Children’s Health Ireland at Crumlin,
Dublin, Ireland

9th Annual Research & Audit Conference
May 17th 2019

Conference Programme & Book of Abstracts

Kindly supported by:
National Children’s Research Centre
Royal College of Surgeons in Ireland
Trinity College Dublin
University College Dublin
Foreword

Welcome to the 9th Annual Research & Audit Conference at Children’s Health Ireland (CHI) at Crumlin.

Children’s Health Ireland at Crumlin is an acute paediatric teaching hospital and is Ireland’s largest paediatric hospital. The hospital is responsible nationally for the provision of the majority of quaternary and tertiary healthcare services for children, and is the national centre in Ireland for a range of specialties including children’s childhood cancers and blood disorders, cardiac diseases, major burns, cystic fibrosis and rheumatology. The hospital also provides secondary care for our local population. The mission of Children’s Health Ireland is underpinned by a commitment to promote and provide child-centred, research-led and learning informed healthcare to the highest standards of safety and quality.

Research contributes to improved outcomes and experiences for patients and their families by identifying the causes of illness, influencing the development of care and treatments, and improving ways in which the service is delivered and experienced. The hospital supports research and audit in all areas of children’s healthcare, and promotes and fosters partnerships among clinicians, nurses, allied health professionals, scientists, support staff and academic partners to maximise the impact of research on the health and wellbeing of our patients and their families.

This 9th Research & Audit Conference is an opportunity for CHI at Crumlin to share with their colleagues the variety and quality of research activity ongoing in the hospital through posters, presentations and attendance at this event.

I would like to take this opportunity to thank the organising committee of Professor Declan Cody, Professor Eleanor Molloy, Carol Hilliard and Sinead Cassidy, whose hard work is essential to the success of the day.

The 10th Annual Research & Audit Conference will be held in May 2020 and I would encourage you all to consider submitting your research and audit projects and activities.

Prof Sean Walsh
Site Chief Executive
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1Physiotherapy Dept, CHI at Crumlin, Dublin; 2 UCD School of Public Health, Physiotherapy and Sport Science, University College Dublin (UCD); 3 Dept. of Orthopaedic Surgery, CHI atCrumlin, Dublin; 4Geary Institute for Public Policy, University College Dublin
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'Engaging and supporting parents of children with chronic illness'
Professor John Sharry,
Founder of the Parents Plus Charity, adjunct Professor at the School of Psychology in University College Dublin, a founder of Silver Cloud Health and weekly health columnist with the Irish Times
13.00 -13.55  Lunch - Board Room on First Floor Atrium, Medical Tower
RESEARCH & AUDIT DAY
Friday 17th May 2019
Venue: Haematology/Oncology Conference Rooms
3rd Floor, Medical Tower, CHI at Crumlin

13.55-14.45 Oral presentations – Moderator: Prof. Eleanor Molloy (5 x 10 minute Presentations)

13.55-14.05 LIVING WITH ADOLESCENT IDIOPATHIC SCOLIOSIS: INSIGHTS FROM A QUALITATIVE INVESTIGATION
Gillian Motyer¹, Barbara Dooley¹, Patrick J. Kiely², Vincent McDarby³, Amanda Fitzgerald¹
¹School of Psychology, University College Dublin
²Department of Orthopaedics, ³Department of Psychology, CHI at Crumlin, Dublin

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Oksana Kozdoba, Patrick Gavin, Richard Drew, Des Cox
¹CHI at Crumlin and ²Irish Meningitis and Sepsis Reference Laboratory, CHI at Temple Street, Dublin

14.15-14.25 KALYDEKO AND LUNG INFLAMMATION IN CHILDREN (KLC)
Daryl Butler¹, Lennon J, Cox D¹,², Greally P³, Linnane B, McNally P¹,²,⁶
¹Cystic Fibrosis Centre, CHI at Crumlin, Dublin 12
²National Children’s Research Centre, Our CHI at Crumlin, Dublin 12, ³Cystic Fibrosis Centre, CHI at Tallaght, Dublin 24, ⁴Graduate Entry Medical School and Centre for Interventions in Infection, Inflammation & Immunity (4i), University of Limerick, Limerick, ⁶Department of Paediatrics, Royal College of Surgeons in Ireland, CHI at Crumlin, Dublin 12

14.25-14.35 DIRECT OBSERVATIONAL STUDY OF INFUSION ERRORS ASSOCIATED WITH SMART-PUMP TECHNOLOGY IN PAEDIATRIC INTENSIVE CARE
Moninne M. Howlett, Brereton, Erika; Cleary, Brian.J; Breathnach, Cormac.V
¹Pharmacy Department, CHI at Crumlin, Dublin 12, ²Paediatric Intensive Care Unit, CHI at Crumlin, Dublin
³School of Pharmacy, Royal College of Surgeons in Ireland, Dublin 2
⁴The Rotunda Hospital, Parnell Square, Dublin 1

14.35-14.45 GROWTH IN INFANTS WITH UNIVENTRICULAR CONGENITAL HEART DISEASE
Leah Foyle³, Anne Marie Shine⁴, Aoife O’ Neill ³, Colin J. McMahon⁵
Clinical Nutrition and Dietetic Department, CHI at Crumlin¹, Dublin 12.Department of Paediatric Cardiology², CHI at Crumlin, Dublin 12

14.45-15.00 NCRC Guest Lecture - Moderator: Carol Hilliard
“Immune system dystegulation, driving future risk of disease in childhood obesity?”
Dr Andy Hogan, Institute of Immunology, Maynooth University, and the Childhood Obesity Group

15.00-15.30 Presentations & Awards

The following awards will also be presented:
“Professor Edward Tempany CHI at Crumlin Junior Doctor Research Award 2019”
UCD Colman Saunders Medal 2018 – Lukas O’Brien
RCSI Paediatric Medal Winner – Aya Al-Hasani
TCD Medal Winners: O’Donohoe Medal, the Professors Prize in Paediatrics: Joint winners: Conor Brown and Ernest Zhi Wei Low
UCD Nursing Medal BSc (Nursing) Children’s and General 2019 – Niamh Buckle

15.30 Close of Study Day
Professor John Sharry

‘Engaging and supporting parents of children with chronic illness'

