six patients received combined kidney-liver transplantation.
Aetiology of ESRF: congenital abnormalities and hereditary nephropathies together were the leading causes of ESRF, accounting for 54 (51.4%) of all cases.
Among black children, congenital abnormalities and hereditary nephropathies together accounted for 42.8% of cases.

Conclusion:
Leading causes of ESRF in this study were not preventable as earlier reports suggested but largely determined prenatally. Efforts should therefore be directed at early diagnosis, prenatally, to allow for early interventions to slow down progression to ESRF.

. **Title:** **MODIFIED SHORT PERITONEAL EQUILIBRATION TEST'S (PET) IN SOUTH AFRICAN CHILDREN ON PERITONEAL DIALYSIS**

Authors: Nourse P, Gajjar P, McCulloch M

Department: Red Cross and Tygerberg Children's Hospital, Paediatric Nephrology Departments, Cape Town, South Africa

Introduction:
The 'short PET' test is more appropriate in resource limited settings and is less cumbersome for staff and small patients. In our PET test a single blood test is taken at two hours and dialysate samples are taken at two and four hours. At the same time the weekly KT/V and creatinine clearances are calculated.

Objective:
To determine they transporter status of our dialysis population. To compare two hour to four hour transporter status results.

Methods:
Retrospective evaluation of PET data obtained from 21 children receiving peritoneal dialysis in a single centre. A four hour modified short PET was done on each patient after about a month on peritoneal dialysis. The fill volume was 1100ml/m2 of Dianeal 2.5%. Blood samples for creatinine were taken at 2hrs and dialysate samples were taken for creatinine only at 2 hrs and 4 hrs. The D/P ratios for creat were determined at 2 and 4 hours and plotted on the reference curves by Warady. Weekly KT/V's and creatinine clearances were also calculated. The 2 hour and 4 hour Transporter status for each patient were compared.

Results:
21 patients were audited. Average age was 113 months (range15-192). 8 children were high transporters, 7 were high average, 3 were low and 3 were low average transporters. Mean KT/V (dial) was 2.54(SD=0.6). Mean Creat clearance/173m2 was 67(SD =20). There was no statistical difference between the 2hr and 4hr transporter status.

Conclusion:
South African children on peritoneal dialysis are high or high average transporters in most cases. Adequate clearances were achieved in the vast majority of cases. No extra information was gained by continuing the test for four hours and we have therefore started doing the 2hr short PET test.

Title: **EVALUATION OF TACROLIMUS THERAPY IN CHILDREN WITH STEROID-RESISTANT AND STEROID-_DEPENDANT NEPHROTIC SYNDROME**

Authors: M McCulloch, P Gajjar, L. Savage, P. Sinclair, J. Wiggelinkhuizen, D. Maytham, G. van Dugteren, C. Morrison.

Department: Renal Unit, Red Cross Childrens' Hospital

Introduction:
Steroid-resistant and steroid-dependant forms of nephrotic syndrome remain a therapeutic challenge, with a variety of treatment options having been tried in the past. However, the majority of therapies report less than 50% efficacy, and these children have a high incidence of progression to renal failure. Early reports of Tacrolimus therapy in this group of patients have shown promising results.

Objective:
To evaluate the efficacy of Tacrolimus in the treatment of children with steroid-resistant/dependant nephrotic syndrome at Red Cross Childrens' Hospital.

Method:
We undertook a retrospective study of all children with nephrotic syndrome who received Tacrolimus.

Results*:*

DEMOGRAPHICS: No. of patients	12	
	Gender	6 male, 6 female
	Race	10 Mixed race
		1 Indian
		1 Black
	Mean age	10.1 years
		(range 1.9-17.4 yrs)
	Mean age at diagnosis	4.6 years
BIOPSY FINDINGS:	Mesangioproliferative GN	7
	Mesangiocapillary GN	2
	FSGS	3
CLASSIFICATION:	Steroid dependant	5
	Steroid resistant	7

PREVIOUS THERAPIES: All patients initially received prednisone 2mg/kg/day and a course of cyclophosphamide. Other therapies included chlorambucil (n=5), levamisole (n=2), cyclosporin (n=5) and mycophenolate mofetil (n=4).

TACROLIMUS THERAPY: The initial dosage of Tacrolimus was 0.1-0.15mg/kg/day divided into two doses. All patients continued on prednisone therapy, weaned to low dose, during Tacrolimus therapy The average duration of treatment was 6 months (range 1.1 – 15 months). 7 patients remain on treatment.

OUTCOME:	Compete remission	8
	Partial remission	2
	No remission	2

ADVERSE EVENTS: Chest infection (n=1), diarrhoea (n=3), pharyngitis (n=2), UTI (n=1), portocath sepsis (n=1) and worsening of hypertension (n=1). One patient developed pneumococcal meningitis and demised. One patient with mesangiocapillary GN did not respond to Tacrolimus and subsequently demised from end-stage renal failure.

Conclusion:
Tacrolimus appears to be an effective, well-tolerated therapy for patients with treatment –resistant nephrotic syndrome, with an overall response rate of 83%. These results are comparable with other reports in the literature.

Title: **PILOT STUDY OF INTRAVESICAL OXYBUTYNIN IN THE PAEDIATRIC NEUROGENIC BLADDER**

Authors: Lazarus J

Department: Red Cross Children's Hospital, University of Cape Town, South Africa

Objectives:
Intermittent catheterization and antimuscarinics represent the standard of care for the paediatric neurogenic bladder. Oral oxybutynin side effect profile is well recognized. Recent work has highlighted the negative cognitive effects of its use in this neurologically vulnerable cohort. Intravesical oxybutynin has purported superior urodynamic efficacy without producing systemic side effects. We conducted a pilot study to assess its usefulness in our Spinal Defects Clinic.

Design and method:
Surgical research and ethics approval was obtained for the study and the off-label use of oxybutynin. 9 children were recruited and parental consent sought. Pre- and post urodynamics and parental questionnaires were performed. 5mg oxybutynin tablets were dissolved in 5ml boiled cooled tap water and instilled into the bladder twice daily.

Results:
2/9 parents elected to withdraw because of the effort required to produce the oxybutynin solution. The remaining children (7) tolerated the trial well. No new symptomatic UTI's were reported. Subjectively 5/7 parents reported a noticeable reduction in nappy use. 2/5 objective urodynamic improvement was shown. In 3/5 no urodynamic change was seen.

Conclusion:
Intravesical oxybutynin represents a safe and potentially more efficacious route of drug administration in motivated patients. We hope to broaden its use locally to a home for physically handicapped children.

Title: **THE DETERMINANTS AND CONSEQUENCES OF BRAIN OXYGENATION IN CHILDREN**

Authors: Anthony A. Figaji MBChB, MMed, FCS (Neurosurgery)

Department: Paediatric Neurosurgery, Red Cross Children's Hospital

Objective:
It is well known that secondary brain insults contribute significantly to adverse outcomes and none more so than brain hypoxia or ischemia. However, the diagnosis of brain hypoxia-ischemia in the ICU has remained elusive. Brain tissue oxygen tension (PbtO2) monitoring is a new method for continuously monitoring oxygenation of the brain. However, a number of questions about PbtO2 monitoring remain unanswered and its application to the pediatric brain is not defined. Therefore, this prospective observational study aimed to examine 1) the relationship between PbtO2 and outcome, and 2) the effect of multiple clinical and treatment variables on PbtO2

Methods:
Prospective observational study. Red Cross War Memorial Children's Hospital. All children who were admitted to the ICU and underwent PbtO2 monitoring between June 2006 and May 2008 were included. Demographic, radiographic, clinical, physiological and treatment data were analysed. Physiological data included intracranial pressure, cerebral perfusion pressure, PbtO2, pulse oximetry, arterial blood gases, ventilator settings, haemoglobin and serum sodium. Multivariate linear and logistic regression analyses were used to determine independent relationships between factors.

Results:
Sixty-three children underwent PbtO2 monitoring; 52 children had sustained severe traumatic brain injury (TBI) (Glasgow Coma Scale $\leq$ 8). Mortality was 9.6% in the TBI group. More than 7500 hours of monitoring were analysed. The main findings were:

1) PbtO2 is the strongest independent predictor of outcome after severe TBI in childhood
2) PbtO2 is the only consistent independent predictor of progression to infarction
3) Intracranial pressure, cerebral perfusion pressure, and arterial oxygenation influence PbtO2 in individuals but have poor predictive ability for PbtO2 across all patients
4) 30% of children with severe TBI experienced critical brain hypoxic episodes despite adherence to treatment targets as recommended by current international TBI guidelines
5) Higher PbtO2 response to PaO2 increases (oxygen reactivity) is associated with poorer outcome and probably signifies loss of normal tissue responses
6) Transcranial Doppler-derived flow velocities and measures of autoregulatory capacity have a variable relationship with PbtO2
7) Red blood cell transfusion has a variable impact on PbtO2 that is poorly predicted by pre-transfusion characteristics
8) Acute clinical grading and classifying systems in TBI may predict prognosis related to primary injury, but do not predict which individuals are at risk for secondary brain injury

Conclusion:
Low PbtO2 is the strongest independent predictor of outcome in children with severe TBI. PbtO2 monitoring provides important additional information in patients with severe TBI that is not available with conventional monitoring. Other physiological parameters were not reliable indicators of brain oxygenation. Therefore, current treatment targets and protocols are not adequate for avoiding secondary brain injury.

Title: **ATRX – GOING ON A GENE HUNT.**

Authors: Fieggen K, Carvill G, Goliath R

Department: Groote Schuur and Red Cross Children's Hospital

Aim:
To describe the phenotype variation in a large family with XLMR and to describe the approach taken to identify the causative gene.
Method:
Record review, history taking and examination of family XMR2, the use of a stepwise molecular approach including linkage and analysis of candidate genes guided by clinical presentation.
Results:
Linkage analysis refined the critical interval in family XMR2 to a ~6Mb region with a maximum LOD score of 3.08. This chromosomal region incorporated three known XLMR genes, including; *DLG3*, *SLC16A2* and *ATRX*. The clinical presentation of affected individuals in family XMR2 was suggestive of an *ATRX* –associated phenotype. The ATRX protein consists of a number of functional domains which constitute *ATRX* mutation 'hotspots'. *ATRX* mutation detection was conducted using cDNA sequence analysis within these 'hotspots' only, in an affected family member. A functionally significant, novel ATRX mutation (c.5987_6011del) was identified. The phenotypic expression and variation in this family is described.
Conclusions:
A clinically guided stratified approach was successful in identifying the causative mutation in this large syndromic XLMR family. This has allowed development of diagnostic testing for ATRX "hotspot" mutations, allowed identification and counselling of carrier females in this family as well as improving our understanding of the phenotypic features of this rare genetic disorder.

Title: **INTELLECTUAL AND BEHAVIOURAL FUNCTIONING AND DUCHENNE MUSCULAR DYSTROPHY: NEUROPSYCHOLOGICAL TESTING AND CORRELATION WITH GENETIC DIAGNOSIS.**

Authors: Dr K Donald, Mr H Mathema, Prof J Greenberg, Dr K Thomas, Prof J Wilmshurst

Introduction:

Duchenne Muscular Dystrophy (DMD) is the most common form of muscular dystrophy seen in paediatric practice. The condition affects approximately 1 in 3300 live male births and occurs across all ethnic groups. It is an X-linked recessive disorder characterized by progressive muscle weakness and degeneration of skeletal muscle.

The spectrum of central nervous system manifestations of DMD is less well described than its musculoskeletal aspects. Although international studies have reported intellectual function ranging from above-average to severe intellectual disability, they have consistently found the average full-scale IQ of affected boys to be reduced by approximately one standard deviation. Fewer reports are available for DMD boys in the pre-school age group. There is also limited data on the behavioural profile of boys with this condition. No material on these aspects of DMD in South African children has been published to date.

This pilot case control study aimed to determine the neurocognitive and behavioural phenotype of a cohort of South African children with a confirmed diagnosis of Duchenne muscular dystrophy as compared to the profile of a matched control cohort of children.

Method:

The sample consisted of a group for cognitive testing (5 pre-school boys with DMD and 4 suitably matched controls) and a larger group with a bigger age-range for behavioural assessment (11 boys). The cognitive measure used was the Griffiths Mental and Development Scales. The tool used for behavioural assessment was the Achenbach Child Behaviour Checklist (Parent Questionnaire). Testing was conducted in the paediatric neurology department at the Red Cross Children's Hospital, Cape Town.

Results:

Even with the removal of the motor scale from the scores of the Duchenne boys, the General Quotient scores were significantly lower than their normally developing counterparts, where the mean $(M)_{DMD} = 78.90$; $M_{CONT} = 106.20$; $p = 0.027$ with effect size = 1.89. The group displayed significantly poorer performance in the hand-eye co-ordination subscale in relation to their controls ($p=0.03$). Three out of the 5 remaining subscales approached significance with a p-value of 0.05.

The results of parental reports on the behaviour of the DMD boys in our group reveal higher rates of general behavioural problems (54.5%) than normative data. This figure is slightly higher than reported in previously conducted studies on general behavioural problems in boys with DMD. This may be due to the exposure of the majority of our children to significant socio-economic stressors. The discrepancy may, however, also be an erroneous finding as a result of our very small sample size.

Conclusion and Recommendations:

The cognitive profile of the pre-school group of boys with DMD as compared to controls is in keeping with previously reported international figures. The profile of the boys in the behaviour group was also in line with other, larger studies although the specific behaviour syndrome profile displayed some differences to a recent report of a cohort of American boys with DMD.

Current practice in the ongoing care of boys with Duchenne muscular dystrophy at Red Cross Children's Hospital does not routinely include cognitive evaluation or behavioural screening. This study suggests that boys with this condition are at greater risk for problems in both areas and that it may be of benefit to identify the children with these problems so they can be managed with early intervention specific to their special needs.

Title: **PRIMARY HIV PREVENTION AMONG YOUNG PEOPLE: ARE WE FIGHTING A FOREST FIRE WITH TEASPOONS OF WATER?**

Authors: Mrs Roselyn Kareithi; Prof Alan Flisher

Department: Adolescent Health Research Unit, University of Cape Town (UCT)

Background:
Given that HIV prevalence increases highest amongst young people, especially females, whilst there are numerous development Non-Governmental Organizations (NGOs) that have arisen in response to the epidemic, there is need to understand the environment within which these organizations and their beneficiaries operate.
Objectives:
To highlight findings from an empirical research that examined if the environment is enabling for primary HIV prevention among young people.
Methods:
As part of a larger research project, a multiple-case study was conducted between October 2007 and August 2008 of four NGOs in Cape Town, purposively sampled by a Panel of Experts. Data was obtained from multiple sources including the NGO Directors, Programme Staff who provide young people with HIV prevention services, Young People receiving the services, Partners Organizations and Donors. Information was gathered through interviews, focus group discussion and drawings. Discussions were digitally recorded, transcribed in verbatim and thematically analyzed utilizing Altas.ti version 5.2.
Results:
It was found that development NGOs are providing young people with a range of services to assist with primary HIV prevention. Young people appreciate the interventions, which gives them knowledge, various skills, confidence in self, opportunities to share knowledge with peers and motivate others, anti-boredom activities, opportunities to escape for unsafe practices, and being valuable members of their community. However, there are several social drivers of HIV transmission that pull young people from fully embracing the HIV prevention message. Meanwhile, due to several factors NGOs have not positioned themselves to influence the complex context.
Conclusions:
Development NGOs are doing good work at intervening in social change processes, but do less at influencing the environment. Over emphasis on simply getting the work done undermines the achievement of social goals. There is an urgent need to intensify primary HIV prevention efforts and constantly intensively examine and influence the external context in order to create a more enabling environment for primary HIV prevention.

Title: **DEMOGRAPHIC, CLINICAL AND ALLERGIC CHARACTERISTICS OF PATIENTS ATTENDING THE ALLERGY CLINIC**

Authors: SJ Karabus, C Motala

Department: School of Child & Adolescent Health, UCT and Red Cross War Memorial Children's Hospital (RCWMCH).

Objective:
To characterize the demographic, clinical and allergen profile of patients referred to the Allergy Clinic – RCWMCH.

Methods:
A prospective descriptive study of all children attending the Allergy Clinic over a 2month period (19 June 2008 - 18 August 2008). Data from 400 children was analysed including: Age at presentation, sex, ethnic group and clinical diagnosis. Laboratory data included: Total IgE, CAP-RAST, skin prick tests (SPT) and elimination-challenge testing, cellular antigen stimulation testing (CAST) – for detecting sensitivity to food addictives in patients with chronic urticaria.

Results:
Of the 400 patients studied, 58% were males, 42% females, 87% mixed race, 12% black and 1% white. The mean age of the children was 7.6years ;< 3years age-52(13%) >3years age-348(87%) Mean total IgE: 2273ku/l; (Mean male-2773ku/l; mean female-1117ku/l). Asthma-317(80%) and allergic rhinitis-247(62%) were the most common allergic diseases followed by atopic eczema-116(29%), food allergy-54(13%), chronic urticaria-20(5%), papular urticaria-12(3%) and drug allergy-8(2%). Two patients (0.5%) were sensitive to latex and no cases of insect venom hypersensitivity were seen.