Prof John Sharry is a founder of the Parents Plus Charity, adjunct Professor at the School of Psychology in University College Dublin, a founder of Silver Cloud Health and weekly health columnist with the Irish Times. He is the lead developer of the award winning Parents Plus and Working Things Out programmes and the best selling author of fourteen positive psychology and self-help books including *Becoming a Solution Detective and Positive Parenting* that have been translated into nine languages including Japanese, Chinese and Arabic. He is currently developing the Parents Plus Positive Pathways Programme (supporting families with an adolescent with a disability) and the Healthy Families Programme (promoting healthy lifestyles to prevent obesity), the latter being co-developed with Dr Adele Keating in Crumlin Hospital. See parentsplus.ie and solutiontalk.ie
THE MAGNITUDE OF PHYSICIAN EMIGRATION AND THE ROLE FAMILY CAN PLAY IN INFLUENCING PHYSICIANS’ MIGRATION DECISIONS
Katie A. O’Connor, RCSI and UCD, Dublin, Ireland

Background: High doctor emigration rates from Ireland are continuously reported. For a health care system to function there needs to be an adequate supply of physicians with the necessary training and experience. Physician emigration therefore represents a challenge for the system. We need to have a better understanding of the factors that contribute to doctors’ decision to stay or leave Ireland.

Method: This study aimed to provide a profile of Irish trained physicians and their emigration choices. A pragmatic mixed method approach was utilised and it consisted of four phases:
1) Geographical tracking of physicians (n=280)
2) Stakeholder meetings (n=12)
3) Online questionnaire (n=99)
4) Semi-structured interviews (n=10)

Results
A dichotomous stayer/ leaver perspective was applied in the geographical tracking (n=280) phase which found that 56% of physicians were working overseas at the time of the study. The survey findings made a further distinction between the different migration statuses by categorising respondents into the following cohorts:
➢ Stayers not intending to emigrate
➢ Stayers considering emigrating
➢ Returners
➢ Leavers

Examining the demographics of each of these cohorts revealed that married physicians are less likely to emigrate, with the exception of doctors who are married to non-Irish nationals who may be more likely to emigrate. Survey findings show that emigrants were more likely to be single (23%) than the other migration cohorts. Stayers considering leaving (16%) were also likely to be single as they were viewed as being more mobile than those who were married and/or have children.

Conclusion
Different people have differing degrees of ability to act upon their desire to emigrate. Immediate family plays a significant role in physicians’ decision to emigration. Factors that influenced respondent’s migration decisions were: whether they had children or dependent elderly parents, their marital status, their spouses’ nationality and their occupation.

THE RELATIONSHIP BETWEEN LEFT VENTRICULAR SYSTOLIC LONGITUDINAL DEFORMATION MEASUREMENTS AND PRELOAD IN PREMATURE INFANTS
Neidin Bussmann1; Aisling Smith1; Alessia Cappelleri1; Naomi McCallion1,2; Orla Franklin3; Afif EL-Khuffash1,2
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2 Department of Paediatrics, School of Medicine, Royal College of Surgeons in Ireland. Dublin, Ireland.
3 Department of Paediatric Cardiology, Our Lady’s Children’s Hospital Crumlin, Dublin, Ireland.

Background: Longitudinal deformation imaging including Strain and Strain rate (SR) is gaining interest in the neonatal field. Reference ranges in extremely low birthweight infants are emerging. However, the relationship between deformation parameters and loading conditions are still being debated. Strain is thought to be influenced by loading conditions and therefore is not reflective of intrinsic contractility. Systolic SR may be less load dependent offering a better reflection of intrinsic contractility. We aimed to assess the influence of preload on left ventricular (LV) global longitudinal strain (GLS) and SR.

Methods: We recruited three groups of premature infants < 29 weeks gestation who are enrolled in the PDA RCT (ISRCTN:13281214) over two time points (Day 2 & Day 8) to reflect different preload conditions. Group 1 (RCT-OPEN, n=22) are preterm infants with a large patent ductus arteriosus (PDA) that remains open over the two time points; Group 2 (RCT-CLOSED, n=10) are infants with a large PDA on Day 2 that closed on Day 8; and Group 3 (OBSERVED, n=11) are infants with a small or no PDA on both days. PDA diameter, left atrial to aortic root ratio (LA:Ao), LV GLS and SR (measured using speckle tracking echocardiography) were assessed on Days 2 and 8. Changes in those measurements were examined overtime.

Results: Forty three infants with a mean ± SD gestation and birthweight of 26.7 ± 1.4 weeks and 919 ± 227 grams respectively were included. LA:Ao remained high in the RCT-OPEN Group (2.0 ± 0.3 vs. 2.1 ± 0.4, p=0.24) but decreased in the RCT-CLOSED Group (2.0 ± 0.4 vs. 1.6 ± 0.4, p=0.05) and remained low in the OBSERVED Group (1.7 ± 0.5 vs. 1.6 ± 0.6, p=0.3) over the study period. LV GLS remained high in the RCT-OPEN group, decreased in the RCT-CLOSED group, and remained low in the OBSERVED group. There were no differences in SR between the groups or over time.
**Conclusion:** Longitudinal strain is highly influenced by preload and mirrors changes in LV preload overtime. Therefore, it is not reflective of intrinsic contractility. There was no relationship between changes in preload in this cohort and longitudinal strain rate suggesting a lack of influence of preload. Strain rate is more likely to reflect intrinsic contractility in extremely premature infants.

**IS DOWN SYNDROME-ASSOCIATED ARTHRITIS (DA) A DISTINCT DISEASE FROM JIA?**

1Charlene Foley, 2Achilleas Floudas, 2Sharon Ansboro, 3Mary Canavan, 2Monika Binniecka, 1Emma Jane MacDermott, 3Ronan Mullan, 1Orla G Killeen, 2Ursula Fearon

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2Trinity Biomedical Sciences Institute, Dublin  
3Rheumatology Department, Tallaght Hospital, Dublin

**Background**

Arthritis is 20-times more common in children with Down syndrome (DS). It is an erosive, polyarticular-RF-negative arthritis with predominance in the small joints of the hands and wrists. Little is known about the underlying mechanisms that drive DA pathogenesis, however we hypothesise that it is a distinct disease from JIA.

**Our aims** were to compare the following in DA and JIA;

- B-cell subsets;
- T-cell cytokine profiles;
- Synovial membrane immunohistochemistry;
- Synovial fibroblast cell (SFC) functionality.

**Methods:** Multicolour-flow cytometry and Flowjo software were used to analyse B-cell subsets and T-cell cytokine expression in PBMCs from 40 children (n=10/group - Healthy Control (HC), JIA, DS, DA). Synovial tissue was obtained through US-guided biopsy and analysed by immunohistochemistry for CD3, CD20, CD68, FVIII (DA=n=3; JIA=n=4). Levels of vascularity and lining layer hyperplasia were also scored. DA-SFC and JIA-SFC migration was assessed by wound repair scratch assays; invasion by Biocoat Matrigel™ Invasion Chambers; and bioenergetic activity using the XFe96-Flux-analyser where oxidative phosphorylation and glycolysis were quantified. Real-time PCR assessed glycolytic gene expression.

**Results**

Flow cytometry analysis revealed that children with DA had a significantly lower number of circulating CD19+CD20+ B-cells when compared to children with JIA and HC. However, they had a greater proportion of memory B-cells (CD27+) when compared to children with DS. T-cell IFN-γ and TNF-α production was significantly greater in DA compared to both JIA and HC.

DA synovial tissue demonstrated greater synovial lining layer hyperplasia, vascularity and inflammatory cell infiltration compared to JIA.

DA-SFC showed greater migratory and invasive capacity, and increased basal metabolic activity and metabolic gene expression when compared to JIA-SFC.

**Conclusion:** Significant differences were observed in the immune, histological and SFC functionality profiles of DA and JIA. These differences may explain the erosive phenotype observed in DA and suggest it may be a distinct disease from JIA.

**INCIDENCE AND 5 YEARS SURVIVAL RATES OF CHILDHOOD CANCER DIAGNOSED LESS THAN 1 YEAR OLD IN IRELAND 2007-2017.**

*These authors contributed equally.

**Introduction:** According to the National Cancer Registry of Ireland, an average of 137 cancers were diagnosed per year in children under the age of 15 between 1994 and 2014. The 5-year overall survival rate for this entire cohort was 81%. It is well documented that survival rates in paediatric oncology vary depending on specific cancer diagnosis, age of the patient at diagnosis and disease stage.

**Aim:** We describe the incidence of cancer in very young children and the influence of age on outcome in children diagnosed with cancer in Ireland under the age of 1 between 2007-2017.

**Method:** Data were extracted from the database of the National Children’s Cancer Service (NCCS) based at Our Lady’s Children’s Hospital, Dublin. The data presented refer to the International Classification of Childhood Cancer (ICCC) version 3 with the inclusion of Langerhans Cell Histiocytosis (LCH).

**Result**

185 patients were diagnosed with paediatric cancer under the age of 1 at the time of their initial diagnosis. 159 (85.5%) patients were diagnosed with...
solid tumours or LCH. 86 (46.5%) were male. The average age at diagnosis was 5.24 (range 0-12) months. Nineteen (10.3%) patients were diagnosed following an abnormal antenatal scan. The most common cancers diagnosed were neuroblastoma (22.7%), central nervous system (CNS) tumours (19.5%) and leukaemia (13.5%). 158 (85.5%) patients received treatment. 124 (78.4%) and 20 (12.7%) patients received chemotherapy and radiotherapy as part of their treatment respectively. The mean age for radiotherapy was 1.35 years (range 0.17-4). The cumulative overall survival rate at 5 years is 80%. CNS tumours have the worst prognosis followed by leukaemias.

Conclusion
Incidence rates of specific paediatric cancer types vary according to the age at diagnosis. There is no difference in survival rates between children diagnosed with cancer under 1 year of age and older children. Outcomes at the NCCS compare favourably with international standards.

HOSPITAL SURVEY OF CURRENT PARENTAL KNOWLEDGE OF EARLY WEANING AND ALLERGY PREVENTION
Marianne Dempsey1 Aoife Fox1 Aideen M Byrne 2
1 School of Medicine, Trinity College Dublin, Ireland 2, Dept. of Paediatric Allergy, Children’s Health Ireland (CHI) at Crumlin.

Background
It is now internationally accepted that regular consumption of peanut from 4-6 months prevents peanut allergy. Throughout the western world, dissemination of new guidance is occurring and changes to weaning practices are being reported. In Ireland, changes to weaning guidelines are in the early stages. We investigated parents’ current understanding and practice of peanut introduction and where parents source their information on weaning.

Method
The study population were parents of children under 5yr, attending outpatient clinics in OLCHC from 19th to 29th March 2019. They were provided with an ethics approved, 10 question, anonymous, survey.

Results
Out of 321 children surveyed, 287 were established on solid food. 42% of these had no peanut at all in their diet. 1 in 4 children had eczema with 41% of these not eating peanut. 6.4% reported peanut allergy. 62% of those eating peanut only consume occasionally or monthly. 1 in 7 parents still believe that peanut should not be introduced until 5 years of age. 28% reported that peanut should be introduced by 1 year of age. However, only 1 in 4 of these children actually consumed peanut by 1year. Half of all parents surveyed seek weaning advice from their public health nurse. 52% also heed family advice. More modern sources such as social media (14%), state funded websites (13%) and other websites (25%) were less credited. 72% had never heard of peanut prevention strategies.

Conclusion
There is minimal awareness of peanut allergy prevention and changing guidance in the population surveyed. We believe this population is representative of the wider Irish public. Ongoing education of healthcare professionals on the front line such as public health nurses is likely to be important to effect change in Ireland. The influence of traditional family weaning practices may slow change.

THE EFFICACY OF AN ADVANCED PRACTICE PHYSIOTHERAPY TRIAGE SERVICE IN PAEDIATRIC ORTHOPAEDICS: INNOVATION AND COLLABORATION TO IMPROVE SERVICE DELIVERY.
Marie O Mic1,2, Catherine Blake3, Ciara Cooney1, Olive Lennon2, Pat O’Toole4, David Moore5, Slawa Rokicki6, Cliona O’ Sullivan, 2
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Background:
Advanced Practice Physiotherapy (APP) clinics in Paediatric Orthopaedics are well established in the UK, Australia, and Ireland, yet there is little to no literature exploring their effectiveness.

Method
This is a mixed methods study. A review of a prospectively garnered database established the demographic profile of patients, clinic outcomes, and the reduction in patient wait-times over a 3-year period. The diagnostic agreement rate was evaluated between APPs and medical consultants. Stakeholder perceptions of the service were examined by surveys and semi-structured interviews. A cost minimisation analysis compared the cost of the APP clinic with that of the usual care pathway. Finally parental willingness-to-pay to attend an APP clinic was explored via contingent valuation.