Of the asthmatic patients, 98% had persistent and 2% intermittent disease; more than two-thirds had co-existing allergic rhinitis (AR). All patients with AR had persistent disease. The majority of children with asthma and/or AR were sensitive to inhalant allergens, those >3years in particular: house-dustmite-150(97%); grass pollen-80(52%); dog dander-46(30%); cat-40(26%); moulds-33(21%).
Patients with atopic eczema (AE) had co-existing allergic disease including asthma, allergic rhinitis and food allergy. Food allergy was present in the majority of subjects with AE. Peanut allergy was the most common-39(35%) followed by allergy to egg white-33(30%), cow's milk-19(17%), fish-5(4%), potato-3(3%), treenuts-3(3%) and soya-2(2%). Peanut and egg allergies were more prevalent in subjects >3years age, whilst cow's milk sensitivity was more common in those <3years age.
Of patients with chronic urticaria (CU), 80% had no identifiable cause for the condition i.e. chronic idiopathic urticaria (CIU). Four subjects with CU were sensitive to tartrazine and one each to sodium benzoate, monosodium glutamate (MSG) and potassium metabisulfite. The twelve patients with papular urticaria had co-existing allergic diseases including asthma and CU. Of the eight patients with drug allergy 5 were sensitive to penicillin and one each to sulphonamides, aspirin and novocaine.

Conclusions:
Asthma and allergic rhinitis are the most common allergic disease in children referred to the Allergy Clinic. Inhalant allergens play a significant role in children over the age of 3 and a minor role in those under the age of 3. In patients with food allergy there is a high incidence of peanut allergy. In patients under the age of the 3, the most common food allergens are egg followed by peanut and milk. In children over 3years peanut is the most common food allergen followed by egg and milk. Potato is an emerging food allergy that may play a role in difficult-to-treat atopic eczema – studies are in progress to evaluate this.

Title: **A PROSPECTIVE EVALUATION OF A SIMPLE METHOD OF INDUCING AND MAINTAINING HYPOTHERMIA FOR TERM INFANTS WITH HYPOXIC ISCHAEMIC ENCEPHALOPATHY.**

Authors: *AR Horn*[¶], *L Linley*[¶], *M Harrison*[†].

Department: *¶ Division of Neonatal Medicine, School of Child and Adolescent Health, University of Cape Town.*
† Division of Neonatology, Hammersmith Hospital, Imperial College NHS Trust.

Objectives:
International advisory bodies have suggested that therapeutic hypothermia for newborns with Hypoxic Ischaemic Encephalopathy (HIE) may be appropriate if entry criteria and methodology is kept in line with existing studies. Therapeutic hypothermia has been offered at Mowbray Maternity Hospital (MMH) for a number of years using less complex methods than those trialed by international bodies. The objective of this study was to evaluate the efficacy of this method (The Mowbray Method) and to make recommendations regarding the continued use of this method.
Methods:
Five term infants with signs of moderate HIE confirmed on aEEG, were cooled by applying soft cold gel bags to the head and servo-controlling core body temperature with a radiant warmer set to 34ºC. The core temperature was measured using a temperature probe between the infant and the mattress (the back temperature) and the infant's heads were shielded from the heater with an opaque, reflective perspex shield. To determine if appropriate rectal temperatures were attained, the rectal and back temperatures of the infants were independently monitored using a dedicated data logger (Squirell®).The data logger recorded temperatures every 15mins and ambient temperatures were also recorded. Infants were sedated during cooling with morphine unless fentanyl or midazolam was already in use. Gel bags were replaced every hour unless the infant's temperature was below 33ºC – in which case the bag was removed until the temperature was above 33ºC. Cooling continued for 72 hours and re-warming was achieved by removing the gel bags and increasing the target temperature on the radiant warmer by 0.2 degrees per hour. Infants received standard medical care in all other respects.
Results:
All infants achieved rectal temperatures between 33 and 34.5 ºC throughout cooling and most temperatures were 34 ºC or less. Mean rectal temperatures during cooling were 33.9 ± 0.3 ºC. The back temperature showed high correlation with the rectal temperature. Mean back temperature during cooling was 33.9 ± 0.4 ºC. Nursing staff were able to co-incide the bag changes with routine hourly observations. Two infants showed initial mild overcooling but in one infant this was due to the fridge being too cold and in the other infant, the radiant warmer was faulty. The temperatures were easily corrected and subsequently remained acceptable.
Conclusions:
The Mowbray Method of inducing and maintaining hypothermia easily maintains a core temperature of 33.9 ºC and the back temperature was an accurate measure of the core temperature. This temperature is in the upper end of the effective neuro-protective range. A core temperature closer to 33 ºC would be more appropriate and would probably be easily attainable using the same methods, if lower reading radiant warmers were available. The method was acceptable to the nursing staff but infants need to be monitored for overcooling. This method of cooling makes it possible for most high care neonatal units to offer hypothermia as long as staff are appropriately trained and informed.

Acknowledgements. We extend sincere thanks for the loan of the Squirrell® Data Logger, from Dr Nicola Robertson, University College London Hospitals.

Title: **THE INCIDENCE OF THE 22Q11.2 DELETION SYNDROME IN CHILDREN REFERRED TO THE CARDIOLOGY SERVICE AT THE RED CROSS CHILDREN'S HOSPITAL, CAPE TOWN, SOUTH AFRICA: A PROSPECTIVE STUDY**

Authors: Rik De Decker[1], Zandre Bruwer[2], Mardelle Schoeman[2], Glynnis Schutte[3], Liesl Zuhlke[1], John Lawrenson[1]

Department: [1]Western Cape Paediatric Cardiology Service, Red Cross Children's Hospital, Cape Town
[2]Division of Human Genetics, Faculty of Health Sciences, University of Cape Town
[3]National Health Laboratory Service, Groote Schuur Hospital, Cape Town

Introduction:
Previous estimates of the prevalence of the 22q11.2 deletion syndrome in a paediatric cardiac clinic population in South Africa were based on a retrospective review of our experience with these patients at the Red Cross Children's Hospital. This prevalence, presumably based on the ability of clinicians to recognise the syndrome from clinical indices, had increased in 2006 to a peak of 1.8% of the new patients seen at this centre. This correlated well with a rate of 2% approximated from published 22q11.2 deletion syndrome prevalence rates and the known population birth incidence of congenital heart disease. However, since the syndrome exhibits marked phenotypic variability, we were concerned that the diagnosis may be missed in patients in whom the facial features were less recognisable. A confirmed diagnosis is essential for the optimum clinical management of these patients, as well as the genetic counselling of their parents.

Aims:
1. To determine the exact incidence of the 22q11.2 deletion syndrome in a cohort of patients with congenital heart disease presenting to a tertiary cardiology referral centre.
2. To assess the utility of an international scoring system for the clinical recognition of the 22q11.2 deletion syndrome in patients with congenital heart disease.

Methods:
All "new patients" with a significant congenital cardiac lesion presenting to the cardiology service at Red Cross Children's Hospital were assessed for recruitment to the study. The following categories of patients were excluded:

1. Neonates with an isolated patent ductus arteriosus.
2. Any child with an identifiable cardiogenetic syndrome other than the 22q11.2 deletion syndrome.

Parents of these patients were approached by a genetic counsellor for inclusion of their child into the study. Once consent was obtained, all children were tested for the 22q11.2 deletion by the standard TUPLE1 fluorescent-in-situ-hybridisation (FISH) probe.

All children were assigned a clinical "*O score*" at presentation, derived from Oskarsdöttir *et al* (2005). This was based on the presence of 8 phenotypic hallmarks and used to estimate the indication for TUPLE1 FISH testing. A score of 2 or more suggests the need for FISH testing.

Results:
The study is an ongoing prospective investigation, and the current figures, given here, will be revised and re-presented at Research Day. Since March 2008, to date 88 patients have been recruited and FISH tested; of these, 69 (78.4%) FISH tests have been reported, and 4 (5.8%) have been found to carry the deletion. The mean O score of these 4 positive patients on presentation was only 2.5 (range 2-3).

Conclusions:
Preliminary results of this study suggest that the 22q11.2 deletion is more than twice as common in a referred cardiac population than previously anticipated. Clinical suspicion must remain high to ensure that the diagnosis is not missed in these patients. The utility of a phenotypic scoring system in our patient population is unconvincing and requires review.

Title: **A REVIEW OF THE PRACTICE OF A STAGED APPROACH FOR BIVENTRICULAR REPAIR IN RED CROSS CHILDREN'S HOSPITAL OVER THE PAST 6 YEARS: IS THE PLACEMENT OF A PULMONARY ARTERY BAND SAFER IN PERCEIVED HIGH RISK CASES?**

Authors: A Geldenhuys; L Zuhlke, Paul Human, A Brooks
K Langtree, G Mashele, F Salie, M Fakier, MQ West*

Department: Presenting author from Chris Barnard Department of Cardiothoracic Surgery at Grootte Schuur and Red Cross Children's Hospitals
*=group of 2nd year medical students working as co-workers on the research project

Introduction:
Patients whom are generally in a poor condition due to a cardiac defect that causes a large left to right shunt may be regarded as a high risk for cardiopulmonary bypass and definitive repair of their defect. In the believe that their surgical risk may be lowered and their condition optimized by reducing their lung blood flow, a pulmonary artery band (PAB) may be applied in the first instance. We tested this hypothesis by a review of our institutional experience with this approach over a six year period.

Materials and Methods:
This is a retrospective review of all patients that received a pulmonary artery band at Red Cross Children's Hospital during the period of 1 January 2002 and 31 December 2007. Patients whom underwent a pulmonary artery band with the aim to later achieve a biventricular repair were analyzed further. If the PAB was applied with a view to a univentricular repair, they were excluded. A standardized data collection sheet was used to retrieve relevant information.

Results:
Of the 187 files that were reviewed retrospectively 144 had a PAB with a view to later achieve a biventricular repair, while 30 were excluded due to planned univentricular repair and13 files were lost.The overall mortality for the 144 patients who underwent a PAB with the view to achieve biventricular repair was 24% (N = 35). Of the total number of deaths, 8% (N = 12) occurred in hospital, whilst 16% (N = 23) occurred after hospital discharge whilst awaiting definitive repair. In these cases the cause of death was not established. The PAB had to be revised in 5 % (N = 7). Growth was assessed by a comparison of pre- and post- PAB weights and this information was available for 119 patients. Of these 52% (62/119) either did not increase in weight or lost weight. The mean weight at PA banding was 5.34 ± 2.94kg (range, 1.8 to 25kg). The mean time interval between PA banding and definitive repair was recorded as 21.79 ± 13.34 months. Interval hospital admissions were recorded in 83 (57.64%) patients between PAB and either definitive surgery or to date. The mean number of interval hospital admissions is 1.5 ± 1.98, the majority being due to respiratory tract infections. The mean ICU stay at PAB was 6.76 ± 14.91 days with a mean hospital stay of 21.10 ± 34.36 days.
At termination of the study 63 (64%) have not had definitive correction.

Conclusion:
Despite an acceptable in-hospital mortality, the practise of deferring biventricular repair by the application of a pulmonary artery band carries such a high total mortality that consideration should be given to early definitive repair.

Title: **FOCUS ON 2007: A CLINICAL AUDIT OF THE RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL PAEDIATRIC CARDIAC SURGERY PROGRAM**

Authors: Rachelle Duffy[2], Andre Brooks[1], Clare Castelyn[2]
Liesl Zühlke[1]

Department: 1. Western Cape Pediatrics Cardiac Services, Red Cross and Tygerberg Hospitals
2. 2nd year Medical Student University of Cape Town

Introduction:
Paediatric Cardiac Surgery has a long and rich history in South Africa with the first cardiopulmonary bypass operation performed by Prof Chris Barnard in a child at Red Cross Childrens Hospital in 1958. Since the 1990's though, severe budget restrictions, the emergence of private health care and ever-increasing numbers of indigent patients have put significant strains on the delivery of specialized cardiac care within the public service. The largest of these units is that based at Red Cross War Memorial Childrens Hospital with upwards of 250 cases per year. It is the referral centre for the Western Cape Paediatric Cardiac Services based at Red Cross and Tygerberg Hospitals as well as the satellite hospitals within the metropole. In addition referrals from the Eastern Cape and other parts of the Western and even Northern Cape comprise a significant part of the service. In recent times, with even more stringent budget restrictions and increasing referrals from the neonatal service, the waiting list has reached unprecedented figures of over 150. In order to critically review areas of deficiencies within the service and to define ways of managing our reduced resources in a more efficient fashion, we undertook a clinical audit of all patients operated upon in 2007.

Setting:
The folders of all patients operated upon between 1 January 2007 and 31 December 2007 were reviewed and demographic, surgical and other patient outcome data were recorded and analysed. Only cardiac surgical procedures were reviewed and all strictly thoracic cases were excluded.

Results:
244 patients were identified although 4 folders were lost and therefore excluded from our audit. A total of 252 surgical procedures were reviewed. Demographic parameters that were reviewed included age, age at time of initial diagnosis and then at surgery, the referral pathway to our service as well as mortality, days spent in ICU and total days spent in hospital. Surgical parameters included time of surgery, bypass times, reoperations and re-intervention rates. The total mortality was 7.5% with in hospital mortality rates at 5.8%. 43% of patients resided within the Cape Metropole while 22% resided in provinces other than the Western Cape. 64% of patients were diagnosed within the first year of life, most as neonates.
The true waiting period for surgery could not be reliably determined from this review.

Conclusion:
In this audit we sought to focus on 2007 and critically appraise as many aspects of our surgical service as possible. We hope to now institute clinical audit as a regular part of our program in particular to aid us in managing our limited resources in a more efficient way and hopefully in so doing, decreasing our waiting list and improving our service delivery.

Title: **A CHILD WITH RESTRICTIVE - CONSTRICTIVE DISEASE: THE DIAGNOSTIC CONUNDRUM CONTINUES**

Authors: George Comitis

Department: University of Cape Town, School of Child & Adolescent Health, Division of Critical Care & Children's Heart Diseases, Red Cross Children's Hospital

The combination of constrictive pericarditis and restrictive cardiomyopathy in the same patient is relatively rare with few reports in the literature. This case report deals with such an example and lends itself to a greater appreciation of the pathophysiological mechanisms and diagnostic features operating between the two processes.

An 11 year old girl with a background of fully treated pulmonary tuberculosis 8 years previously presented with features of acute rheumatic fever, severe mitral regurgitation and biventricular failure as well as a moderate pericardial effusion (PE). Over the course of 4 months despite full therapy including cover for tuberculosis and corticosteroids she manifested signs of a mixed restrictive cardiomyopathy - constrictive pericarditis with a refractory PE requiring three separate procedures for drainage - two surgical (with pericardial windows) and one percutaneous. Pericardial fluid chemistry, microbiology and cytology as well as histology of pericardial tissue were negative or non-specific on all occasions.

Cardiac catheterisation was performed to obtain endomyocardial biopsies (also non-specific) and to further delineate the pathophysiology and haemodynamics as there were persistent features of a restrictive cardiomyopathy. This confirmed a mixed restrictive - constrictive picture. Due to the constrictive element she underwent a pericardial stripping procedure and direct right atrial biopsy which surprisingly showed endocardial fibroelastosis. Subsequently her PE resolved but she was left with residual severe mitral regurgitation and will likely require a mitral valve repair or replacement in the near future. The aetiology of her disease remains undefined.

The pathophysiology and diagnosis of restrictive versus constrictive disease are reviewed and the importance of distinguishing between the two is emphasised due to their significantly different management implications.

Title: **G-CSF DOES NOT CONFER A SURVIVAL ADVANTAGE IN PATIENTS WITH BURKITT LYMPHOMA (GROUP B) TREATED ON THE LMB 89 PROTOCOL AT RED CROSS CHILDREN'S HOSPITAL.**

Authors: M Hendricks, A Davidson, F Desai, PS Hartley

Department: Haematology-Oncology Service, Red Cross Children's Hospital, School of Child and Adolescent Health, University of Cape Town.

Objective:
To assess the efficacy of G-CSF in an LMB-based protocol used to treat Burkitt Lymphoma at the Red Cross Children's Hospital.

Methods:
The study was a retrospective audit of G-CSF usage in a cohort of Group B Burkitt lymphoma patients between 1988 and 2007. The LMB protocol was adopted in 1988 and G-CSF began to be used at a dose of 5mcg/kg daily for 14 days after COPADM 1 and 2 in 1995.

We compared two cohorts of Group B Burkitt lymphoma patients; those prior to 1995 who did not receive G-CSF and those after 1995 who were given G-CSF.

Results:
Seventy-six patients were diagnosed with Burkitt lymphoma during the study period, three with Group A disease, 44 with Group B disease and 29 with Group C disease. Two of the Group B patients died during induction and one was changed to COMP due to toxicity. These were excluded.

Forty one patients were eligible for analysis; 13 did not receive G-CSF and 28 did.

Comparing the two groups, there was no significant difference in the mean number of days of neutropaenia and the mean number of days of delay before starting subsequent chemotherapy.

Similarly, there were no significant differences between the groups with respect to percentage of infections and mean number of blood and platelet transfusions. Mucositis was almost twice as prevalent in the group of patients who received G-CSF compared to the group who did not (58.62% vs. 31.25).

The overall survival (OS) of the group not receiving G-CSF was 84.6% compared 96.3% in the group who did. This was not statistically significant (p=0.2). OS for the entire group was 85.5%.

Conclusions:

In a non-randomised retrospective analysis patients who received G-CSF following COPADM 1 and 2 did no better in terms of survival, than those who did not receive G-CSF.

Title: **PAEDIATRIC ACUTE MYELOID LEUKAEMIA: THE ROLE OF TRANSPLANTATION AT THE RED CROSS CHILDREN'S HOSPITAL**

Authors: Alan Davidson, Marc Hendricks, Farieda Desai, Margeret Shuttleworth, Paddy Hartley

Objective:
Stem cell transplantation (SCT) is now well-established in the treatment of paediatric acute myeloid leukaemia (AML). It is indicated for standard and poor risk disease in CR1, and for good risk AML in CR2. Cost constraints in the public sector limit the donor pool to matched siblings. The purpose of this study was to examine both transplantation and transplant intent for AML at the Red Cross Children's Hospital (RCCH).

Methods:
This was a retrospective folder review of patients diagnosed with de novo AML at RCCH between 1994 and 2005. All patients were started on a protocol based on BFM-87 at diagnosis, and those with acute promyelocytic leukaemia commenced all-trans-retinoic-acid prior to induction. Risk in relation to transplant was assigned by cytogenetics. Patients with t(15;17), t(8;21) and inversion 16, as well as those with M3 morphology, were considered good risk. The intention was to perform tissue typing on all children with standard and poor risk AML who achieved remission, as well as all those with good risk disease who relapsed.

Results:
Seventy-eight children were diagnosed with AML. The 37 patients with good risk disease achieved an estimated five-year event free survival (EFS) of 74.4%. Six of the 35 patients who achieved remission relapsed. One was found to have a matched sibling but did not achieve CR2. Two had no siblings, one had a fungal infection which precluded retreatment and two families refused SCT. Three of six patients tissue typed in CR1 had matched siblings but were not transplanted and remain in CR1 36, 87 and 136 months from diagnosis.

The 41 patients with standard or poor risk disease achieved an estimated five-year EFS of 27.3%. Of the 34 who achieved remission, three had matched sibling donors, 29 had either no match or no siblings and two were unsuitable for SCT. Two underwent successful SCT in CR1 (both are alive and disease free) but the third patient with a donor relapsed and died prior to transplant. There were 18 other relapses: one transplantee had a CNS relapse and was salvaged with radiotherapy and high dose AraC (HDAC); one patient was successfully transplanted in CR2 when cord blood from a sibling became available (he subsequently relapsed and died); 15 of the remaining 16 patients either had no siblings or no match.

Only 8 (17.8%) of the 45 patients considered for tissue typing had a matched sibling. For the whole group, 17 patients (21.8%) with relapsed AML, all but two with standard and poor risk disease, might have been considered for matched unrelated donor (MUD) SCT.

Conclusions:
SCT for AML was limited by the availability of matched sibling donors. The outcome for standard and poor risk AML was poor. Possible strategies to improve outcomes are [1] more intensive chemotherapy; we have adopted the HDAC arm of MRC AML15 [2] increased use of allogeneic stem cell transplantation. Given the scarcity of matched sibling donors, consideration could be given in selected cases to MUD SCT in CR1. An expanded South African donor pool and financial support for tissue typing is vital in this regard.

Title: **SERUM IMMUNOGLOBULIN LEVELS IN CHILDREN ON TREATMENT FOR ACUTE LYMPHOBLASTIC LEUKAEMIA (ALL)**

Authors: Ann Van Eyssen, Marc Hendricks, Fareida Desai, Alan Davidson

Objective:
To review the current approach to serum immunoglobulin(Ig) testing in children undergoing treatment for Acute Lymphoblastic Leukaemia (ALL) and explore the rationale for routine monitoring.
Methods:
This study was a retrospective audit of children treated for ALL at Red Cross Children's Hospital (RCCH) between May 1996 and November 2006. Shared care patients and early deaths were excluded. All infections in the children under study were recorded according to number, site, timing and the presence or absence of neutropaenia. Testing of immunoglobulin (Ig) levels was noted with respect to both indication and timing, and the administration of and the response to intravenous immunoglobulin (IVIG) was recorded.
Results:
Ninety two children were included in the study. Eighteen of these had their Ig levels tested. Five children had a baseline level recorded at the onset of treatment which was normal. Thirteen children were tested because of recurrent infections not explained by neutropaenia. Of these, nine were tested during maintenance chemotherapy, three were tested after completing chemotherapy and one was tested while on treatment for relapsed disease. Four children (31%) were hypogammaglobulinaemic.
In the group tested as a result of recurrent infection there were more non-neutropaenic fevers (mean 5.5 vs. 3) and more lower respiratory tract infections (mean 5 vs. 3) than those not tested. Of the 74 children not tested, 18 (24%) had more than five non-neutropaenic fevers and/or five lower respiratory tract infections.
The mean number of infections in children with low Ig levels did not differ greatly from those with normal levels both in terms of non-neutropaenic fevers (mean 5.25 vs. 5) and lower respiratory tract infections (mean 5.25 vs. 5.6).
Children who had low Ig levels received 4 - 5 (mean 4.5) administrations of IVIG before their levels normalised.
Conclusions:
Recurrent infection in the absence of neutropaenia is a significant problem for children on ALL treatment. One third of a tested cohort were shown to have deficient Ig levels and responded well to IVIG. Routine testing of Ig levels at the onset of treatment for ALL in a small group yielded only normal results, and probably holds no benefit.
We recommend testing of Ig levels early in maintenance therapy to ascertain the true prevalence of hypogammaglobulinaemia. Recurrent non-neutropaenic fevers (>5) and/or lower respiratory tract infections (>5) should prompt repeat testing.

Title: **MALIGNANCIES AND HIV IN CHILDREN AT TYGERBERG HOSPITAL**

Authors: DC Stefan, Mark Cotton

Objective:
A descriptive review of cancers associated with HIV in children below the age of 15 at Tygerberg Hospital between 1987 and 2008

Methods:
Retrospective analysis of tumor registry and patients records over a period of 22 years

Results:
A total of 23 patients were diagnosed with HIV related malignancies of which 17 (73%) had Kaposi sarcoma and 6 patients (26%) other tumors: 3 diagnosed with Burkitt's lymphoma, 1 with neuroblastoma and 2 with acute lymphoblastic leukemia.
Age at diagnosis ranged between 66 days and 10years.
There were 9 females and 14 males.
The initial Kaposi protocol consisted only of 2 drugs.
All non Kaposi patients were treated according to the protocols specific for their malignancy.
Survival was 53% in the patients diagnosed with Kaposi sarcoma and 4 out of the 6 patients (66%) survived in the group of non Kaposi sarcoma (one patient with ALL who also finished maintenance, one child with neuroblastoma and 2 patients with Burkitt's lymphoma)

Conclusions:
In children, HIV related cancers are much less common and less well described as in adults, although HIV positive children are also known to have an increased risk of developing non Hodgkin lymphoma and Kaposi sarcoma.
HIV testing is part of initial screening in children with malignancies and a positive test is not a contraindication to intensive and effective treatment of cancer
.

Title: **INVESTIGATING THE BENEFIT OF A NOVEL HIV/AIDS INFORMATION WORKBOOK AS A TEACHING AID IN A SCHOOL LIFE-SKILLS PROGRAM IN THE WESTERN CAPE, SOUTH AFRICA**

Authors: Diane Gray[1], Anne Betzel[1], Lesley Workman[3], Paul Roux[1,4]

Department: [1]Paediatric HIV/AIDS Service, Groote Schuur Hospital, Cape Town, South Africa [3] South African Tuberculosis Vaccine Initiative, University of Cape Town, South Africa [4]School of Child and Adolescent Health, University of Cape Town, South Africa

Background:
South African adolescents are at very high risk of infection with the Human Immunodeficiency Virus (HIV). It is vitally important that adolescents know and understand important facts about HIV/AIDS so as to raise appropriate concern about personal risk.

Aim:
To investigate the impact on adolescents' knowledge of HIV/AIDS of a novel HIV/AIDS information workbook used in a high school life-skills program.

Method:
This was a cluster randomized trial conducted in a high school in the Cape Town metropolitan area. A workbook focusing on *biological* and *life skills* HIV/AIDS related information was developed by Grassroots Soccer. This workbook, *Extra Time,* was introduced into the life skills curricula in classes in each grade (8 to 11) at the school. The classes were randomized to receive the magazine as a teaching aid (participant classes) or to complete life skills lessons without the magazine (comparison classes). HIV/AIDS-related knowledge was tested using an HIV/AIDS Knowledge Questionnaire (divided into *biological* and *life skills* questions) which had been formulated using the contents of the '*Extra Time'* workbook. Both participant and comparison classes completed the questionnaire at the start of the life skills curriculum and again after 6 months. Statistical analysis was done using the Kruskall Wallis test and paired t-test, $p<0.05$ was considered significant. The STATA statistical package was used. Written parental consent was required in order to participate. The information collected was anonymous. Ethics approval was granted by the University of Cape Town Research Ethics Committee. Permission to conduct the study was received from the Education Department of the Provincial Government of the Western Cape (PGWC) and the School Health Service of the Department of Health of the PGWC.

Results:
The questionnaire was administered to 966 children from Grade 8-12 at the start of the life skills program, 498(52%) were female. The median age was 15yrs (13-27). Six hundred-and-twelve children completed the repeat questionnaire, 135 from participant classes and 477 from comparison classes. On initial testing the children had an overall average score of 28/44 (64%), with the higher grades scoring significantly better than the lower grades. All grades did better in the *life skills* questions as compared to the *biological* questions. On repeat testing the children who received the information workbook scored significantly higher than their pre-workbook scores in the *biological* questions (14/22 versus 12/22, $p<0.005$). There was no significant difference in *life skills* questions or overall scores. The participants scored higher than the comparison children who did not receive the workbook (30/44 versus 28/44, $p=0.01$). The improvement was surprisingly higher in grade 10 and 11 than in the lower grades. The improved knowledge was seen in the *biolo*gical questions. The comparison group had similar overall scores on initial and repeat questionnaires.

Conclusion:
High school children in our cohort had a fair knowledge of HIV/AIDS by the time they reached Grade 12. The use of the *Extra Time* workbook significantly improved the HIV/AIDS related theoretical knowledge in the participant classes. This workbook may be a valuable educational tool in life skill curricula in the early and late high school years to improve HIV/AIDS related knowledge of adolescents.

Title: **A RANDOMISED CONTROLLED TRIAL OF INTERMITTENT COMPARED WITH DAILY TRIMETHOPRIM SULPHAMETHOXAZOLE PROPHYLAXIS IN HIV-INFECTED CHILDREN**

Authors: Heather J Zar, Lesley Workman, Teresa Jennings, Nomawethu Jele, Gregory D. Hussey, *H. Simon Schaaf, **Carl J Lombard, *Mark F Cotton

Department: School of Child and Adolescent Health, Red Cross Children's Hospital, University of Cape Town, South Africa, *Department of Paediatrics and Child Health, Tygerberg Children's Hospital, Stellenbosch University, South Africa, ** Biostatistics Unit, Medical Research Council, South Africa

Background: Trimethoprim-sulphamethoxazole (co-trimoxazole, CTX) prophylaxis has been increasingly recommended as an effective intervention to reduce morbidity and mortality in HIV-infected children. In adults, intermittent CTX is as effective as daily prophylaxis but is associated with less toxicity. There is little data on the effectiveness of different CTX prophylactic regimens in HIV-infected children especially in developing countries. We therefore investigated the efficacy and tolerability of intermittent compared with daily CTX prophylaxis in HIV-infected children.

Methods: A 5 year prospective randomised controlled study in Cape Town, South Africa, comparing intermittent (thrice weekly) with daily CTX in HIV-infected children aged 8 weeks or older. Outcome measures were mortality, hospitalisations and adverse events.

Findings: 325 children (median age 22.8 months) were followed for 694.4 child-years; 166 (51%) were randomised to intermittent CTX prophylaxis. Most children (285; 88%) were CDC clinical category B or C; median (IQR) CD4 percentage was 20% (14-27) at randomisation. At enrolment, 28 (9%) children were on highly active antiretroviral therapy (HAART) but 207 (64%) went onto HAART during the study period. The mortality rate (53; 16%) was similar in the intermittent compared with the daily CTX group [24 (14%) vs. 29 (18%), hazard ratio (HR) 1.33 (95% CI: 0.8 to 2.3)] by intent to treat analysis. Sepsis (19; 36%) or pneumonia (16; 30%) were the predominant causes of death in both groups. There were 135 hospitalisations; the rate of hospitalisation was similar in both groups (70; 42% vs 65; 41%, OR 1.03). The rate of serious adverse events was similar in both groups (36; 22% vs 32; 20%, OR 1.09); grade 3 or 4 haematological events were most common.

Interpretation: Intermittent or daily CTX prophylaxis has similar efficacy and tolerability in HIV-infected children. Thrice weekly CTX prophylaxis is an alternative strategy that may be recommended in HIV-infected children.

Funding: *Rockefeller Institute, Dept of Health South Africa, MRC South Africa*

Title: **THE OUTCOME OF HUMAN IMMUNODEFICIENCY VIRUS (HIV) EXPOSED CHILDREN ADMITTED TO A PAEDIATRIC INTENSIVE CARE UNIT (PICU) IN A RESOURCE-LIMITED SETTING.**

Authors: Shaun Barnabas[1,3], Shamiel Salie[2,3], Andrew Argent[2,3], Brian Eley[1,3]

Department: [1]Paediatric Infectious Diseases Unit, Red Cross Children's Hospital, Cape Town, South Africa
[2]Paediatric Intensive Care Unit, Red Cross Children's Hospital, Cape Town South Africa
[3]School of Child and Adolescent Health, University of Cape Town, South Africa

Objective:
To look at the short and medium term outcomes of HIV exposed children who are admitted to a PICU.
Methods:
A 1 year review from January 2007 to December 2007 was conducted at Red Cross Children's Hospital.
Results:
63 of the 1119 patients admitted to PICU in 2007 were HIV exposed: 32 were HIV-infected, 28 were uninfected, and the status of 3 not determined. Case records of 31 infected [HIV+] and 27 uninfected [HIV-] children were analysed.
Perinatal history: Most HIV+ children had not received prevention of mother to child transmission (PMTCT) interventions [No PMTCT (64.5%), NVP/AZT (19.4%), HAART (3.2%), and Unknown (3.2%)] compared to the HIV- group [No PMTCT (7.7%), NVP/AZT (66.7%), HAART (3.9%), Unknown (23.1%)]. Median age (IQR) on admission of HIV+ and HIV- children was 2.7 (1.9, 3.6) and 2.4 (1.0, 5.2) respectively, p=0.8. Most HIV+ children had advanced WHO stage 3 (7.4%) or stage 4 (85.2%) disease. In the HIV+ group the most common diagnoses were pneumonia (61.3%) and sepsis (9.7%) and the main indication for PICU admission was respiratory failure (77.4%). In the HIV- group most frequent diagnoses were pneumonia (51.9%), gastroenteritis (14.8%) and CCHD (11.1%). The main indications for PICU admission were respiratory failure (55.6%) and post-operative monitoring (25.9%).
In the HIV + group 90.3% required assisted ventilation; 87.1% required IPPV and/or HFOV. In the HIV – group 85.2% required assisted ventilation; 63% required IPPV and/or HFOV. The median (IQR) stay in PICU for the HIV+ and HIV- groups was 7.0 (4, 10) and 3.0 (1, 5) days respectively, p=0.0009. More HIV+ children required >5 days ICU care: 64.5% *vs* 14.8%, OR (95%CI): 14.1 (3.3, 66.6), p=0.00002. Inotropes were required in 25.8% of the HIV+ group and 29.6% of the HIV- group. The median duration of inotropic support was 2 days in both groups. Empiric gancyclovir was started on 18 (58.1%) children in the HIV+ group, 13/18 (72.2%) had evidence for CMV infection; and 5 (18.5%) in the HIV- group, none had evidence of CMV infection. In patients without CMV infection gancyclovir was discontinued. On admission, 3 HIV-infected children were on HAART. During the admission a further 17 children were started on HAART, 10 in PICU. During the PICU admission 32.3% (10/31) in the HIV+ group and 14.8% (4/27) in the HIV- group died, p=0.1. In the HIV+ group who died, gancyclovir was started in 70% (7/10), a median (IQR) of 7 (7, 11) days after hospital admission. By comparison, in HIV+ children who survived, gancyclovir was started in 52.4% (11/21), a median (IQR) of 2 (1, 3) days after hospital admission, p=0.003.
Median total hospital stay (IQR) for the HIV+ and HIV- groups was 18 (14, 26) and 14 (8, 19) days respectively, p=0.06. More HIV+ children were hospitalized for >14 days: 71.0% *vs* 44.4%, p=0.04. No further deaths occurred and at hospital discharge 67.7% of the HIV+ group and 85.2% of the HIV- group were alive.
Conclusions:
HIV-exposed children are a vulnerable group. Predictably, hospital outcome following PICU admission was worse in HIV-infected children than in the HIV-uninfected group. PMTCT seems to reduce the HIV transmission rate.