Results:
A mean wait-time reduction per patient of 87 weeks was observed, with a majority of the 2650 patients managed without consultant intervention.
Diagnostic agreement rate evaluation demonstrated good to excellent agreement in almost all categories based on kappa co-efficient, with raw percent agreement of 87%. Parental satisfaction rated as “excellent” on linear scale with the same term being the most frequently occurring coded comment. Medical Consultants and referrers were extremely satisfied with the service, describing the clinic as a positive adjunct to consultant-led services, and improving access for paediatric patients. Incremental cost savings of €24.51 per appointment in favour of the APP service over the usual consultant-led pathway were established. Parents demonstrated a positive willingness-to-pay to attend an APP clinic that far exceeded appointment costs, representing significant cost savings both to the health service and the health user.

Conclusion
This study demonstrates that routine elective paediatric orthopaedic referrals can be successfully managed by an APP in a cost effective manner. The positive results from a broad, mixed methods evaluation firmly support Advanced Practice Physiotherapists as first contact diagnosticians in paediatric orthopaedics.

LIVING WITH ADOLESCENT IDIOPATHIC SCOLIOSIS: INSIGHTS FROM A QUALITATIVE INVESTIGATION

Gillian Motyer, Barbara Dooley, Patrick J. Kiely, Vincent McDarby, Amanda Fitzgerald

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Background: Adolescent idiopathic scoliosis is a three dimensional curvature of the spine with onset typically occurring around puberty. Acquiring a physical health condition such as scoliosis can have a significant impact on the psychological wellbeing of adolescents, and can also be a difficult experience for the parents of those affected. Using a qualitative approach, the current research investigated the psychological impact of scoliosis on adolescents and their parents, in order to understand the lived experience of this patient group and their families.

Method: A sample of preoperative patients diagnosed with adolescent idiopathic scoliosis (n=11), and their parents (n=16), participated in the study*. Semi-structured interviews were conducted with the adolescents and their parents separately. Audio recordings were transcribed verbatim and thematically analysed.

Results: A preliminary analysis of adolescent interview data revealed a number of themes in relation to their day-to-day functioning, body image, emotional well-being, as well as coping strategies, and support needs. Parent data focused on their experience of their children’s scoliosis and medical care, including the impact it has had on their lives. Key insights will be presented with supporting quotations.

Conclusion: Living with idiopathic scoliosis is a challenging experience for adolescents and their parents, considering the physical, psychological, and social implications that can impact on everyday life. However, the resilience of these adolescents and their families is evident.*This study is ongoing

A REVIEW OF THE DIAGNOSTIC EVALUATION OF COMPLICATED PARAPNEUMONIC EFFUSION OR EMPYEMA IN AN IRISH PAEDIATRIC TERTIARY HOSPITAL

Oksana Kozdoba, Patrick Gavin, Richard Drew, Des Cox

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Background: complicated parapneumonic effusion or empyema is a relatively common complication of pneumonia, often requiring thoracentesis. The diagnostic yield with traditional culture of blood or pleural aspirate specimens is low, emphasizing the role for new molecular techniques to improve identification of the responsible pathogens.

Methods: a retrospective review of paediatric cases of complicated parapneumonic effusion or empyema requiring thoracentesis was undertaken in OLCHC over a five-year period, from January 2014 to December 2018. Cases with clinical and radiographic findings consistent with a diagnosis of complicated parapneumonic effusion or empyema were only included if a sterile site specimen was taken for diagnostic microbiologic evaluation. Baseline patient demographic data, clinical findings, laboratory indices, microbiology results and imaging findings were collected.

Results: sterile site specimens from 43 children with parapneumonic effusion/empyema were identified (females, 60%). 79% of the children were younger than 5-years of age. 45% (14 of 31) of children who had virologic testing performed had at least one respiratory virus detected. Six children had multiple viruses detected. A causative bacteria was identified in 24 cases (56%), 6 by conventional culture (pleural fluid, 5; blood, 1) and 21 by PCR (pleural fluid, 20; blood, 3). PCR had the highest detection rate of causative organisms: pleural fluid PCR positive, 52% (20 of 38 tested); blood PCR positive, 50% (3 of 6...
tested); pleural fluid culture positive, 11.6% (5 of 43 tested); and blood culture positive, 2.5% (1 of 39 tested). *Streptococcus pneumoniae* was the causative organism detected in 95% of cases.

**Conclusion:** This retrospective review confirms that in paediatric cases of complicated parapneumonic effusion or empyema traditional microbiological culture of sterile site specimens infrequently identifies a causative organism. For such culture negative cases, appropriate PCR testing significantly improves the detection rate of causative organisms.

**KALYDEKO AND LUNG INFLAMMATION IN CHILDREN (KLIC)**

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3 Cystic Fibrosis Centre, Tallaght Hospital, Dublin 24  
4 Graduate Entry Medical School and Centre for Interventions in Infection, Inflammation & Immunity (4i), University of Limerick, Limerick, Ireland  
6 Department of Paediatrics, Royal College of Surgeons in Ireland, Our Lady’s Children’s Hospital Crumlin, Dublin 12

**Background:** The effects of Ivacafator on cystic fibrosis transmembrane conductance regulator (CFTR) activity in people with cystic fibrosis and G551D-CFTR mutations have been well described regarding sweat chloride, weight gain, quality of life and exacerbation frequency. However, little is known about Ivacafator’s relationship with lung inflammation in children.

This study aims to better understand the relationship between CFTR activity and lung inflammation in patients with cystic fibrosis.

**Methods:** We studied the bronchoalveolar lavage fluid (BALF) from 5 subjects with G551D-CFTR mutations before and after commencing Ivacafator. Inflammation was assessed by quantitative neutrophil elastase (NE), inter-leukin-8 (IL-8) ELISA and absolute neutrophil counts (ANC). NE data was available for 4 of the 5 subjects.

**Results:** Mean time of sampling post commencing Ivacafator was 4 months (1.5-6.5). Mean IL-8 before Ivacafator was 3454 pg/ml, mean IL-8 post treatment was 1515 pg/ml (P=0.23). Three of the 4 subjects had negative NE after commencing Ivacafator (P=0.5). Mean ANC pre and post Ivacafator was 348,197 and 49,398 (P=0.17). No significant BALF inflammatory changes were demonstrated both in IL-8, NE and ANC post commencing treatment.

**Conclusions:** This study demonstrates a trend towards a reduction in lung inflammation in paediatric subjects with G551D-CFTR mutations after commencing Ivacafator treatment. Further surveillance will continue to assess if this relationship can be better delineated.