Title: **CYTOMEGALOVIRUS INFECTION IN CHILDREN HOSPITALISED WITH SEVERE PNEUMONIA IN A HIGH HIV PREVALENCE SETTING**

Authors: Zampoli M, Morrow B, Hsiao M, Whitelaw A and Zar HJ

Background:
Pneumocystis jirovecii pneumonia (PCP) and cytomegalovirus (CMV) infection are common causes of severe pneumonia in young children in high HIV prevalence settings. Both are associated with high mortality but the prevalence of CMV infection in this setting has been poorly studied.
Aim:
To investigate the prevalence and outcome of CMV infection in HIV-infected and uninfected children hospitalised with severe pneumonia.
Methods:
A prospective study of sequential children with clinically suspected PCP admitted to Red Cross Children's Hospital. A nasopharyngeal aspirate (NPA) and lower respiratory tract (LRT) sample (induced sputum, IS, non-bronchoscopic bronchoalveolar lavage, BAL or post-mortem biopsy) were collected prospectively. Immunofluorescence for *P. jirovecii*, a panel for respiratory viruses and CMV shell vial culture (SVC) were done on respiratory specimens. Blood samples were collected for qualitative CMV PCR, quantitative CMV viral load (VL) and HIV PCR. Children were considered CMV-infected if blood CMV PCR or respiratory tract sample CMV SVC was positive. CMV pneumonia was defined as a positive blood CMV PCR *and* positive CMV SVC from any respiratory tract sample.
Results:
201 children were enrolled. CMV was isolated by SVC in 63/187 (34%) NPAs, 33/101 (33%) IS and 16/90 (18%) BALs. PCP was confirmed in 42 (21%) patients. Of these, 35 (83%) were co-infected with CMV and 24 (57%) had CMV pneumonia. 68 (35%) patients were infected or co-infected with another respiratory virus .Data of CMV infection in HIV-infected and uninfected children are presented below:

Variable	Total	HIV +	HIV-	OR (95% CI) p
N (%)(3 HIV status unknown)	198	122 (61.6)	76 (38.4)	
Median age months (IQR)	3.2 (2-4.6)	3.4(2.6-4.6)	2.5(1.3-4.9)	0.003
CMV-infected n, (%)	127/191 (66.5)	88/118 (74.6)	39/73 (53.4)	2.5 (1.4-5.4) 0.002
CMV blood PCR+ n, (%)	122/192 (63.5)	86/118 (72.3)	36/74 (48.6)	2.8 (1.4-5.4) <0.001
CMV pneumonia n, (%)	67/189 (35.4)	50/116 (43.1)	17/73 (23.3)	2.5 (1.2-5.1) 0.005
CMV VL >4.0 log copies/ml (high viraemia), n %	68/192 (35.4)	55/118 (46.6)	13/74 (17.6)	4.1 (1.9-8.9) <0.001
Gancyclovir treatment, n %	107 (54)	77 (63.1)	30 (39.5)	2.6 (1.4-4.9) 0.001
Median Hospital days (IQR)	17 (10-26)	19 (12.-29)	15 (9-25)	0.09
In-hospital mortality (%)	49 (24.7)	41 (33.6)	8 (10.5)	4.3 (1.8-11.3) <0.001

Mortality was similar in children with (28%) and without (24%) CMV pneumonia (OR 1.2; 95% CI 0.6-2.6). However, the mean CMV VL was significantly higher in children who died. (4.6 log copies/ml vs. 3.9 log copies/ml; p=0.001)
Conclusion:
CMV is an important pathogen in infants presenting with severe pneumonia. CMV infection, high CMV viraemia and CMV pneumonia were more common in HIV-infected than HIV-uninfected children. Mortality in HIV-infected children with pneumonia was higher than that in HIV-uninfected children. CMV pneumonia is not associated with increased mortality.

Funding: National Research Foundation, South Africa; ASTRA-Zeneca Respiratory Award from the South African Thoracic Society

Title: **CHEST RADIOGRAPHIC PRESENTING FEATURES AND RADIOGRAPHIC PROGRESSION OF PNEUMOCYSTIS PNEUMONIA (PCP) IN SOUTH AFRICAN CHILDREN**

Authors: Richard D. Pitcher[1], Rupesh Daya, Stephen J. Beningfield, Heather J Zar

Department: 1. Division of Paediatric Radiology, Red Cross War Memorial Children's Hospital, School of Child and Adolescent Health, University of Cape Town.

Objective:
1) To describe the chest radiographic features of PCP in South African children, including the evolution of changes and impact of co-infections. 2) To compare the chest radiographic features of PCP in HIV-infected and -uninfected children in whom pneumocystis was the only identified pathogen.

Method:
A retrospective study of all children with confirmed PCP admitted to Red Cross Children's Hospital between January 2003 and June 2006 was conducted. All in-patient chest radiographs taken during the relevant admission were reviewed and reported according to a standardised format by a single paediatric radiologist blinded to clinical details. The nature, distribution and extent of pulmonary pathology on presentation were documented. Radiographic progression was assessed on sequential radiographs by recording the time to evolution of maximum pulmonary opacification. Details of intensive care unit (ICU) admission, HIV infection, medical history, concurrent infections and clinical outcomes were extracted from the patient's medical records and correlated with radiological findings. Statistical analysis was conducted on Stata version 10.0 utilising Fisher's exact test and Wilcoxon's ranks-sum test as required. Institutional ethics approval was obtained.

Results:
113 children had proven PCP. Presentation CXR's of 110 (97.3%) were available for review; 96 (87.2%) had follow-up radiographs. The HIV status was known in 107 (97.2%); 88 (82%) were HIV-infected. Sixty-six (60%) were female. The median age at presentation was 104 days. The median time between presentation and PCP diagnosis was 4 days. In 45 (41%) PCP was the only infecting organism; 65 (59%) had co-infection. Cytomegalovirus (33 cases; 30%) was the commonest co-infection. The commonest findings on presentation CXR were pulmonary hyperinflation and diffuse symmetrical pulmonary opacification; the incidence of these features was independent of HIV-status and co-infection. The commonest so-called unusual radiographic feature on sequential radiographs was pulmonary interstitial emphysema, occurring in 30% of cases, irrespective HIV-status or co-infection. Cases with co-infection showed slower progression to maximum opacification (median time 96 vs 48 hours; p=0.056). There was no correlation between presenting radiographic findings and mortality. There was no significant difference in radiographic progression between fatal cases and survivors.

Conclusion:
In addition to diffuse pulmonary opacification, pulmonary hyperinflation and interstitial emphysema are important radiographic features of PCP in our setting; their incidence is not significantly influenced by HIV-status or the presence of co-infection The determinants of radiographic progression in PCP require further evaluation.

Title: **DIGITAL RADIOGRAPHIC MEASUREMENT OF THE PEDIATRIC MAIN BRONCHI**

Authors: Virginia Sanders

Department: Human Biology, University of Cape Town

Conventional chest radiographs show poor visualization of the main bronchi and sub-carinal angle. Improved visualization of the airways would allow the identification of extrinsic compression or displacement by adenopathy. *Objective* To establish whether dimensions of the main bronchi and sub-carinal angle in children can be consistently measured on an AP supine chest image, utilizing the Statscan® digital radiography unit (Lodox Systems Pty Ltd, Sandton SA). *Materials and Methods* Supine digital chest images were acquired on 101 children between the ages of 6 months and 13 years taken from the full body images on Statscan®. Proximal bronchial diameters were measured directly from these images. *Results* Visualization of the left main bronchus and the right main bronchus was achieved in over 90% of the cases. Interclass Correlation Coefficient indicates that the 2 observers are measuring the LMB and RMB consistently, facilitating accurate measurement of bronchial dimensions. The sub-carinal angle has a weak agreement between the 2 observers. *Conclusions* Supine chest images acquired on the Statscan® low-dose digital radiography unit facilitate accurate measurement of the main bronchi and sub-carinal angle in children. Further work is required to establish local age-related norms for bronchial dimensions. These could serve as reference standards for detection of early deviations from normal, thus enhancing conventional chest imaging detection of mediastinal pathology.

Title: **SPUTUM INDUCTION FOR DIAGNOSING CHILDHOOD PULMONARY TUBERCULOSIS IN A COMMUNITY SETTING – A PRELIMINARY REPORT**

Authors : Moore H A*, de Villiers PJT*, Apolles P#, Zar H J#

Department: * Division of Family Medicine, University of Stellenbosch
#School of Child and Adolescent Health, Red Cross Hospital, University of Cape Town

Introduction:
The microbiological diagnosis of PTB is difficult in children because children do not cough up their sputum. Obtaining a positive culture is also becoming increasingly important in the era of the HIV epidemic, and the increasing prevalence of resistant TB. Sputum induction has been reported to be feasible, safe and effective for microbiologic confirmation of pulmonary TB in hospitalized infants and children, but has not yet been reported in children in community settings.

Objective:
This study aimed to introduce diagnostic sputum induction in a primary health care clinic in Khayelitsha. If feasible, the technique could be extended to other similar settings.

Methods:
A prospective study was carried out in a primary health care clinic (Kuyasa clinic) in Khayelitsha (2007 April – 2008 April) and the study is still ongoing. Consecutive children (1 month to 13 years), with suspected PTB or child contacts of adult PTB or HIV-infected and with respiratory symptoms were evaluated. Investigation included history, clinical examination, a tuberculin skin test and chest x-ray. Sputum induction (2 specimens) was performed according to a standard operating procedure, following informed consent.

Results:
Of 112 children screened by sputum induction, 12 (11%) microbiological positives were identified, including 5 culture positives and 7 microscopy positives. Two of the 12 were HIV-infected, 7 were uninfected and the status of 3 was unknown. A positive clinical diagnosis was made in 24 children (21%) and 6 of these were confirmed microbiologically after sputum induction. Six children (5%) were commenced on treatment only after positive microbiological results. Thus, sputum induction improved the diagnostic yield by 20% (from 24 to 30 cases). In the culture positive group, 1 child had inconclusive clinical and radiological findings and so received treatment only after a positive culture result; the other 4 were started on treatment on clinical diagnosis and the diagnosis was subsequently confirmed microbiologically. In the 7 with positive microscopy, 2 were treated on clinical grounds and 5 after sputum results.

Conclusion:
Sputum induction was shown to be feasible and safe in a community setting and it improved diagnostic yield, facilitating early treatment. This is a preliminary report as numbers are still small. The study is still ongoing.

Title: **RATE OF PULMONARY FUNCTION DECLINE IN SOUTH AFRICAN CHILDREN WITH CYSTIC FIBROSIS.**

Authors: BM Morrow[1]; AC Argent[1,2]; G Distiller[3]; HJ Zar[1,2]; ATR Westwood[1,2]

Department: 1. School of Child and Adolescent Health, University of Cape Town
2. Red Cross War Memorial Children's Hospital
3. Department of Statistical Sciences, University of Cape Town.

Objective:
Pulmonary function tests (PFT) objectively measure the extent and progression of cystic fibrosis (CF) lung disease. The rate of PFT decline has not been studied in developing countries. This study investigated the average annual rates of pulmonary function decline in South African children with CF from 1999 to 2006.

Methods:
The medical records and best PFT over three-monthly intervals of children attending the CF clinic at Red Cross War Memorial Children's Hospital, Cape Town, South Africa, were retrospectively reviewed and analysed using the mixed model regression method.

Results:
1139 PFT were recorded on 79 patients, with a median (IQR) of 14 (6 – 21) PFT per patient. With no covariates in the model, the estimated mean (SE) forced expiratory volume in one second (FEV1) at age six years was 73.83 (3.34) percent predicted and the annual FEV1 decline was 0.23 (0.43)%. FEV1 at age six of patients born after 1996 was 93.7 (11.8)% vs. 66.3 (10.6)% in those born between 1980 and 1985 (p = 0.02). ΔF508 heterozygous patients had significantly lower FEV1 at age six, but reduced FEV1 decline when compared to ΔF508 homozygous patients (p <0.01). FEV1 decline was greater in patients colonised with *Pseudomonas aeruginosa* than in noncolonised patients (p = 0.046).

Conclusions:
Although FEV1 at age six years was low compared to developed countries, the annual rate of FEV1 decline in South African children with CF was minimal.

Title: **TMVA85A IMMUNISATION OF HEALTHY ADOLESCENTS INDUCES POLYFUNCTIONAL CD4 T CELLS THAT CO-EXPRESS TH1 CYTOKINES AND IL-17**

Authors: Thomas J. Scriba[1], Michele Tameris[1], Nazma Mansoor[1], Erica Smit[1], Fatima Isaacs[1], Alana Keyser[1], Sebastian Gelderbloem[1], Sizulu Moyo[1], Nathaniel Brittain[2], Alison Lawrie[2], Ashley Veldsman[1], Mark Hatherill[1], Linda van der Merwe[1], Anthony Hawkridge[3], Adrian V.S. Hill[2], Gregory D. Hussey[1], Hassan Mahomed[1], Helen McShane[2] and Willem A. Hanekom[1].

Department: [1]South African TB Vaccine Initiative and School of Child and Adolescent Health, IIDMM, University of Cape Town, South Africa. [2]Centre for Clinical Vaccinology and Tropical Medicine, Oxford University, UK. [3]Aeras Global TB Vaccine Foundation, Rondebosch, South Africa.

Objective:
World-wide, most infants receive BCG to prevent tuberculosis (TB), but BCG-mediated protection against lung TB is highly variable. MVA85A, a new TB vaccine aimed at boosting BCG-primed immune responses, may enhance immunity to TB. We characterised T cell responses induced by MVA85A in healthy, BCG-primed adolescents, from Worcester, South Africa.

Methods:
Twelve adolescents were vaccinated with MVA85A and followed up for 1 year. Vaccine-induced T cell responses were characterized by IFN-γ ELISpot assay. Detailed analysis of vaccine-specific CD4 and CD8 T cell expression of cytokines was performed by intracellular cytokine staining with multiparameter flow cytometry. The memory phenotype of these cells was also assessed.

Results:
MVA85A vaccination induced potent and durable T cell responses in all volunteers, which exceeded pre-vaccination levels up to 1 year post-vaccination. These responses were CD4 cell mediated and comprised multiple cell subsets expressing combinations of IFN-γ, TNF-α, IL-2 and IL-17. Two polyfunctional CD4 T cell subsets dominated the MVA85A response, one expressing the Th1 cytokines IFN-γ, TNF-α and IL-2, and another co-expressing these 3 Th1 cytokines and IL-17. These CD4 T cells exhibited a stable effector memory ($CD45RA^{-}CCR7^{-}$) phenotype.

Conclusions:
MVA85A vaccination induced robust and durable polyfunctional T cell populations that may enhance BCG-induced immunity to TB.

Title: **DELAYING BCG VACCINATION DOES NOT IMPAIR THE BCG –SPECIFIC CD4+ T CELL RESPONSES IN INFANTS**

Authors: Benjamin Kagina[1], Brian Abel[1], Mark Bowmaker[1], Thomas Scriba[1], Sebastian Gelderbloem[1], Erica Smit[1], Mzwandile Erasmus[1], Non Nene[2], Gerhard Walzl[2], Gillian Black[2], Anneke Hesseling[3], Willem Hanekom[1]

Department: [1]South African Tuberculosis Vaccine Initiative (SATVI), Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town, Cape Town, South Africa.
[2]DST/NRF Centre of Excellence in Biomedical Tuberculosis Research and MRC Centre for Molecular and Cellular Biology, Division of Molecular Biology and Human Genetics, Faculty of Health Sciences, Stellenbosch University, Tygerberg, South Africa
[3]Desmond Tutu TB Centre, Department of Paediatrics and Child Health, Faculty of Health Sciences, Stellenbosch University, Tygerberg, South Africa

Background:
Mycobacterium bovis Bacille Calmette Guerin (BCG), the only registered vaccine against TB, is administered at birth. However, neonates' immune system is immature and this may prevent optimal immune responses to the vaccine. Delaying BCG vaccination in infants may enhance the immune response induced by the vaccine.
Objectives:
This study aimed to compare the magnitude, quality and memory phenotype of BCG-specific T cell responses in infants who either received BCG at birth or at the age of 10 weeks.
Methods:
In this longitudinal study, infants born to mothers in Khayelitsha, Western Cape were randomly assigned to receive BCG at birth or at 10 weeks of age (delayed group). Whole blood from the infants was collected at 10, 20 and 50 weeks after birth, and was either left unstimulated or incubated with live BCG. T cell expression of IFN-γ, TNF-α, and IL-2, and their associated memory phenotype were measured using a flow cytometric intracellular cytokine assay. Infant exposure to *Mycobacterium tuberculosis* (M.tb) was assessed using a 7-day whole blood assay incorporating ESAT-6 and CFP-10, and positive infants were excluded from further analysis.
Results:
Twenty-two infants were characterised in each group. Vaccination at birth induced a robust BCG-specific T cell responses at 10 weeks of age; including a significant population of polyfunctional CD4+ T cells co-expressing multiple cytokines; IFN-γ, TNF-α and IL-2. This contrasted with the unvaccinated cohort, which had an undetectable frequency of cytokine expressing BCG-specific CD4+ T cells. Ten weeks post vaccination; both groups had comparable BCG-specific CD4+ T cells responses, however at 50 weeks, the delayed group had a significantly higher BCG-specific T cell response. The memory phenotype of BCG-specific CD4+ T cell cytokine producing cells only differed at 50 weeks, and revealed that the delayed group had a significantly lower frequency of effector memory T cells.
Conclusion:
We conclude that BCG-induced T cell immunity measured at 10 weeks of age is vaccine-specific, and that delaying BCG vaccination by 10 weeks resulted in a longer-lived BCG-specific memory T cell response at 1-year of age.

Title: **CD4 AND CD8 T CELL RESPONSES TO CANDIDATE TUBERCULOSIS VACCINE ANTIGENS IN CHILDREN**

Authors: N.G. Tena-Coki[1,2,3,5], T.J. Scriba[1,2,3], N.Peteni[1], Brian Eley[1,3], R.J. Wilkinson[1,5], P. Andersen[4], W. Hanekom[1,2,3], B. Kampmann[1,5]

Department: 1. Institute of Infectious Diseases and Molecular Medicine (IIDMM), University of Cape Town, RSA.
2. South African Tuberculosis Vaccine Initiative (SATVI), University of Cape Town.
3. School of Child and Adolescent Health, University of Cape Town.
4. Staten Serum Institute (SSI), Denmark.
5. Division of Medicine, Imperial College London, UK.

Objective:
Despite routine vaccination of infants with Bacille Calmette-Guérin (BCG), the only Tuberculosis (TB) vaccine available, increasing numbers of children are diagnosed with TB and mortality is high in children with concomitant Human Immunodeficiency Virus (HIV) infection. The need for a more efficacious vaccine suitable for persons with immunodeficiencies is urgent. We aimed to study the T cell response thought to be relevant in protective immunity against TB and which may be enhanced by novel TB vaccines.

Methods:
We developed a multi-parameter flow cytometry panel that can be used to phenotypically and functionally characterise CD4 and CD8 T cell responses to mycobacteria-specific antigens. Whole blood was stimulated with mycobacterial antigens, including Antigen 85B and TB10.4, which are contained in a promising novel TB subunit vaccine. CD4 and CD8 T cell cytokine production as well as memory markers were analysed in 3 cohorts: children on TB treatment (n=15), BCG vaccinated, healthy children (n=15) and HIV-infected children prior to starting ART (n=15).

Results:
CD4 and CD8 T cell responses to the novel vaccine antigens were observed in all groups of children, albeit to varying degrees. CD4 T cell responses (IFN-γ^+/IL-2^+) dominated in TB patients and were mainly of an effector phenotype ($CD45RA^-CCR7^-CD27^{+/-}$). Single IFN-γ^+ producing CD8 T cell responses dominated in all groups of children. These cells primarily expressed a $CD45RA^-CCR7^-CD27^-$ effector memory phenotype as well as an effector memory phenotype re-expressing CD45RA ($CD45RA^+/CCR7^-/CD27^-$).

Conclusions:
It is encouraging that key cytokines are produced by both CD4 and CD8 T cells in response to antigens contained in a promising TB vaccine candidate in children, even in those with HIV infection. Our data suggest that vaccination may boost these responses in all groups of children, which may enhance BCG-induced immunity against TB.

Title: **THE NOVEL TB VACCINE, AERAS402, INDUCES A ROBUST AND POLYFUNCTIONAL CD4 T CELL RESPONSE, AND CD8 T CELL RESPONSE IN HEALTHY ADULTS**

Authors: Brian Abel[1], Nazma Mansoor[1] Michele Tameris[1], Deborah Abrahams[1], Lebohang Makhethe[1], Sebastian Gelderbloem[1], Marwou de Kock[1], Linda van der Merwe, Anthony Hawkridge[2], Giulia Schirru[3], Maria Grazia Pau[3], and Jaap Goudsmit[3], Jerry Sadoff[2], Hassan Mahomed[1], Gregory D. Hussey[1], Willem A. Hanekom[1]

Department: [1]South African Tuberculosis Vaccine Initiative, IIDMM, UCT
[2]Aeras Global Vaccine Foundation, Rockville, Maryland
[3]Crucell N. V, Leiden, The Netherlands

Background:
Tuberculosis (TB) is a major cause of illness and death worldwide, especially in the developing world, and it remains a leading infectious killer of young children and adults. Bacille Calmette-Guérin (BCG), the only licensed vaccine against TB, confers reliable protection against severe forms of TB disease in infants, but demonstrates variable efficacy against pulmonary disease. Since replacing BCG with a novel TB vaccine would be impractical and unethical, there is a concerted effort towards employing a heterologous vaccination strategy that boosts the existing BCG-specific response.

Objectives:
We investigated the safety and immunogenicity of the boosting vaccine, AERAS402, in a Phase I study in healthy *Mycobacterium tuberculosis* uninfected adults previously vaccinated with BCG.

Methods:
AERAS402 comprises Adenovirus35 expressing the mycobacterial antigens Ag85A, Ag85B, and TB10.4. Three escalating doses of AERAS402 were administered to groups of 10 adults each, and a fourth group received two administrations of the maximum dose. Whole blood was obtained from participants longitudinally, and vaccine-specific T cell responses measured by multi-parameter flow cytometry.

Results:
AERAS402 vaccination induced a robust CD4 T cell response against the vaccine antigens, which peaked at 28 days post-vaccination. This vaccine antigen-specific CD4 T cell response was dominated by a polyfunctional population co-expressing IFNγ, TNFα, and IL-2. Strikingly, AERAS402 strongly induced vaccine antigen-specific CD8 T cells expressing IFNγ and/or TNFα.

Conclusion:
The preliminary findings from this study indicate that AERAS402 is immunogenic, induces both CD4 and CD8 T cells, and supports further clinical trials assessing the efficacy of AERAS402 as a boosting vaccine.

Title: **CULTURE-CONFIRMED TUBERCULOSIS AT RED CROSS CHILDREN'S HOSPITAL**

Authors: David Paul Moore[1], Shaun Barnabas[1], Heather Finlayson[1], James Nuttall[1], Charmaine Rinquest[2], Andrew Whitelaw[3], Brian Eley[1]

Department: [1] Paediatric Infectious Disease Service, Red Cross Children's Hospital
[2] Infection Control Service, Red Cross Children's Hospital
[3] National Health Laboratory Service, Groote Schuur Hospital

Objectives:
The Western Cape is one of the epicentres of the world's tuberculosis (TB) pandemic, and children living in high-burdened communities in this Province are at high risk for developing active TB. The clinical profiles and management of children who were investigated for TB at Red Cross Children's Hospital over a 21 month period from 25 October 2006 to 30 July 2008, and confirmed to have culture-proven disease, are described.

Methods:
Children with culture-positive TB were identified by weekly updates provided by the Groote Schuur Microbiology laboratory. Folders of these children were retrieved and details relating to demographics, history, clinical status and therapy offered at the TB index admission episode were recorded. Statistical analysis was conducted using STATA version 9.0, employing standard statistical methods.

Results:
Two hundred and thirty children were noted to have culture-confirmed TB: 127 (55%) boys and 103 (45%) girls. Median age at presentation was 32.9 months (IQR 15.4 – 84.6). One hundred and twenty-eight (56%) children had PTB and 102 (44%) had EPTB. HIV status was confirmed to be positive in 58 (25%) and negative in 81 (35%) of the children. Ninety-one (40%) children had no discernable HIV result.
Sixty-four (28%) children had smear-positive disease. Median time to culture positivity was 18 days (IQR 13 – 22): 12 days (IQR 10 – 18) in patients who had smear-positive disease and 19 days (IQR 15 – 24) in those with smear-negative disease, P<0.001. HIV positive children were more likely to have smear-positive disease (OR 2.0; 95% CI, 1.0 – 4.4), P=0.046.

Tuberculosis was not clinically suspected in 32 (14%) of the children, 5 (16%) of whom had smear-positive disease. The frequency of unrecognised TB was similar in HIV positive and negative children (OR 2.4; 95% CI, 0.7 – 9.9), P=0.13. Eighty (40%) of the 198 children who were clinically diagnosed with TB were not notified for their condition.

Thirty (9%) of the isolates were resistant to H, R or HR. Drug resistant TB tended to be more frequently encountered in HIV positive children (OR 2.8; 95% CI, 0.9 – 8.8), P=0.042. Anti-tuberculous regimens utilised in those who were started on TB treatment consisted of RHZ in 96 (50%), RHZE in 43 (22%), RHZEo in 39 (20%) and MDR therapy in 7 (4%).

Conclusion:
A substantial proportion of children with culture-confirmed TB are neither tested for HIV nor notified for their condition at Red Cross Children's Hospital. Avenues for strengthening the feedback of TB investigations to patients and their families need to be explored in our setting in order to effect appropriate care.

Title: **CLINICAL PRACTICES AROUND CHILDREN WHO DIE AT THE RED CROSS CHILDREN'S HOSPITAL – AN EXPLORATION OF *RESPONSABILITY* AS CENTRAL TO PRACTICE**

Authors: Minette Coetzee; Louis Reynolds, Jane Booth, Carla Brown, Angela Leonard, Anchen Verster, Michelle Edkins.

Department: UCT School of Child and Adolescent Health

Introduction:
Children die in hospital each week. Evidence certainly exists for the importance of best practice in the palliation of children who are dying. The accepted standard of care is that a child should be cared for in the context of the family system and community. In a hospital setting this means that no child should ever be allowed to die alone, in pain, or without support. At Red Cross Children's Hospital, as in many other tertiary care settings, practitioners need to balance the care of the child, the family, staff and witnesses with the resources at hand. The practices around the care of dying children at this hospital were the focus of this study.

Method:
This paper will describe the results of the first phase of a descriptive action- oriented study. It was directed at describing the current situation and involving a wide and multi-disciplinary group of participants in a continuing research and practice agenda. This phase utilised qualitative design to describe the current experience and practices of multi-disciplinary ward teams around children who die in their wards. Content and thematic analysis of data from 3 different settings revealed that the central phenomenon in the practices around the dying child is practitioners' *responsibility*.

Results:
Data indicates that the actions and interactions around a child and family revolve around how practitioners are able to respond and carry their particular responsibility for doing the best for a particular child. The theoretical model of Corbin and Strauss was utilised to distil the causal conditions and consequences surrounding the range of actions and interactions around this central process of *responsibility*. Data also reveals the nature of the context and intervening conditions that could effect the particular practices in these settings.

This presentation will describe the initial analysis of the nature of practice around children dying in this setting.

Title: **AUDIT OF POISONING CASES PRESENTING TO RED CROSS CHILDREN'S HOSPITAL**

Authors: Dacombe KA, Roberts JC, Du Plessis J, Glasstone M, Curling L, Mann M

Department: Poison Information Centre, School of Child and Adolescent Health, Red Cross Children's Hospital

Objective:
To describe the poisoning cases presenting to Red Cross Children's Hospital with a view to investigating effective means of decreasing childhood morbidity and mortality related to ingestion of harmful substances.

Method:
Analysis of data collected between 2003 and 2007 inclusive by retrospective review of case records shortly after discharge.

Results:
2403 children were seen in the 5-year period, ranging from 471 to 498 per year. 11 deaths occurred. 74% of the poisonings came from 9 suburbs. Children under 4 years of age made up 80 % of the poisonings.

Medicines, paraffin (kerosene), household cleaning agents and pesticides were responsible for 81% of poisoning agents and all the deaths. The number of patients with poisoning by medicines, paraffin and household cleaning agents remained constant, over the years reviewed.

Poisonings related to medicines were the highest totalling 938. Patients came from all areas. The drugs most frequently involved were psychiatric medications. 49 (0.05%) of the children poisoned by medicines were classified as severely ill. Long-term sequelae were expected in 1 patient who had ingested traditional medicines. There were 4 deaths, all due to traditional medicines. Paraffin poisoning was second highest with 596 cases. 89% of patients come from 5 areas. 28 (0.05%) of the patients who had ingested paraffin were classified as severely ill. Long-term sequelae were expected in one of the patients. There were 2 deaths. Household cleaning agents were responsible for 244 cases of poisoning. Patients came from all areas. The product most commonly involved was Jik (household bleach). 5 (0.02%) of patients were classified as being severely poisoned. There were no deaths but long-term sequelae were expected in one patient who ingested bleach and 3 who ingested oven cleaner.

Poisonings relating to pesticides was fourth highest with 222 cases. The incidence of pesticide poisoning has increased from 25 cases in 2003 to 70 cases in 2007. This has been largely due to unlabeled pesticides. Pesticide poisonings come from numerous suburbs but 75% of unlabelled pesticides are found in 5 suburbs. Other agents commonly involved in pesticide poisonings are Rattex (coumarin rodenticide) and organophosphates. Their incidence has remained constant. 62 (0.28%) of patients were classified as severely ill. 53 of these were related to unlabelled pesticides, 7 to organophosphates and 1 each to moth balls and amitraz. There were 2 deaths due to unlabelled pesticides, 2 to organophosphates and 1 to Phostoxin (aluminium phosphide).

Conclusion:
There has been no change in the number of poisonings presenting to Red Cross Hospital over the last 5 years.
To decrease the number of childhood poisonings the target group would be children under 4 years, focusing on 9 specific suburbs, with attention to medicines, in particular psychiatric medicines, paraffin, household cleaning agents and pesticides. Decreasing mortality may require a different approach with the focus on 5 specific suburbs, pesticides, paraffin and traditional medicines.
The increase in unlabeled pesticides needs urgent attention as not only are they frequently involved in poisonings, but have also lead to 2 deaths so far.

Title: **AUDIT OF PAEDIATRIC BLOOD CULTURES PREFORMED AT NEW SOMERSET HOSPITAL FROM 01/09/2005 to 01/09/2006.**

Authors: Black D, Levin M

Aim:
To review blood cultures done at New Somerset Hospital over a period of one year from 01/09/2005 to 1/09/2006 and to determine the percentage of positive blood cultures, the most common organisms isolated and the incidence of contaminated cultures.

Method:
Retrospective review of all paediatric blood cultures done at Somerset hospital over the period of one year from 01/09/2005 – 01/09/2006.Data collected by NHLS laboratory IT technician. Organisms were classified as contaminants or pathogens on bacteriological rather than clinical criteria.

Results:
Total cultures analysed 363. Of these 66 (18%) were positive. In 28 of 66 (42%) Staphylococcus Epidermidis was isolated. **Pathogenic organisms were isolated in 23 of 66 positive blood cultures (35%)**. Pathogenic organisms were isolated from 33% of positive cultures (Bailey) 43% (Barkley) 25% (Ebden) and 24% (casualty).**Contaminated cultures composed 43 of 66 positive blood cultures(65%).** 66%(Bailey ward), 57% (Barkly ward), 75% (Ebden ward), 76% (casualty).

Conclusions:
A significant percentage of cultures done during the study period were contaminated. These contaminants result in significant additional costs and reduce the incidence of isolating pathogenic organisms. Ongoing reinforcement of correct method of culture taking and demonstration of technique to all new doctors in paediatric clinical areas is to be encouraged. Differences were found between different areas of the hospital. These may result from differences in patient population or in differences between medical practice .Cultures should not be done in casualty but in more controlled circumstances in paediatric wards unless delay in commencement of antibiotic therapy would negatively affect patient care. Blood cultures to be done at initial patient presentation only if clinically indicated.

Title: **RAPID REHYDRATION FOR DEHYDRATION IN GASTROENTERITIS: SAFETY IN A BUSY REHYDRATION UNIT**

Authors: Bromley C, Westwood A, Frigati L

Objective:
To audit the safety of nasogastric or intravenous rapid rehydration (RR) therapy introduced into a busy clinical setting where there may be significant co-morbidities.

Methods:
Folder review of 402 admissions to the Red Cross War Memorial Children's Hospital in March 2007. Basic data collected included demographic data, HIV and nutritional status and use of oral rehydration (ORT) before admission. Safety was assessed by measures of protocol adherence e.g. correct fluid calculation and reassessment, and defined complications such as oedema. Complications among those on routine treatment where RR had been indicated were compared with those on RR.

Results:
Mean age of the patients was 10,6 months. 10,7% were HIV-infected. ORT had been used in 90% of cases. Seventy five percent of children were rehydrated via the nasogastric route. RR was indicated in 142 children (35%) of whom 96 received it. Of the 265 children not eligible for RR, 39 (14.7%) received it, with one developing fluid overload. In almost half of RR cases, re-assessment and fluid re-calculation did not occur within the 4 hours stipulated in the protocol. Two children receiving RR for correct indications had mild adverse effects. Three children on the slower hydration regime had complications. No complications resulted in permanent sequelae.

Conclusions:
RR appears to the safe in this environment, but further steps need to be taken to ensure it is used correctly.

Title: **DENTAL MANAGEMENT IN PROFOUND CHILDHOOD DEAFNESS**

Authors: Beighton P, Sellars S, Stephen LXG

Dental management of children with profound deafness poses special problems which are related both to the hearing loss and to a variety of underlying conditions. More than 10,000 deaf children are currently resident in special educational facilities throughout South Africa.
This presentation outlines Genetic syndromic deafness conditions which are likely to be encountered in dental practice, such as Waardenberg Syndrome, Treacher Collins syndrome, Usher Syndrome, and Pendred Syndrome,

Objective:
To document the clinical manifestations of deaf children at various special educational institutions in SA

Methods:
A team of geneticists, ENT specialists, and dentists visited the facilities in South Africa to examine a document the clinical findings of the patients.

Results:
This survey revealed that a significant proportion of these patients had complex malformation syndromes or genetic disorders, in which cardiac and other complications posed risks during dental intervention and anaesthesia. In some children, concomitant visual loss or intellectual dysfunction created additional problems. In all aspects of dental care it was also necessary to overcome the barriers to communication which are inherent in hearing loss.

Conclusion:
Dental management of a child with profound deafness necessitates an understanding of the implications of the hearing loss and the potential presence of wide range of additional complications.

Title: **A DESCRIPTIVE SURVEY TRACKING CATHETER RELATED BLOODSTREAM INFECTIONS IN RCCWMH PICU**

Authors: Candice Bonaconsa, Charmain Rinquest, Andrew Argent, Minette Coetzee

Objective:
It is found that between 3200 and 5000 deaths are associated with Catheter Related Bloodstream infections annually in the USA. These are relevant findings that provoke questions around why these statistics are so high. Currently, data concerning CR-BSI in our context is scanty.

Our aim was to carry out a descriptive survey to reflect practice and create awareness around CR-BSI. No such studies were taking place. Concurrently, protocols on line care were being developed through the BOUNCE project (Best Outcomes for Nursing Children with Excellence). We hoped that in reflecting our current rate of line sepsis, it would influence the relevance of implementing evidence based protocols on line care. Knowing the current situation would direct future intervention.

Methods:
A protocol was drawn up using the CDC guidelines: *How to collect and monitor bloodstream infection rates*. Over a four month period, positive blood cultures were tracked on all children who had central lines for 48hours or more in the PICU The objective was to establish if the primary source infection was related to the line. A study by Boon et al 2008 suggested that arterial catheters should be accorded the same degree of importance as the central venous catheters as a potential source of sepsis. We included arterial lines in the survey.
A vascular access form was designed to capture line information on every child for a period of a month. This included peripheral, central and arterial lines: date inserted, removed, type, where inserted.
We then t reviewed the information gathered and using the CDC guidelines helped to identify CR-BSI in Red Cross Children's Hospital PICU.

Results:
Results were tracked for a period from March to June 2008.
The findings reflected:

- Rate of CR-BSI per 1000 catheter days (Arterial lines were included in June 2008). These varied from 4.3 to 16.9 CR-BSI per 1000 catheter days.
- Number of bed days occupied due to prolonged hospitalization (77 days over four months)
- Cost of treatment (R385 000 over four months)

Conclusions:

- Reflecting findings has increased the awareness around CR-BSI amongst PICU staff
- It has created a relevant platform from which to improve practice relating to line care
- The findings realistically reflect the drain on resources caused by CR-BSI

Title: **WORKING WITH SICK CHILDREN – DESCRIPTIVE EVALUATION OF THE FIRST THREE YEARS OF A TRAINING PROGRAMME AT RED CROSS CHILDREN'S HOSPITAL**

Authors: Minette Coetzee, Weez Bramwell

Department: Child Nurse Practice Development Initiative, Child Nurse Unit, UCT School of Child and Adolescent Health

In 2004 a Teaching and Learning Needs Analysis of nurses at Red Cross Children's Hospital indicated a need for additional and transitional training of current staff in working with sick children. This need had arisen because undergraduate and pre-registration nursing education in South Africa is adult based. The significant loss of experienced nurses in the preceding ten years as well as continuing migration and retirement of nurses with experience in working with children resulted in the need for an accessible practice-based module.