**DIRECT OBSERVATIONAL STUDY OF INFUSION ERRORS ASSOCIATED WITH SMART-PUMP TECHNOLOGY IN PAEDIATRIC INTENSIVE CARE**

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4. The Rotunda Hospital, Parnell Square, Dublin 1, Ireland

**Background and Aims:** Smart-pump technology and standardised concentration infusions (SCIs) are advocated to reduce infusion errors in the high-risk paediatric intensive care unit (PICU) setting. In 2012, the PICU of Our Lady's Children’s Hospital, Crumlin implemented a smart-pump drug-library of SCIs; infusion data is auto-transferred to the PICU clinical information management system. This study aims to determine the frequency, severity and distribution of smart-pump infusion errors.

**Methods:** All infusions were directly observed at the bedside and compared against both medication orders and auto-populated infusion data. Identified deviations were categorised as either medication errors or discrepancies. Five opportunities for error (OEs) were identified: programming, administration, documentation, assignment, and data transfer. Error rates were calculated as: number of infusions with errors, and number of errors per OE. Pre-agreed definitions, multi-disciplinary consensus and grading processes were utilised.
**Results:**
1023 infusions for 175 patients were directly observed on 27 days between February and September 2017. 74% of patients were under 1 year, 32% under 1 month. The drug-library accommodated 96.5% of all infusions. SCIs were most common (72%), followed by 13% maintenance fluids (13%) and total parenteral nutrition (10%). Compliance with the drug-library was 98.9%. 55 infusions had ≥ 1 error (5.4%); a further 67 (6.3%) had ≥ 1 discrepancy. From a total of 4997 OEs, 72 errors (1.4%) and 107 discrepancies (2.1%) were observed. Documentation errors were most common; programming errors were rare (0.32% OE). Errors were minor, with just one requiring minimal intervention to prevent harm.

**Conclusion:**
These error rates are low compared to similar studies. This study has demonstrated the benefits of smart-pumps and auto-populated infusion data in the paediatric intensive care setting.

**GROWTH IN INFANTS WITH UNIVENTRICULAR CONGENITAL HEART DISEASE**
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**Background**
Growth impairment in infants with univentricular congenital heart disease is well documented. Meeting the nutritional requirements can be challenging as these infants undergo complex surgical palliation within the first few days of life. This audit is a retrospective study aiming to evaluate the nutritional status of infants with univentricular heart defects.

**Method:** 90 infants with single ventricle physiology were included. All underwent a surgical procedure or hybrid intervention within the first 6 weeks of life in OLCHC between January 2014 - December 2018. Subject data collected included demographics, anthropometry, nutritional intake and nutrition related complications. Weight for Age z scores (WAZ) and Length/Height for Age z scores (LAZ/HAZ) were calculated using the World Health Organisation Standards. Data was analysed using SPSS. Ethical approval was obtained.

**Results**
A WAZ <-2 is a screening criterion for undernutrition. Mean birth WAZ was -0.01. Mean WAZ on discharge was -1.45 and prior to stage 2 surgery Bidirectional Glenn was -1.22. On discharge (median length of stay 25 days) post intervention 32% of infants had a WAZ <-2, including 11% with a WAZ of <-3. This drop was deemed statistically significant (p<0.01).

A significant drop between Mean birth LAZ (0.05), and mean HAZ at time of stage 3 Fontan (-1.05) was seen (p=0.002). Stunting is classed as a LAZ of <-2. At time of Fontan 17% of the infants were classed as stunted. From birth to time of Fontan 83% dropped >0.5 z-scores, 33% of which had a drop of >2 z-scores.

**Conclusions**
Our results concur with the literature with the greatest decline in WAZ occurring in the neonatal period, and a significant drop in LAZ up until time of Fontan. A third of this group had a WAZ <-2 on discharge, whereas 2.3% of the normal healthy population would be expected to fall into this category.

Nutrition guidelines should aim to minimise early nutritional deficits which in turn may improve the nutritional status of this vulnerable group.
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CARING FOR CHILDREN WITH COMPLEX HEALTHCARE NEEDS IN THE COMMUNITY: WHAT ARE THE EDUCATION NEEDS OF REGISTERED NURSES?

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Background: Caring for children close to home is a key priority for Irish healthcare. Increasing numbers of children with complex healthcare needs require care delivery within their home. Children’s complex healthcare needs include multidimensional health and social care needs (Brenner et al. 2018). A learning needs analysis was conducted to identify the education needs of registered nurses who are caring for children with complex healthcare needs in the community.

Methodology: An electronic, self administered survey was developed and ethical approval was granted from a hospital committee. The sample was accessed via the Health Service Executive and administered to registered nurses who care for children with complex healthcare needs in the community. 159 completed surveys were received and analysed.

Findings: are presented within three themes; demographics, satisfaction with current education and further education requirements. The data demonstrates wide variance in nursing roles and qualifications. Registered children’s nurses comprise 44% of respondents. While 70% of respondents accessed education, only 52% report that this meets their needs. Education is accessed via the national network of Centres of Nursing and Midwifery Education (48%) and Higher Education Institutes (48%). Barriers to education include; non-release, lack of relevant education and insufficient funding. Priorities for further education include; medication management, communication, caring for children who require enteral feeding, tracheostomy care, ventilation and palliative care.

Conclusion: The data demonstrates the importance of specific education for registered nurses who care for children with complex healthcare needs in the community. The results will support the development of relevant education programmes, which will aim to support quality care for children in the community and continuous professional development of registered nurses.

DEVELOPMENT OF A SELF-MANAGEMENT PLAN FOR 8-14-YEAR OLDS WITH DIABETES MELLITUS TYPE 1

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Introduction

Type One Diabetes Mellitus (T1DM) is an autoimmune condition characterised by loss of B-cells. It is a chronic condition where insufficient/no insulin is produced by the pancreas27. An exact cause is unknown. Research shows that genetic predisposition and environmental factors contribute14. If a child presents with suspected T1DM, immediate referral to a paediatric diabetes team is required for diagnosis and treatment19. In 2017, approximately 586,000 children (<15 years) were diagnosed worldwide with diabetes13. It estimates the incidence of T1DM to continue to rise by 3% annually. Irish figures estimate up to 5 children and adolescents diagnosed with T1DM weekly8. Average age at diagnosis is 8.4 years with incidence highest in the 10-14-year group, indicating the appropriate target age-group for our self-management plan is the 8-14-year age-range22.

Aim & Objectives: This poster was developed as part of a module assessment, to critically discuss the self-management plan aimed at children between 8-14 years and to recognise possible complications of poor controlled T1DM

Age-Appropriate Self-Management: Research has shown that children between 9-11 years have different self-management styles. Some children may have problems in various aspects of diabetes management and will require the most help. Others may need help in specific areas of treatment e.g. insulin administration, but not others. Some children will demonstrate competence in their management of diabetes24. This self-management plan of T1DM is aimed towards children with difficulties in various aspects of T1DM. The aim is to improve knowledge and adherence to the medical regimen and promote optimal well-being and better outcomes.
Methods: Qualitative design using semi-structured interviews based upon the Critical Incident Technique (CIT).

Results: Thematic analysis using the CIT approach identified five themes all of which pertained to either the positive or negative aspects of the transition programme for adolescents with severe haemophilia, parents of adolescents with severe haemophilia and MDT. The main issues that emerged in the themes were the change in independence, meeting peers, being prepared for inevitable change, apprehension and communication levels.
Conclusions: There is a distinct paucity of research completed with this study group in Ireland. This study provided a comprehensive view of the transition service from the viewpoint of the adolescent, parent and MDT. Research findings relating to positive and negative aspects of the service were explored. Implications for practice for the three study groups were identified.

THE ROLE OF THE RESEARCH NURSE IN CLINICAL TRIALS.
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Background: The demand for research nurses has increased due to the expanding clinical research environment in hospitals. There are currently three research nurses working in the Haemostasis & Thrombosis service here. They are involved primarily with clinical trials, but also work on academic studies and on patient databases. The role of the research nurse in clinical trials in this department varies depending on the trial specifics. It was decided to review the published material on this topic to assess what is currently understood about nurses working in research and on clinical trials.

Methods: A literature review was conducted to explore published articles on the role of the research nurse in clinical trials. The search strategy included articles published in English within the last 10 years, and included terms such as “research nurse” and “clinical trials”.

Results: There were 123 relevant articles located in the literature search of which 12 were deemed most relevant and were explored further. These articles included data from the U.K, U.S.A, Ireland, Canada, Australia & New Zealand.

Conclusions: Postgraduate qualification in Clinical Research is not a requirement of the role, but may be beneficial. Nurses with extensive clinical trial experience, whether with or without specific postgraduate training, are few, and are employed in a wide variety of specialties and settings.

FAMILY EDUCATION IN RELATION TO CONCUSSIONS
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Introduction
Head injury is the most severe trauma caused by motorcycling, cycling, and other wheeled recreational devices activities in children and these are the leading cause of serious head and facial injuries and mortality among children. Concussion has been defined as a condition which changes one’s mental status, with or without loss of consciousness (LOC)1 often being referred to as a traumatic brain injury (TBI). Commonly it’s caused by a direct blow/ whiplash, (2), slightly shifting the brain interrupting with the electrical activities that make up the reticular activating system (RAS). The most cases occurring in children aged between 5 to 14 are due to cycling and sport (3). Yearly, it’s estimated that 2000 people require hospitalisation due to a concussion episode (3). However, the exact number of concussions in unknown yet its estimated that 1.6 to 3.8 million sports related TBI arise annually (2). Parents’ knowledge of and understanding of concussions and its presenting symptoms are often vital factors that affect care for injured child.

Aim & Objectives:
This poster was developed as part of a module assessment, to critically discuss and educate parents regarding concussions, and what to do if symptoms linger as well as provide tips on how to prevent concussions.

Recognising symptoms:
Some symptoms of concussions may show up immediately and some may take a few hours or days to appear. Parents most commonly correctly identified vestibular-somatic and cognitive-sensory symptoms including headache, blacking out, dizziness, trouble understanding, and trouble remembering1. Continue to monitor for signs or a concussion. Concussion is primarily diagnosed by the presence of commonly assessed subjectively through patient reporting. Therefore, it is advocated that the parent be included as an integral part of the concussion management and evaluation.
Concussion action plan
Remove the injured individual from the situation. Keep the individual with a possible concussion out of any sports on the same day of the injury and until cleared by a health-care professional. Under no circumstances should parents, coaches or non-health care professionals judge the severity of a concussion. Record and share information about the injury such as how it happened and the signs and symptoms to help health care professional assess the individual. Inform parents and guardians about the possible concussion and refer them to concussion information websites. Ask for written instructions from the individuals’ health care provider about the steps that should be taken to help the individual return to sports or everyday activities.

Conclusion:
The parents of youth sport participants would benefit from increased concussion education focusing on the types of symptoms as well as the consequences of suffering a concussion.


IMPROVING VACCINE RESPONSES IN THE PAEDIATRIC POPULATION BY PROMOTING TH1- AND TH17- CELL RESPONSES
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Two million infants die each year from infectious diseases before they reach 12 months; many of these diseases are vaccine preventable in older populations. Vaccination is a highly effective method of preventing disease; however, although the majority of the global vaccine market is paediatric, the current vaccine formulations are modelled in adult blood and it is likely that the most effective adjuvants for the neonatal and paediatric populations are being overlooked.

Pattern recognition receptors (PRRs) of the innate immune system represent the critical front-line defence against pathogens, and many new vaccine formulations target these PRR pathways to boost vaccine responses. Evidence suggests that elements of the innate immune system do not fully develop until puberty, contributing to impaired response to infection and impaired vaccine responses in neonates, infants, and children. We have recently reported that the activity of one family of PRRs, the cytosolic nucleic acid (CNA) sensors, is intact in cord blood and peripheral blood of young children.

This study investigates the function of CNA sensors in specific cell types of the innate immune system, namely monocytes, monocyte-derived dendritic cells (moDCs) and monocyte-derived macrophages (MDMs), from cord blood. These cells are the critical innate immune cells employed to activate and shape the adaptive immune response. Our work thus far shows that these cell types, isolated from cord blood, can be activated to express important T cell activatory markers and also to produce important Th1 promoting cytokines. We have compared CNA activation to current adjuvants alone or in combination and found that CNA activation is a promising new adjuvant strategy.

CIRCUMFERENTIAL AND RADIAL DEFORMATION ASSESSMENT IN PREMATURITY?

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Background: The utility of longitudinal deformation measurements (longitudinal strain and strain rate) in premature infants is becoming well established. However, more studies are needed to demonstrate feasibility and reproducibility of left ventricular (LV) circumferential (circ) and radial strain and strain rate (SR) in this population. We aimed to assess feasibility and reproducibility of circ and radial deformation measurements in preterm infants < 29 weeks gestation, and study the impact of a haemodynamically significant patent ductus arteriosus (hsPDA) on those measurements.