The key differences between nursing adults and children are not only technical skills based but also revolve around understanding and anticipating different behavioural responses of children at different developmental stages. The presence of anxious parents, different work routines and organisation also add challenge to the care of sick children. A 5-day module was developed and has been offered every two months for the last four years and 220 nurses have attended the module.

The module augments courses offered in the hospital nursing education department and it aims

- to facilitate an understanding of the development and behaviour of sick children
- to offer the nurse the tools to communicate, in the best possible way, with children and their families in times of being ill and hospitalised.

Practical application and skills development are included.

This poster will present the demographic data of these participants as well as a descriptive analysis of the evaluation process.

Submitted from the Child Nurse Practice Development Initiative,
School of Child and Adolescent Health

Lead: Minette Coetzee PhD RPaedN Contact: minette.coetzee@uct.ac.za ext: 5492

Title: **COMMUNICATING FAMILY-FRIENDLY PRACTICE – STARTING BY SAYING WHAT WE DO**

Authors: Minette Coetzee, Anchen Verster, Angela Leonard and Brenda Goedeke

Department: Child Nurse Practice Development Initiative, Child and Adolescent Nursing Unit, UCT School of Child and Adolescent Health

A growing evidence base confirms that Family-centered approaches improve outcomes in paediatric health care facilities. At the Red Cross Children's Hospital a shift to family friendly Care became the focus of the Child Nurse Practice Development Initiative in 2007.

The approach is conceptually sound and outcomes like decreased length of hospital stay (25%) and cost per admission decreased (between 13.5 and 29%) have been reported in some settings. There is also evidence, which confirms our experience that success seems to revolve around two issues: space to accommodate families and communication norms.

At Red Cross Children's Hospital, one of the main themes of implementation has been the development of materials to communicate with children and their families. To date this has included more family friendly signage, welcome information brochures about various clinical areas and materials to facilitate communication about conditions and procedures. The methodology used in the development of these materials has been intentionally participative and has included working with parents, children and practitioners in various settings.

This poster will present the processes of development and evaluation of these materials in the last two years.

Submitted from the Child Nurse Practice Development Initiative,
School of Child and Adolescent Health

Lead: Minette Coetzee PhD RPaedN Contact: minette.coetzee@uct.ac.za ext: 5492

Title: **MECHANISMS OF IMMUNE REGULATION IN *MYCOBACTERIUM TUBERCULOSIS* INFECTION**

Authors: Cheryl L. Day[1], Keertan Dheda[2], Willem Hanekom[1]

Department: [1]South African Tuberculosis Vaccine Initiative, IIDMM, Faculty of Health Sciences, School of Child and Adolescent Health, University of Cape Town, [2]Lung Infection and Immunity Unit, Department of Medicine, Groote Schuur Hospital, University of Cape Town

Objective:
The aims of this study are to determine the expression of inhibitory receptors that negatively regulate activated antigen-specific T cells in peripheral blood of persons with latent and active pulmonary TB.

Methods:
Subjects recruited for this study include adults with untreated sputum smear+ pulmonary TB, sputum smear-/culture+ pulmonary TB, and healthy adults with latent TB infection (LTBI). Whole blood from these subjects is stimulated for 8 hours at 37°C with overlapping peptide pools spanning the sequences of Ag85A, CFP10, ESAT6, and TB10.4, as well as PPD and SEB. Red blood cells are then lysed and white cells fixed and permeabilized, followed by staining with monoclonal antibodies for the following markers: CD3, CD4, CD8, PD-1, CTLA-4, CD160, TIM-3, BTLA, IFN-γ, TNF-α, and IL-2. Stained cells are acquired on a BD LSRII multiparameter flow cytometer and analyzed using FlowJo software. Expression of the negative regulatory receptors PD-1, CTLA-4, CD160, TIM-3, and BTLA is determined on the total CD4 and CD8 T cell population, as well as the antigen-specific, cytokine-producing populations of CD4 and CD8 T cells. Longitudinal studies using peripheral blood samples obtained prior to anti-TB treatment, as well as 2 and 6 months following initiation of treatment, will be performed to determine the relationship between mycobacterial antigen load and expression of negative regulatory receptors on *M. tuberculosis*-specific T cells.

Results:
Enrollment has commenced to obtain peripheral blood samples from adults with LTBI, sputum smear+ pulmonary TB, and sputum smear-/culture+ pulmonary TB. Preliminary data indicate markedly upregulated expression of the inhibitory receptor CTLA-4 on *M. tuberculosis*-specific T cells in individuals with smear+ pulmonary TB compared to individuals with smear-/culture+ pulmonary TB and healthy LTBI individuals. In addition, expression of programmed death receptor 1 (PD-1) was increased on *M. tuberculosis*-specific T cells of individuals with pulmonary TB compared to healthy LTBI individuals.

Conclusions:
Expression of negative regulatory receptors has been associated with antigen-specific T cell dysfunction in other chronic infection models. Our preliminary data suggest that these inhibitory receptors are also upregulated in the context of high levels of chronic antigen stimulation in individuals with active pulmonary TB disease. Further studies will be conducted to determine the relationship between mycobacterial antigen load and expression of negative regulatory receptors, and whether the functional capacity of *M. tuberculosis*-specific T cells can be augmented following blockade of negative regulatory pathways *in vitro.*

Title: **DETERMINING THE EFFECT OF BIRTH WEIGHT AND GESTATIONAL AGE ON BCG SPECIFIC IMMUNE RESPONSE**

Authors: Frederick Dube, Cheryl Day, Willem Hanekom.

Department: South African Tuberculosis Vaccine Initiative, Division of Immunology, Department of Clinical Laboratory Sciences, Faculty of Health Sciences, University of Cape Town.

Vaccination of newborns with Bacillus Calmette-Guérin (BCG), the only currently licensed tuberculosis (TB) vaccine, has been shown to be effective in preventing severe and disseminated forms of TB in children. However immune correlates of protection and factors affecting priming of the BCG-specific immune response are poorly understood. The effects of birth weight and gestational age on the BCG induced immune responses are important issues to address as the protection offered by BCG vaccination in preterm (<37 weeks gestation) and low birth weight (<2,500g) infants compared to newborn full term infants is unknown. In this study, we are investigating the relationship between birth weight and gestational age with BCG-induced immune responses in a cohort of 104 10-week old South African infants vaccinated with BCG at birth. Whole blood stimulated with BCG for 12 hours will be stained with antibodies to CD3, CD4, CD8, IFN-γ, TNF-α, GMCSF, IL17 and IL-2, and analyzed by multiparameter flow cytometry. The human cytokine LINCOplex bead array assay kit will be used to determine the preferential expression of either Th1 or Th2 cytokines from cryopreserved plasma samples following 7-hour stimulation of whole blood with BCG. In addition, the effects of birth weight and gestational age on the proliferative capacity of BCG-specific T cells and the frequency of regulatory T cells will be determined. Understanding the effects of birth weight on the development of neonatal immune responses will be important in addressing public health questions regarding BCG vaccination of infants.

Title: **DOG BITES TO THE HEAD, NECK AND FACE IN CHILDREN**

Authors: Jeremy P. Dwyer, Sudeshni Naidoo, Sebastian van As

Dog bites are a poorly understood and complex public health problem. Children are most frequently the victims of dog bites and the face is often the favoured target.
Objective: A review of dog bite wounds in children presenting to the Red Cross Children's Hospital was carried out over a 13.5 year period (1991-2004). Methods: One thousand eight hundred and seventy-one dog-bite wounds were admitted from a total of 125,677 patients treated. This paper reports on the data regarding head, face and neck injuries. It does not report on the other bodily injuries sustained. Results: Of the patients presenting with dog bite injuries (n=1871), 596 children sustained injuries to the head, face or neck. Dog bites to the head, face or neck were responsible for 0.5% of all trauma unit presentations and 32% of all dog bite injuries. The mean age of the child was 5.1 years. Male children accounted for 68% of the patients. The peak incidence was noted in children ages two to four years old. One hundred and seventy-two (29%) bites occurred between the summer months of December and February. Two hundred and forty-nine (42%) patients presented to hospital between the hours of 12:00 and 18:00 hours and 275 (46%) children presented between 18:00 and 0:00 hours. A large proportion of all attacks occurred either inside or outside the victim's own home and at the home of friends or family. There were no statistically significant differences in the location of the attack and the age of the child. Superficial injuries were treated with wound cleaning, suturing and dressing. Only 5% of children required a procedure under general anaesthesia in the operating theatre. There were no fatalities. Conclusion: Dog bites are relatively common in small children, but do not represent a major cause of morbidity and mortality.

Title: **INVESTIGATION OF T-CELL RESPONSES TO MYCOBACTERIUM TUBERCULOSIS-DERIVED LATENCY ANTIGENS**

Authors: Lerisa Govender, Brian Abel, Jane Hughes and Willem Hanekom

Department: South African Tuberculosis Vaccine Initiative (SATVI), Institute of Infectious Diseases and Molecular Medicine and School of Child and Adolescent Health, University of Cape Town.

One-third of the world's population is latently infected with *Mycobacterium tuberculosis*, and approximately ten percent of this group is at risk of developing TB disease later in life. HIV infection dramatically increases the threat of TB disease to ten percent per annum in infected people, and in South Africa where HIV is rife, this poses a massive problem. Since the only licensed vaccine for TB prevention, Bacillus Calmette-Guerin, has variable efficacy against the development of pulmonary tuberculosis, and its effect on latency is unknown, it is imperative that further insight is gained on this mycobacterial enigma.

The objective of this study is to screen novel latency antigens in distinct cohorts, and characterize the specific immune response induced by these antigens. The aim is to comprehensively characterize the latency-antigen specific T cell subsets in peripheral blood. A comprehensive cross-sectional study comprising blood collected from BCG vaccinated latently infected and TB-diseased adults will be carried out. Established whole blood and PBMC lympho-proliferation assays will be performed using the novel latency antigens as stimuli, followed by intracellular cytokine staining and multi-parameter flow cytometry. This will allow for a comprehensive characterization of the phenotype, frequency and cytokine expression profiles of the latency antigen-specific T cell subsets.

The findings from this study will lead to the characterization of novel latency antigens, which may enable improved diagnosis of TB latency, and the development of improved vaccines.

Title: **IMPROVING MORALE AND TEAM WORK IN A WARD AT RED CROSS CHILDRENS HOSPITAL**

Authors: Galiema Haroun, Trudy Ramplin, Angela Leonard and Minette Coetzee

The Child Nurse Practice Development Initiative project's purpose was to enable nurse teams to consider their current practice and to identify something that they could tackle using a participative action research process. E1 is a busy ward specialising in the care of children with cardiac conditions and complex ENT conditions, often requiring tracheostomy and ventilation. All of these patients require vigilant and complex nursing care and interventions. This level of care can result in undue pressure resulting in low morale, a breakdown in communication and a strained working environment.

Quality of care is integrally linked to nurses' perceived ability to make a difference and their sense of support. Staff morale also has a great impact on the level of care that is rendered.
This project offered the opportunity for the issue of teamwork and staff morale to be addressed. The objective of the project was to identify the reasons for low morale in the ward and improve staff teamwork. The project set about encouraging communication between staff members to make a cohesive team.

There is significant evidence to suggest that good working relationships result in improved staff engagement, decreased illness and absenteeism and an increased confidence and ability to manage stress.

The method used in this project was questionnaires, completed by staff at regular intervals. As a result an encouraging 'thought for the day' message and birthday chart was implemented.

The poster will present the initial results, limitations and triumphs of this project.

Submitted from the Child Nurse Practice Development Initiative,
School of Child and Adolescent Health

Lead: Minette Coetzee PhD RPaedN Contact: minette.coetzee@uct.ac.za ext: 5492

Title: **EARLY LOW DOSE SURFACTANT THERAPY AND NASAL CONTINUOUS POSITIVE AIRWAYS PRESSURE FOR MILD RESPIRATORY DISTRESS SYNDROME.**

Authors: *AR Horn[†], C Pieper[†], S Holgate[‡], I Els[**].*

Department: *†: Division of Neonatal Medicine, School of Child and Adolescent Health, University of Cape Town and University of Cape Town.*
‡: Neonatal Medicine, Department of Paediatrics, University of Stellenbosch.
***: Department of Paediatrics, George Hospital, Western Cape.*

Objectives:
Previous research has shown that the administration of 200mg/kg surfactant, using Poractant Alpha (Curosurf®) to infants less than 30weeks gestation with infant respiratory distress syndrome (iRDS) receiving nasal continuous positive airways pressure (NCPAP) and inspired oxygen (FiO_2) ≥ 0.38, results in a decrease of the incidence of mechanical ventilation (MV) from 68 to 25%. Due to budget constraints, local practice has always been to use a lower dose of 100mg/kg in these infants and anecdotal experience suggests that administration of Curosurf® at lower thresholds and a lower dose is successful and beneficial. The objective of this study was to determine if the administration of Curosurf® 100mg/kg within 24 hours after birth when required FiO_2 is in the range 0.3 – 0.4, decreased the duration of assisted ventilation with NCPAP or MV compared to infants in whom the required FiO_2 is allowed to rise to > 0.4 before Curosurf® is administered. A further objective was to determine if this earlier intervention reduced the incidence of death or need for MV.

Methods:
Preterm Infants age 0.5 - 24 hours, gestation 28 - 35 weeks, weight ≥ 900g with a diagnosis of iRDS requiring NCPAP ≥ 5cm of water, and FiO_2 0.3 - 0.4 were recruited. All preterm infants who required NCPAP were screened over the first 24 hours of life to enable recruitment if the FiO_2 rose above 0.3. Infants with congenital sepsis, fetal hypoxia, pre-existing pneumothorax or life-threatening congenital anomalies were excluded. Infants were prospectively randomised into either a low or high threshold treatment group. The low threshold group received Curosurf® 100mg/kg, immediately after randomisation and the high threshold group only received Curosurf® 100mg/kg if their F_iO_2 requirement rose above 0.4. Curosurf® was administered intra-tracheally following intubation and the infants were subsequently extubated and returned to NCPAP as long as they had good respiratory effort. All the infants received routine care and monitoring. Arterial blood gas analysis was performed at recruitment, at age 24hours and as clinically indicated and the duration of assisted ventilation and incidence of complications was recorded.

Results:
Between January – November 2006, 27 infants were recruited. 14 infants were randomised to the high threshold group and 13 infants were randomised to the low threshold group. The mean gestational age in the two groups was 31 and 32 weeks respectively. There were no significant differences between the groups in the incidence of death, severe intraventricular haemorrhage or periventicular leucomalacia, necrotizing enterocolitis, pneumothorax, sepsis or patent ductus arteriosus. 15% of infants required MV in the low threshold group vs 30% in the high threshold group, but the difference was not significant. By 72 hours, fewer infants in the low threshold required respiratory assistance, but the difference was not significant. However, the mean $PaCO_2$ at 24 hours was significantly lower in the low threshold group ($p = 0.007$) and significantly fewer infants in the low threshold group required assisted ventilation after 36 hours
($p < 0.05$).

Conclusions:
Despite the small sample size, this study showed that the administration of 100mg/kg Curosurf® to preterm infants at 28 – 35 weeks gestation, with iRDS requiring NCAP at a threshold FiO_2 ≥ 0.3, significantly reduced the need for assisted ventilation beyond 36hours, compared to waiting until the FiO_2 reaches 0.4. The low dose early administration approach achieved lower subsequent MV rates than have been reported in other studies.

Title: **IDENTIFYING OPPORTUNITIES TO ENHANCE THE TOILET FACILITIES IN THE AMBULATORY SERVICES**

Authors: Yolande Jacobs, Rozanne Bihl, Lynne Starck, Dot Brown, Evelyn Turner, Angela Leonard and Minette Coetzee

The Child Nurse Practice Development Initiative was established to create a forum where the complex issues surrounding practice and the processes of nursing care of children can be explored by nurses in specific settings. This year the focus has been exploring practice issues around family friendly care. The quality of healthcare practice depends on the environment as well as the practice of providers.

In the busy ambulatory care service where approximately 198 000 children are seen every year, this could mean up to 4000 children a week. Children are always accompanied and often by more than one person in their family. This means at least 8000 people though the facility every week. The facility is newly built and was custom designed at the time. Toilet facilities for both children and parents were presumed adequate and accessible to adequately provide for needs of families attending the services. The majority of patients attending the ambulatory services are babies and toddlers who require feeding and nappy changing, but a survey to assess this adequacy early in 2008 revealed that only 20% of visiting families had any knowledge of nappy changing facilities.

Nappy changing facilities, like toilets, require running water, soap and safe access. The project's objective was to evaluate the current status of the toilet facilities in ambulatory care and to improve the nappy change areas. This would also support the ongoing hand hygiene focus in the hospital.

The methods used were a parent questionnaire about nappy change facilities and a number of subsequent action research cycles in which the research team explored current status of toilet and nappy changing areas. This process revealed often overlooked aspects of maintenance of toilets, and change facilities, the challenges of regular servicing and the complexities of varying departments responsibilities for maintenance. Additional understanding of the practices reveal that behavioral, institutional, and economic factors that determine the priority of interventions are often not clearly visible.

While the project encountered a variety of hurdles, there have been measurable practical improvements, including an understanding of communication and practice norms. This poster will present these and highlight the challenges of shifting practice when a variety of departments are involved.