Methods: We recruited premature infants < 29 weeks gestation who are enrolled in the PDA RCT (ISRCTN:13281214) over two time points (Day 2 &
Day 8). The cohort was divided on the basis of the presence of a hsPDA on Day 8 (defined using a previously published PDA risk score). Circ and radial strain, systolic strain rate (SRs), early diastolic strain rate (SRe) and late diastolic strain rate (SRa) were measured on Days 2 and 8 using speckle tracking echocardiography. Intra- and inter-rater reproducibility were determined using Bland Altman analysis, intraclass correlation coefficient (ICC) and the coefficient of variation (COV). The impact of a hsPDA on all those measurements was also assessed.

Results: 40 infants with a mean ± SD gestation and birthweight of 26.9 ± 1.1 weeks and 985 ± 211 grams respectively were recruited. Imaging and offline analysis was possible in all scans. Circ parameters demonstrated excellent intra- and interrater reproducibility with minimal bias, an ICC range between 0.89 – 0.99 (all p<0.001) and a COV between 4 – 13%. Radial parameters demonstrated acceptable intra- and interrater reproducibility with minimal bias, an ICC range between 0.73 – 0.96 (all p<0.001) and a COV between 14 – 27%. Day 2 and Day 8 reference values were obtained. On Day 8, infants with a hsPDA (n=21, 53%) demonstrated higher Radial strain, SRs and SRe but not Sra. There were no differences in circ parameters between those with and without hsPDA at either time point.

Conclusion: Measurements of circumferential and radial deformation in premature infants is feasible and reproducible. The demonstration of reference ranges is the first stepping stone to clinical utility. A haemodynamically significant PDA increases radial (but not circumferential) systolic strain, systolic SR and early diastolic SR. This novel information suggests that increased LV preload secondary to a hsPDA may increase intrinsic contractility in the radial but not circumferential plane.

WEANING FROM NJ TUBE FEEDS TO EXCLUSIVE BREASTFEEDING FOLLOWING SURGICAL REMOVAL OF NECK TERATOMAS IN A NEONATE – THE ROLE OF SLT.

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Background
This rare case describes a male neonate with an antenatal diagnosis of teratomas causing obstruction of the hypopharynx and airway. Intubated post planned caesarian section at 38 weeks. Neck exploration with resection of the teratoma and thyroid gland was undertaken on day 2 of life. Stormy post-surgical course, intensive care stay and naso-jejunal (NJ) feeding. Speech and Language Therapy (SLT) referral for assessment of oral feeding at one week of age. SLT are increasingly involved in development of the breastfeeding initiative in this centre.

Research Aims
To outline SLT role in supporting transition to breastfeeding in a complex post-surgical neonate on NJ feeding tube post neck exploration for teratoma removal.

Method
Clinical feeding assessment addressed readiness for feeding, oral skills, tube feeding, parental wishes. A strong non-nutritive suck (NNS) was present. A NJ tube was in place due to aspiration concerns with nasogastric (NG) tube causing right upper lobe collapse. NJ poses a challenge in transitioning to full oral feeding. Hospital breastfeeding guidelines were followed: mum supported to establish and maintain supply of maternal milk, kangaroo mother care and NNS, careful management of NJ feeds with Dietitian, SLT/nursing support with latching, positioning and attachment at the breast, coordinated Suck/Swallow/Breathe with external pacing. Ongoing medical monitoring. Outcomes of interest were; time to exclusive breastfeeding, weight gain and parental satisfaction.

Results
Time to full oral feeding was 18 days. Weight gain was appropriate (start 3.11kg; end 3.49kg). Parents very happy.

Discussion
Working with complex medical cases is challenging. SLT can play a central role in supporting oral skills, SSB coordination, early bonding and transition from tube to exclusive breastfeeding working closely with the wider MDT.

Conclusion
Exclusive breastfeeding was established in this complex case following in-house breastfeeding and tube weaning guidelines.
Introduction: Juvenile idiopathic Arthritis (JIA) is the most common inflammatory disorder of childhood. Early recognition and optimal treatment of JIA is associated with reduced mortality and morbidity. Wait times for new patients to be reviewed by paediatric rheumatologists in Ireland are significantly outside the Standards of Care for children and young people with JIA (2010). These recommend that patients with suspected JIA be seen by a paediatric rheumatologist within 42 days of the referral being made. Advanced practice physiotherapist (APP) provided triage clinics have successfully reduced waiting lists and provided intermediate care pathways for patients who do not necessarily require rheumatologist review (Stanhope et al., 2012). This service model may be an option to manage waiting lists.

New referrals to the paediatric rheumatology are triaged by rheumatologists based on the information provided in the paper referral as “urgent”, “soon” and “routine” as per clinical indications. Those referrals categorised as urgent require consultant review, however it may be possible for referrals in the “routine” and “soon” categories to be reviewed by an APP.

Method: The active waiting list for new referrals categorised as “soon” and “routine” were audited in July 2018 to identify the characteristics of referrals and determine the number of referrals that would be appropriate for an APP clinic. Referrals for a musculoskeletal (MSK) presentation were deemed appropriate for APP clinic where;
- it appears likely to be a non-inflammatory source of the MSK issue
- is it was not clear from the paper referral whether an inflammatory joint condition is the source of MSK issue
- there is no indication of connective tissue disorder, specific rheumatologic disorder, unexplained and/or significant co-morbid medical symptoms, nor of complex neuro-disability history.

Results: There are 421 and 437 children in total on the “routine” and “soon” waiting lists respectively. These children are waiting on average 631 and 592 days, and the longest wait is 1550 and 1516 days on the “routine” and “soon” waiting lists respectively. Review of the diagnosis provided on the referral indicates that 89% on the “routine” waiting list and 65% on the “soon” list are appropriate for APP triage.

Conclusion: An APP triage clinic is feasible to help manage the waiting list for paediatric rheumatology. The implementation of an APP triage clinic can ensure that only those referrals that require a consultant review are seen at consultant clinic. All others may be successfully managed by an APP.

Introduction: Standards of Care for children and young people with JIA (2010) recommend that patients with suspected JIA be seen by a paediatric rheumatologist within 42 days of the referral being made. Current wait times for new patients to be reviewed by paediatric rheumatologists in Ireland are significantly outside of this with an average wait time of 592 days (85 weeks) for “soon”, and 631 days (90 weeks) for “routine” referrals.

New referrals are triaged by rheumatologists based on the information provided in the paper referral as “urgent”, “soon” and “routine” as per clinical indications. Those referrals categorised as urgent require consultant review. However, it may be possible for referrals in the “routine” and “soon” categories to be reviewed by an advanced practice physiotherapist (APP) triage clinics. This model of care has successfully reduced waiting lists and provided intermediate care pathways for patients who do not necessarily require rheumatologist review in adult and paediatric services (Stanhope et al., 2012).