Submitted from the Child Nurse Practice Development Initiative, School of Child and Adolescent Health
Lead: Minette Coetzee PhD RPaedN Contact: minette.coetzee@uct.ac.za ext: 5492

Title: **A NOVEL ASSAY MEASURING LIVE T CELL PROLIFERATIVE AND FUNCTIONAL POTENTIAL ASSOCIATED WITH BCG INDUCED PROTECTION AGAINST CHILDHOOD TUBERCULOSIS**

Authors: E. Jane Hughes, Marwou de Kock, Willem Hanekom

Objective:
To develop an assay to assess BCG-specific proliferative responses and cytokine production potential using cryopreserved PBMCs from infants.

Methods:
A flow cytometric assay that uses a new cell cycle tracking dye, Oregon Green, has been optimised in pilot studies using cryopreserved PBMCs from 10 week old infants vaccinated at birth with BCG. Briefly, PBMC are rapidly thawed, transferred to prewarmed medium with DNAse, washed with PBS and a Trypan Blue viability test performed. In 96-well plates, $2x10^5$ PBMC are rested overnight per well in 200µl medium; BCG at a MOI of 0.01 is added the next day. After 6 days, PMA (50ng/ml), ionomycin (250ng/ml) and brefeldin-A (10µg/ml) are added to restimulate the cells in order to assess cytokine production potential. After 5 hours, cells are harvested with EDTA (2mM), washed with PBS, stained with the violet viability dye (ViViD; Invitrogen), then fixed and stored at -80°C in BD FACSLysing Solution. Later, cells are thawed, washed, permeabilised and stained with anti-CD3-QDot605, anti-CD8-Cy5.5PerCP, anti-IFN-γ-Alexa700, anti-TNF-PECy7, anti-IL-2-APC, and anti-IL-4-PE, acquired using a BD LSRII flow cytometer and analysed using FlowJo™, Pestle and Spice software.

Results:
Use of Oregon Green cell tracking dye was associated with greater frequencies of proliferating cells detectable, and gave clearer, sharper peaks, compared with the more widely used CFSE. An 8-colour antibody panel has been successfully optimised to quantify IFN-γ, TNF, IL-2 and IL4 production potential. PBMCs stimulated with BCG showed an improved percentage of cytokine producing proliferating CD3+ T cells with inclusion of a viability dye. The distribution of Th1 cytokine production showed a predominance of cells producing both IFNγ and TNF, followed by single IFNγ producers for both CD8+ and CD8neg proliferating T cells.

Conclusions:
This proliferation assay is able to measure the capacity of proliferating cells to produce the Th1 cytokines IFN-γ, TNF, and IL-2, thought to be critical in immune responses to *M. tuberculosis*, and the Th2 cytokine IL-4, thought to be associated with suboptimal protection against TB. Supernatant may also be harvested and stored to measure further cytokines. We have shown in pilot studies, using PBMC from infants vaccinated with BCG, that all these cytokines are detectable in proliferating cells of BCG vaccinated infants.

Title: **DETERMINING UNDERGRADUATE NURSING STUDENTS IMPRESSION OF THE VISIBLITY OF PRACTISING FAMILY FRIENDLY CARE IN THE WARDS**

Authors: L Jonker, J Lucas, N Möller

Introduction:
Measuring the implementation of aspects of family friendly care is complex. Parents are reluctant to verbalise negative information.
The nursing education unit set out to measure the visibility of implementation obtaining information from students placed in the wards to practice nursing skills required for their training.

Methods:
Students were exposed to the concept of family centered care as practiced in Red Cross War Memorial Children's Hospital [RCWMCH] during the orientation session held on the first day of the practice placement period.

The students were asked to complete a checklist during the 4th week of placement. The checklist contained no ward data or details about the respondent to ensure anonymity.
Students from WCCN [who spent a period shorter than 4 weeks in a ward] and students on night shift were excluded from the study.

The results were analyzed using an excel spreadsheet.

Results:
Number of students on orientation: 201

Students excluded from the study: 109

Students eligible to participate: 92

Questionnaires returned: 51 [54%]

Students were positive that medical and nursing team greets parents. They observed that parents are involved in the care of their children and that they are most of the time asked how they think their child is progressing. Students observed that parents are encouraged to stay at the bedside. It has been noticed that the parents' personal needs are taken into account, that the parent is involved in the care of the child and that the siblings are allowed to visit.
Students were less convinced that staff knew the family and home background.

Conclusion:
Students observed that family centered care is entrenched in the hospital. This confirms the results of a survey done in 2007 [Coetzee M, Verster A and Bramwell L] where parents were the respondents. Repeat of a similar study comparing results of individual wards may show areas that need strengthening.

Submitted from the Child Nurse Practice Development Initiative, School of Child and Adolescent Health

Lead: Minette Coetzee RPaedN

Title: **MISSING:** WHERE HAVE ALL THE BABIES GONE?

Authors: Legg PA, De Decker R, Fieggen K, Urban M, Urry J, Sklar D.

A retrospective audit to assess the follow-up rate of infants seen by medical geneticists in the neonatal units of GSH, MMH and NSH over a three year period.

Records were reviewed to determine the number of babies followed up at Red Cross Hospital Genetic or Cardiogenetic Clinics. For those not seen again by geneticists an attempt was made to find the reason. In a small group no follow-up had been requested by the assessing geneticist. A further subset was known to have died, or was presumed to have died, due to the lethal nature of the condition.

The remaining group were those babies lost to follow up. This group was analysed more carefully to ascertain the possible diagnosis, cytogenetic results, attendance at other clinics at Red Cross Hospital and demographic data to see if any trends could be identified that may assist in improving clinical genetic services.

Title: **GENITAL WARTS IN HIV POSITIVE CHILDREN**

Authors: Didi Motsepe

We present a series of 5 female patients aged 2 – 6 years seen at a Paediatric Dermatology Clinic in Cape Town over a period of 6 months. All children presented with at least a few months history of severe genital warts. On examination large fungating vulval warts that extended into the perineum were evident. All children were HIV positive on HAART. Onset of warts relative to CD4 count was not known.

In none of the cases was there suspicion of sexual abuse. All children failed to respond to treatment with podophyllin and 1 child responded to imiquimod. One child with little response to 10 months of HAART, responded to treatment with CO_2 laser.

In two children the lesions resolved spontaneously after a period of 9 and 11 months of HAART respectively. There was no direct correlation between warts clearing and the extent of immunosuppression (CD4 count) or length of time the child had been on HAART.

This anecdotal data may suggest that genital warts in HIV positive children are resistant to topical treatment and may take at least a year to respond to HAART.

Title: **LONGITUDINAL CHARACTERISATION OF THE HUMAN IMMUNODEFICIENCY VIRUS TYPE-1(HIV-1)-SPECIFIC T-LYMPHOCYTE IMMUNE RESPONSES OVER THE FIRST YEAR OF LIFE IN HIV-1 INFECTED INFANTS**

Authors: Bongeka Nqoko, Cheryl Day, Nazma Mansoor, Willem Hanekom

Department: South African Tuberculosis Vaccine Initiative, Division of Immunology, Institute of Infectious Diseases and Molecular Medicine,Faculty of Health Sciences, University of Cape Town

Without antiretroviral treatment, HIV-infected infants can progress to AIDS very rapidly within the first year of life. This has been proposed to be due to the high number of available cells for infection as well as the immaturity of the infant immune system. Although virus-specific CD8+ T cell responses have been detected in HIV-infected infants at birth, little is known about the functionality of these responses and their correlation with control of viremia and disease progression. Previous infant studies have shown that the strength of the HIV-specific IFNγ+ CD8+ T cell response increases with age and is dependant on the CD4+ Tcell count and phenotype. We have previously shown that the cytokine secretion capacity of BCG-specific T cell responses following BCG vaccination is impaired in HIV-infected infants compared to HIV-uninfected and HIV-exposed uninfected infants. Using this same cohort of infants, HIV-specific T cell responses are being characterized longitudinally at 3, 6, 9 and 12 months of age. Whole blood samples were stimulated with HIV antigens Gag and Env and intracellular cytokine staining will be used to analyze expression of IFN-g, TNF-a, and IL-2 by multiparameter flow cytometry. Additionally, expression of the inhibitory receptors PD-1 and CTLA-4, both of which have been associated with HIV disease progression in adults, will be measured on cytokine-producing HIV-specific CD4+ and CD8+ T cells in this infant cohort. These data will broaden the database of knowledge of the mechanisms of HIV immunopathogenesis in HIV-infected infants.

Bongeka Nqoko
MSc Student
South African Tuberculosis Vaccine Initiative
Institute of Infectious Diseases and Molecular Medicine
University of Cape Town
Tel: 021 4066072

Title: **CANDIDATE GENES FOR SUSCEPTIBILITY OR RESISTANCE TO TB: DNA SEQUENCE ANALYSIS OF THE IL12P40 PROMOTER.**

Authors: Sandy Pienaar[1], Brian Eley[1], Mike Levin[2], Howard Henderson[3]

Department: 1 Department of Paediatrics and Child Health, Red Cross Children's Hospital
2 Faculty of Medicine, Imperial College of Science, Technology and Medicine, London
3 Department of Chemical Pathology, Red Cross Children's Hospital/GSH

Objective:
DNA sequence analysis of the promoter of the IL12p40 gene, one of the critical components of the IFNγ pathway and a strong candidate gene for susceptibility or resistance to TB in children.

Methods:
DNA was sourced from a sub cohort of children with TB (n=111) and healthy controls (n=59). A 2022bp section of the IL12 p40 promoter was amplified by PCR in eight overlapping sections. These individual fragments were screened for mutations by the WAVE method. DNA fragments with mutations were sequenced for description of the sequence changes, with Multiplex PCR assays being set up to detect the alterations detected.

Results:
Two single nucleotide polymorphisms (SNPs) were detected in this promoter region, an A→G substitution at bp -1515 and a C→ T substitution at bp -1564. Both SNPs were only found in the heterozygous state.
A larger section of the DNA cohort of children with TB (n=180) and healthy controls (n=142) was then screened for the A→G heterozygous change by PCR.
Comparisons of the frequencies of these SNPs between patients and controls revealed the A→G SNP to be significantly less prevalent in the patients compared to controls [1.67% vs 7.04%; (p = 0.015 Fischer's Exact); n=180 and 142, respectively]. No significant difference was found between the subject groupings for the C→T SNP. Interestingly, the A→G SNP was found to lie within a GTATA pentanucleotide sequence, reported to bind nuclear proteins.

Conclusions:
Two novel SNPs have been found in the promoter of the IL12 p40 gene. The possible biological importance of these SNPs in the regulation of gene expression is currently being investigated through reporter assays using the Dual Luciferase Reporter Assay. Clinical descriptions and cytokine levels (TNFα, IFNγ and IL12) have been recorded for these children and further analysis will be done.

Title: **AN INITIATIVE AIMED AT BEST OUTCOMES FOR NURSING CHILDREN WITH EXCELLENCE (BOUNCE)**

Authors: Charmain Rinquist RN, RM, RPscyN, RCHN, 1 &
Sandy Staveski RN, MS, CPNP-AC, CNS, CCRN 2 &

Marleen Petersen RN, RM, RCCN, DNA, DNE 3 &
Natalie Möller RN RSCN (Eng) DNE B.A. (Psych/Education UNISA) 4 &

Jenny Knobel RN, RM, RSCN 5 &
Hilary Barlow RN, RM, RNeonN, MSC [US] 6 &
Johanna Lucas RN, RM, RSCN 7 &
Linda Jonker RN, RM, RCHN, RCCN, DNE, DNA, Hons BACUR [UNISA] 8 &
Candice Bonaconsa, RN, RM, RPscyN, RCHN, BCUR [Nursing –SUN] 9&
Andreas Tsakistos, M A (Denver, Colorado) in International Development.10 &.
Minette Coetzee, RN, RM, RPscyN, RCHN, RSCN; PHD [UCT] 11

Introduction:
Children's Heartlink (CHL), a United States based NGO, approached the Red Cross Children's Hospital (RCWMCH) a specialist children's hospital in Cape Town, South Africa to collaborate on a project aimed at retention of PICU nurses. At RCWMCH, this coincided with a newly appointed nurse leadership team and an existing child nurse practice development initiative working on participative protocol development with an interdisciplinary Paediatric Intensive Care (PICU) team.
During a series of meetings, the BOuNCE project was conceptualized. The main aim was to support resource development and PICU nurse training. Lucile Packard Children's Hospital (LPCH) in the United States became the other project partner.

Methods:
The mainstay of any successful collaboration is communication. The BOuNCE collaborative is enhanced by teleconference meetings-, on site visits 2-3 times per year and augmented by regular electronic communication. We used a multi-modal, participative approach to enhance clinical care delivery. Methods included:

1. Resource development consisting of protocol development process and pocket reference booklets for use in PICU;
2. Training including joint seminars, formal cardiac care courses and ad-hoc in- service sessions;
3. Skills fair;
4. Preceptor workshop and
5. Information posters.

Results:
There was an increase in the number of staff who could participate in training.
Eight professional nurses are currently completing a cardiac care course designed to provide skills caring for children after cardiac surgery.
Twenty four Nurses completed a High Care Course preparing staff to care for very sick children.
Eighteen new Prof Nurses successfully completed the induction and orientation requirements to work in the PICU unit. This assisted in staffing the PICU for 18 patients. (Increase of 2 beds)
Ten preceptors were trained to support new staff during orientation and induction.
A Hundred Nurses attended the skills fair.
Staff of RCWMCH and LPH presented two workshops that were attended by 180 persons from the Health Sector in the Western Cape Province.

Conclusions:
Our collaboration has taught us many lessons including cultural and practice differences. We have shared information and become acquainted with one another's' contexts by communicating across oceans and time zones.
CHL funding increases what we are able to achieve and offers opportunities for travel to a different country and clinical settings in hopes of retaining nurses both in the United States and South Africa and improving our patient's outcomes.

Title: **DENTAL ASPECTS OF RUSSELL-SILVER SYNDROME**

Authors: T ROBERTS, L. STEPHEN[1], and P. BEIGHTON[2]

Department: [1]University of Western Cape, Cape Town, South Africa, [2]University of Cape Town, South Africa

Introduction:
The Russell-Silver syndrome (RSS) is characterised by low birth weight, slow growth and limb length asymmetry. Affected persons have slight stature and a typical "elfin" appearance, with a prominent forehead and a pointed face. Fifth finger clinodactyly and brown skin macules are additional minor features.
The RSS is uncommon but well recognised, and a population prevalence of 1 in 100,000 has been estimated. On this basis, there must be several hundred affected persons in South Africa.
Mandibular hypoplasia is frequent, and if severe, dental crowding and tooth malalignment can occur. The palate is often high, and in infrequently, the Pierre-Robin sequence and cleft palate may be present. In these circumstances, disturbances of articulation may necessitate speech therapy.

Objectives:
In order to bring the RSS to the attention of the SA Dental community, we have documented and depicted an affected woman and child, outlined a protocol for dental management and reviewed the dental features of this disorder.

Methods:
Two individuals, namely a woman and child in which a diagnosis of the Russell-Silver syndrome had previously been made on the basis of defective growth, asymmetry and the characteristic facies, were assessed. Clinical examination and intra-oral assessments were made.

Results:
There was extensive dental caries in both individuals. The older person also demonstrated plaque and calculus on the majority of the teeth. Malalignment was noted. Severe gingival recession and tooth mobility was seen.

Conclusion:
In terms of dental management, the slight stature may influence positioning in the dental chair. Likewise the small dimensions of the mouth may impede dental management of tooth malalignment and caries. If intubation is needed, limited buccal size may be a constraining factor. On the positive side, there are no specific internal ramifications in the RSS which might otherwise complicate dental anaesthetic

Title: **DENTAL MANAGEMENT OF GENETIC DISORDERS**

Authors: T ROBERTS, L. STEPHEN[1], and P. BEIGHTON[2]

Department: [1]University of Western Cape, Cape Town, South Africa, [2]University of Cape Town, South Africa

Introduction:
More than 5000 genetic disorders have been delineated and their molecular pathogenesis and natural history is now being elucidated. With the advances in knowledge, these heritable conditions are becoming increasingly important in dental practice.
In many genetic disorders, involvement of oro-dental structures is a major feature, and in some, additional syndromic components impact upon dental management. Recognition of the potential for familial occurrence is also relevant for the long term dental care of affected kindreds.
Numerous genetic disorders cause categories of serious handicap for which institutional care or special facilities are required

Objectives:
This presentation outlines the major features of a few genetic conditions as well as the principles of management of patients that have been treated in the special dental genetic clinic of UWC at Red Cross Hospital.

Methods:
Patients were referred to the special dental genetic clinic from the department of Human Genetics (UCT) for appraisal and management of their dental care. All patients were assessed and treated by a team of medical and dental specialists.

Results:
The major features of a few patients such as Marfan Syndrome, Freeman Sheldon Syndrome and Ehlers-Danlos syndrome are discussed in the presentation

Conclusion:
In view of the large numbers of affected individuals, dedicated dental services are often required. These necessitate approaches which are orientated towards the primary disability. In addition, specific features of many genetic conditions may further complicate dental intervention and anaesthesia.

Title: **HYPERDONTIA IN CLEIDO-CRANIAL DYSPLASIA**

Authors: T. ROBERTS, L. STEPHEN[1], and P. BEIGHTON[2]

Department: [1]University of Western Cape, Cape Town, South Africa, [2]University of Cape Town, South Africa

Introduction:
Cleido-cranial dysplasia (CCD)
[OMIM 119600] is a relatively benign generalised skeletal dysplasia in which hypoplasia of the clavicles and deficient ossification of the anterior fontanelle are the major features. Affected persons have a characteristic facial appearance with a bulky forehead and mid-facial hypoplasia. General health is good and the intellect is unimpaired.

This genetic condition is inherited as an autosomal dominant trait. Due to the founder effect, CCD is comparatively common in Cape Town.

Dental problems occurring in CCD include supernumerary teeth in the primary and secondary dentition resulting in dental crowding and malocclusion. Retention of the deciduous teeth may exacerbate this situation. For these reasons, dental care is a significant component of the health care of affected

Objectives:
To highlight the spectrum of clinical and dental features of CCD and to emphasize the importance of an interdisciplinary approach to the management of affected individuals.

Methods:
A 20 year old male and 14 year old female were referred to the dental genetic facility at the University of the Western Cape for dental assessment and management. Comprehensive orofacial and dental investigations were performed and findings recorded.

Results:
The affected male showed the following features: severe mandibular prognathism, a hypoplastic maxilla and concave profile. There were several missing teeth, numerous retained deciduous teeth and an anterior open bite. A history of sporadic eruption and multiple extractions was elicited. The affected female displayed more subtle skeletal features. Although only two permanent canines remained visible, there was a positive history of multiple erupted deciduous and permanent teeth. These teeth were extracted in private practice.

Conclusion:
The orthodontic, prosthodontic and oral surgery departments were approached to assist in establishing a treatment protocol for the male patient. Unfortunately, the female patient required a denture to facilitate eating and improve aesthetics.

Title: **TASK SHIFTING IN PAEDIATRIC ARV CLINICS THROUGH EMPLOYMENT OF *'EXPERT***

Authors: Melanie Evans Paul Roux Shaffiq Essajee

Objective:
To assess whether lay persons employed to work in Paediatric ARV clinics are an acceptable means of augmenting the shortage of health care workers (HCWs) for children with HIV/AIDS in Sub-Saharan Africa. This poster describes the deployment of '*expert patients'* to perform routine tasks that would otherwise hamper the efficiency of clinic health care workers

Methods:
Paediatric Aids Treatment for Africa (PATA) (www.teampata.org) is a network of paediatric ARV clinics in 22 Sub-Saharan countries. Teams meet annually to share experiences, learn from each other and discuss health care quality. Thirty-two teams, (each with nurse, pharmacist, counsellor and physician) from 18 countries attended the second PATA forum in Nairobi during November 2006. At this forum clinic teams were invited to submit grant proposals to recruit and employ *expert patients.* These are defined as PLWHA who are appropriately skilled caregivers of HIV-positive children; can perform administrative or simple clinical tasks in the clinic and extend activities into the community.

Results:
Twenty-three clinics from 6 countries applied to recruit 74 *expert patients.* These were employed during 2007. They were employed in clinic play areas (13), as assistant clerks (3) disclosure supporters (6), in clinic triage (4), community liaison (2), as PMTCT feeding counsellors (18), home visitors (19), peer educators (3) lay counsellors (3) and in other positions (3). At the 3rd PATA forum in Swaziland, 31 teams from 11 countries applied for access to 104 *expert patients* to perform a similar set of tasks.

Conclusions:
Health care workers in Sub-Saharan paediatric HIV/AIDS clinics welcome *expert patients* in their clinics. Employment of *expert patients* permits trained health care workers to devote more time to direct patient care rather than routine tasks. Organisations such as PATA can administer and extend *expert patient* programmes.

Next steps: The *expert patient* programme will be monitored. Process, outcomes and impact on performance of core health care activity will be measured and reported.

Title: **THE IMPACT OF LEVEL OF GENETIC KNOWLEDGE ON REPRODUCTIVE CHOICES AND RISK COMMUNICATION IN CYSTIC FIBROSIS FAMILIES**

Authors: Mardelle Schoeman, Merle Futter, Jacquie Greenberg

Department: Division of Human Genetics, University of Cape Town/NHLS

Objective:
The Red Cross War Memorial Children's Hospital (RCWMCH) has a dedicated weekly cystic fibrosis clinic, attended by children with cystic fibrosis and their parents/caregivers from all over the Western Cape. The aims of the present study were to determine the level of genetic knowledge of parents with a child with cystic fibrosis; to determine the impact of the birth of a child with cystic fibrosis upon subsequent reproductive choices and to investigate family communication about genetic risk.

Methods:
A qualitative approach was selected as it aims to understand, attempts to make sense of and provides descriptions that portray the richness and complexity of ordinary events from the perspective of the participants. Ten semi-structured qualitative interviews were conducted with parents who had a child with cystic fibrosis. Interviews were conducted in the language of the participants' choice and signed informed consent was obtained prior to the interview.

Results:
The participants in this study generally had a flawed understanding of the genetics of cystic fibrosis. The level of understanding was identified as being related to socioeconomic status. The birth of a child with cystic fibrosis had a major impact on subsequent reproductive decisions for participants. Most of them chose to reduce the number of children they had originally planned to have, following the diagnosis of their affected child. Knowledge about the genetics of the condition was not readily disseminated in the majority of these families. A lack of genetic knowledge was found to be the main barrier to risk communication.

Conclusion:
The findings of this study will help healthcare professionals involved in the cystic fibrosis clinic to address gaps and misconceptions in parents' knowledge and to understand the barriers to risk communication in these families. The service that is delivered at RCWMCH' cystic fibrosis clinic may be improved by having a genetic counsellor as a regular member of the interdisciplinary team involved with all families with cystic fibrosis. A genetic counsellor could play an important role in facilitating information giving; knowledge gain and the dissemination of risk information in the family; assist in the reproductive decision-making process of carrier couples; and in contributing to providing the necessary ongoing psychosocial support.

Title: **THE ROLE OF TLR6 POLYMORPHISMS IN INNATE IMMUNE RESPONSES TO MYCOBACTERIUM TUBERCULOSIS.**

Authors: Muki S Shey[1], Thomas R Hawn[2], Mark Bowmaker[1], Elizabeth Smith[1], Marwou de Kock[1], April K Randhawa[2], Willem A Hanekom[1].

Department: [1]South African Tuberculosis Vaccine Initiative, Institute for Infectious Diseases and Molecular Medicine, University of Cape Town, South Africa
[2]Department of Medicine, University of Washington School of Medicine, Seattle, USA.

Background and objective:

Toll-like receptors (TLRs) recognize pathogen associated molecular patterns derived from invading microorganisms such as *Mycobacterium tuberculosis* (Mtb). These molecules are critical regulators of the innate immune response; polymorphisms may therefore result in altered immune responses to pathogens like Mtb. Associations of TLR2 and TLR4 variations with differential responses to Mtb have been reported. Our objective was to determine whether single nucleotide polymorphisms (SNPs) in the TLR6 are associated with altered immune signaling to Mtb.

Method:
Healthy adults from the Cape Town region were enrolled. The TLR6 coding region was sequenced and polymorphisms identified. Functional consequences of polymorphisms were assessed by determining IL-6 production in whole blood stimulated with heat-killed (HK-Mtb), mycobacterial lipopeptides and TLR6 ligands, and by determining NF-κB signaling activity in a luciferase assay system. NF-κB signaling activity was determined after overnight stimulation of HEK293 cells which had been transfected with TLR variants, and stimulated with HK-Mtb, mycobacterial lipopeptides and TLR6 ligands. The protein expression of TLR6 variants was also determined by immunoblotting.

Results:
100 participants were enrolled. 10 TLR6 SNPs were identified, of which one, T34A (F12I), had not previously been described. A nonsynonymous SNP, C745T (P249S), and a synonymous SNP, G1083C (T361T), significantly altered IL-6 production in response to stimulation with HK-Mtb and TLR6 ligands: 745TT and 1083CC genotypes were associated with lower IL-6, compared with 745CC and 108GG, whereas heterozygotes (745CT and 1083GC) produced intermediate levels of IL-6. Transfection of HEK293 cells with 745CC was also associated with substantially higher NF-κB signaling, compared with transfection with 745TT. The different TLR6 variants had similar expression levels in transfected HEK293 cells.

Conclusion:
We conclude that TLR6 may regulate innate immune responses to Mtb owing to the observation that SNPs in the coding region alter innate immune responses to Mtb and mycobacterial lipopeptides.

Title: **IMMUNE MONITORING OF BCG VACCINE-SPECIFIC T CELL RESPONSES IN INFANTS.**

Authors: Andreia Soares[1], Thomas Scriba[1], Henry Boom[2], Gilla Kaplan[3], Willem Hanekom[1].

Department: [1]South African TB Vaccine Initiative, Division of Immunology, Department of Clinical Laboratory Sciences, Faculty of Health Sciences, University of Cape Town; [2]Tuberculosis Research Unit, Case Western Reserve University; [3]Laboratory of Mycobacterial Immunity and Pathogenesis, Public Health Research Institute, Newark.

Vaccination is aimed at the induction of adaptive immunity, which mediates protection against infection. T cells play a central role in this adaptive response. The evaluation of the complex characteristics of T cells induced by vaccination relies on tools that allow analysis of multiple T cell effector molecules and phenotypic markers. The primary objectives of monitoring vaccine-specific T cell immunity are to assess vaccine immunogenicity within the target population and to monitor the development and maintenance of stable, memory T cell subsets. However, the lack of standardised assays, T cell heterogeneity and correlating assay outcomes with clinical endpoints have proven to be major obstacles in successfully assessing vaccines in humans. The detailed analysis of vaccine responses in infants, a probable target population for novel TB vaccines, is also hampered by the limited volume of blood that can be safely drawn.

In this study we investigated the feasibility of combining a number of whole blood based assays with multiparameter flow cytometry (MPC) to allow detailed delineation of complex BCG-specific T cell responses using very small blood volumes from BCG-vaccinated infants. We show optimisation of short-term and long-term whole blood culture assays in infants and adults for the analysis of ex vivo T cell effector function and memory, including activation markers, cytokine expression profiles, cytotoxic and proliferative potential.

In our model of BCG vaccinated infants these whole blood based assays were robust and sufficiently sensitive for monitoring vaccine specific T cell immunity.

Title: **TRICHO-RHINO-PHALANGEAL SYNDROME: PREMATURE ERUPTION OF PERMANENT TEETH**

Authors: *Stephen LXG, *Roberts T, **Fieggen K, **Beighton P

Trichorhinophalangeal Syndrome (TRPS) [OMIM 190350] is an autosomal dominant skeletal dysplasia which is characterised by sparse hair, clinobrachyphalangy and a pear-shaped nose with an elongated philtrum. Other variable manifestations include a propensity to upper respiratory tract infections.
Dental abnormalities that have been previously reported are very variable in the TRPS and include hyperdontia, hypodontia and delayed eruption. Malocclusion is frequent but dental management may be constrained by practical problems associated with upper airway obstruction and other primary and secondary syndromic components.

Objective:
To document the oral-dental, facial and syndromic manifestations in a four year old male with TRPS.

Methods:
The young boy was appraised at Red Cross hospital by a team of Clinical geneticists, pediatricians and dentists. Relevant clinical parameters were recorded and radiographic records were obtained for comparison of growth at a later stage.

Results:
The patient had thin hair and scant eyebrows, a bulbous nasal tip, a long philtrum, and medial deviation of his index fingers.
Eruption of his permanent teeth was very early. Although the patient was only four years of age, there were seven permanent teeth present i.e. teeth numbers 11,21,31,41 and 16,36,46 and tooth 26 was erupting .These teeth were well formed . His palate was normal and the maxillary and mandibular midline frenular attachments were intact.

Conclusion:
Dental care is becoming recognised as an integral component of the overall management of persons with genetic disorders. On this basis it can be expected that heritable conditions such as TRPS will be increasingly referred to academic dental facilities for specialized appraisal and care.

Title: **GUNSHOT TRAUMA TO THE FACE IN AN 11-YEAR-OLD CHILD**

Authors: Sebastian van As, Sudeshni Naidoo

South Africa has a high level of violence: more people are killed by gunfire each year than in motor vehicle accidents, and the numbers are increasing. Regrettably, children are affected by this epidemic – in the USA, only motor vehicle accidents and cancer claim more children's lives than do firearms. During 1997, 142 children aged under 14 years of age died from gunshot injuries while many more were injured. Objective: This report describes an 11 year-old male street child who sustained a gunshot to the face. Methods: The bullet entry was in the left cheek above the left side of the upper lip. Bullet fragments were lodged subcutaneously in the left posterior triangle of the neck. Results: Radiographs demonstrated a left-sided comminuted compound fracture of the mandible, with shrapnel ledged diffusely in the soft tissue of the left cheek. He was given prophylactic intravenous antibiotic therapy and prepared for theatre, where extensive debridement of the wound was performed with removal of a number of bullet fragments and shrapnel from the casing. An open reduction of the mandibular fracture was performed followed by internal fixation of the left mandible. The postoperative course was uncomplicated until day three when the patient discharged himself back on to the street. Conclusion: There is an escalating epidemic of firearm-related injuries and deaths among children and adolescents in Cape Town. Further research is needed to understand firearm-related injuries among children and adolescents in South Africa and to develop policies and programmes for prevention that are effective.

Title: **DOES FLOW AFFECT PATIENT CARE IN THE B4 CATH LAB ANGIOGRAPHIC SUITE?**

Authors: Yvonne Van Rooi, Angela Leonard, Minette Coetzee

This project is part of the Child Nurse Practice Development Initiative at the Red Cross Children's Hospital which creates a forum where the complex issues surrounding nursing practice can be explored.

The B4 Cath lab provides services to almost 300 children every year. The complex procedures carried out in the lab include cardiac catheterizations, balloon dilatations – valuloplasty, septostomy, cerebral angiograms and venograms.

A main concern for the team working in this environment was the flow and clutter inside small converted lab. They identified lack of storage space for catheters, procedure equipment and patient files affecting work flow as a practice issue to tackle. These issues also prevented nurses spending more time in direct patient monitoring and care, a principle nursing task in this setting. The objective of the project was to identify challenges to the current flow with the aim to increase nursing time with children during the complex procedures.

The team designed a detailed flowchart adapted from IHI's "Methods and Tools for Breakthrough Improvement" course, which has been used widely in health care organizations. This was a close-up view of the flow in their Cath lab on a daily basis. This flowchart made it easy to identify rework loops, complexity in their lab and identified issues that did not add value to patient care.

Strategies that really made a difference were decreasing redundant documentation and moving supplies closer to where nurses were using them so they spend less time searching for equipment and files. The transformation of an entire wall into shelving (storage area for patient files and equipment) has lead to less frustration in the actual practice.

Reducing inefficiencies and redesigning processes of care is not only cost effective, but also improves morale and satisfaction. The results from the flowchart will serve as a basis for providing input during the move of the Cath lab into the new theatre complex.

The poster will present the challenges and triumphs of the project to date.

Submitted from the Child Nurse Practice Development Initiative,
School of Child and Adolescent Health

Lead: Minette Coetzee PhD RPaedN Contact: minette.coetzee@uct.ac.za ext: 5492

Title: **THE PROGNOSIS OF CYSTIC FIBROSIS IN THE WESTERN CAPE PROVINCE OF SOUTH AFRICA: A 33 YEAR STUDY.**

Authors: A Westwood, P Willcox, ED Nel

Background:
Cystic fibrosis (CF) occurs in all population groups in South Africa, a middle income country with significant poverty levels.

Objective:
To determine survival of patients with CF in the Western Cape province.

Patients and Methods:
Applying Kaplan Meier statistics to a database of CF patients in the Western Cape province, the overall survival of 216 patients with CF was studied over a 33 year period (1974 – 2008). The effect of sex, ethnicity and decade of birth on prognosis was explored.

Results:
Median survival was 20.8 years (25th percentile: 11.6 years). There was no significant difference in survival between males and females ($p = 0.5$). There was a significant difference in prognosis between white (N=116) and mixed ethnicity (N=92) patients (20,9 vs 18 years, $p = 0.0025$). There were 17 deaths in infancy (22.6% of all deaths) spread equally across the period. Infant deaths accounted for 2/33 deaths in white patients versus 13/39 deaths in mixed ethnicity patients ($p = 0.0058$). Median survival beyond infancy for white patients was 25.8 years versus 20.5 for mixed ethnicity patients ($p = 0.007$). There was evidence for improved survival for coloured patients born in the second half of the period.

Conclusions:
Median survival is into adulthood in this population. Infant death due to CF is a significant risk in the province. There is an ethnic difference in survival that is likely to relate to awareness of CF in different populations and differences in socio-economic status.

Title: **DENTAL REFERRAL BY HEALTH CARE PROVIDERS IN A CHILDREN'S HOSPITAL**

Authors: S. YASIN-HARNEKAR, M. ALLLIE and M. DLAWATHI

Department: Dental Faculty, University of the Western Cape, South Africa

Aim:
To assess the knowledge, the awareness, and the practice of HCP in the referral of child patients to the dental clinic and their satisfaction of the dental service provided.

Method:
Permission was obtained from the hospital's Chief Operations Officer to conduct a cross sectional survey. This was in the form of a self-administered questionnaire which was given to all the HCP in the Specialist Out-Patients Department. Open ended and closed questions were posed. Qualitative data was analyzed thematically. The data were entered and analyzed.

Results:
Twenty – nine (N= 29) HCP responded. Reasons for referral were mostly for caries (n=18). The oral examination formed part of their general examination of the child in 24 respondents. Caries were recognized as "holes" or discoloured teeth. The causes of caries were mostly related to a sweet / poor diet, and bad oral hygiene. Gum disease was more readily recognized and was stated to be caused by infection or poor oral hygiene. Twenty – three of the HCP stated that the child's oral health impacted on their discipline. Most (21) were satisfied with the dental service provided. Oral hygiene advice given was 'brush the teeth and eat less sweets'. The importance of the child's oral health on a scale from 1 (low) to 10 (very important) was rated in the range of 7 to 10.

Conclusion:
The health care providers had a good knowledge and clinical recognition of *established* dental caries and gingivitis. They rated the importance of oral health of the child as high to very high. Most providers do an oral screening as part of their general examination of the child.