Method: An APP provided paediatric rheumatology triage service was piloted in OLCHC in 2018 to establish feasibility of the clinic. The waiting list of referrals categorised as “routine” was audited and triaged by the PT. Referrals for a musculoskeletal presentation were deemed appropriate for APP clinic where;
- it appears likely to be a non-inflammatory source of the MSK issue
- is it was not clear from the paper referral whether an inflammatory joint condition is the source of MSK issue
- there is no indication of connective tissue disorder (e.g. rash, fever etc.), specific rheumatologic disorder (e.g. lupus, dermatomyositis etc.), unexplained and/or significant co-morbid medical symptoms, nor of complex neuro-disability history.

Referrals were triaged over the telephone and those appropriate attended for review in triage clinic. Patient who did not attend their appointment were contacted via telephone to discuss if a further appointment was required.

Results: In total 19 children were triaged. Of this 68% were discharged from the service, 32% were appropriate for triage via telephone and only 11% required review by consultant paediatric rheumatologists. Investigations were required for 7 children (37%). Despite patients being contacted directly by the PT and receiving reminders of the clinic appointment there was a DNA rate of 13%.

Conclusion: This pilot highlighted the feasibility of an APP triage clinic to help manage the waiting list for paediatric rheumatology. The implementation of a PT
triage clinic can ensure that only those referrals that require a consultant review are seen at consultant clinic. All others can be successfully managed by APP.

RETROSPECTIVE SINGLE CENTRE REVIEW OF AUDIOLOGICAL ASSESSMENTS OF CHILDREN WITH SICKLE CELL DISEASE RECEIVING IRON CHELATION THERAPY

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Background: Sickle cell disease (SCD) is a disorder of haemoglobin which can lead to severe debility and death. One of the major consequences of SCD is the development of stroke. Regular blood transfusion programmes can reduce the risk of stroke development but can lead to the development of iron overload, necessitating the use of iron chelators. There are 3 iron chelators, Deferasirox (oral), Desferrioxamine (IV/SC) and Deferiprone (oral), available. Paediatric populations with SCD are reported to have a higher prevalence of sensorineural hearing loss (SNHL). The aim of this review is to examine audiological outcomes from this cohort. Audiological assessments were conducted using a variety of means; Standard Audiometry, Play Audiometry, Visual Reinforcement Audiometry (behavioural assessments) and Otoacoustic Emission assessments. Typically, assessments are conducted at frequencies 250Hz-8000Hz. Hearing thresholds \(\leq20\mathrm{dBHL}\) are considered satisfactory.

Methods: This is a retrospective, single-centre, cross-sectional review. Inclusion criteria were paediatric population with SCD, receiving iron chelation therapy and assessed in the Audiology Department from 2016-2018 inclusive. A review was conducted of assessments and outcomes collated.

Results: Ninety-five patients with SCD were assessed from 2016-2018. Six were excluded as results are not yet conclusive due to middle ear issues or cerumen in external auditory meatus which may impact on thresholds. Of the eighty-nine included, 46.06% (n=41) were male and 53.93% (n=48) were female. The mean age at assessment was 11.21 years. 96.62% (n=86) had satisfactory hearing, 3.37% (n=3) presented with a degree of SNHL. In the three cases, SNHL was identified at frequencies at 2000Hz or higher. Two of the three patients had previously received Deferasirox and Desferrioxamine. The third had received Deferasirox, Deferiprone and Desferrioxamine.

Conclusion: The prevalence of SNHL in this cohort is lower than some previously published data. More data will be collated from ongoing reviews to monitor for progressive SNHL.

THE IMPACT OF SODIUM DEFICIT ON GROWTH IN SURGICAL INFANTS: A RETROSPECTIVE COHORT STUDY

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Background: Surgical Infants with major sodium losses, e.g. pre-term infants with ileostomies are at risk of sodium depletion which can result in delayed growth and poor weight gain. From current literature, experts suggest that urinary sodium (UNa) should be monitored closely and if levels are low, sodium supplements should be prescribed to infants. There are no current guidelines of how this is best carried out and there is a lack of evidence within the literature. With a lack of consensus in the literature, development of guidelines and further research is sparse.

The study aims to evaluate the sodium deficit related to the type of surgery, evaluate stoma losses in patients related to type of surgery, and to evaluate weight gain in patients in association to UNa levels.

Methods: A retrospective review of surgical infants from 2006-2017 in OLCHC. Data was collected from both medical and dietetic notes. Inclusion criteria included infant’s ≤12 months at time of surgery; ileotomy, laparotomy; 3 or more UNa measurements post-surgery; and three or more weight measurements post-surgery. Weight at birth z-scores were calculated and weight at procedure z-scores were categorized as per WHO classification. Statistical analysis was undertaken using Excel and SPSS (v. 24).

Results: 12 surgical infants from a total recruitment number of 135 were eligible for inclusion (6 males, 6 females). The mean age at time of surgery was 66 days old. UNa levels were grouped into 2 groups: \(\geq30\mathrm{mmol/L}\) and \(\leq10\mathrm{mmol/L}\). UNa levels positively correlated with change in weight Z-score \((p = 0.039)\) so that lower UNa values were associated with larger growth deficits.
Conclusion: Poor growth is evident within this cohort of surgical patients and appears to be linked with sodium levels. Correction of a sodium deficit to achieve urine sodium ≥30 mmol/L is associated with improved weight gain. A future prospective study is needed to draw up guidelines for relevant sodium supplementation.

INFLAMMATORY MARKERS OF ANTIPSYCHOTIC WEIGHT GAIN AND CARDIOMETABOLIC DYSFUNCTION IN YOUTH MENTAL HEALTH DISORDERS
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Introduction
Second generation antipsychotics (SGAs) are prescribed to treat mental health disorders in children. These medications cause significant weight gain in some patients. There is limited understanding of the factors increasing susceptibility to these side effects. It is established that increased adiposity associated with weight gain is mediated by the emergence of a persistent low-grade inflammatory state. There has been no research investigating the relationships between pro-inflammatory states in children and the cardiometabolic side-effects of SGAs and there are no clinical indicators of those at risk.

Aims:
1. To determine whether there is a subgroup of patients at baseline who present with a profile of immune dysregulation.
2. To investigate how SGA medication impacts on inflammatory markers and cardiometabolic function in children.
3. To investigate the potential to predict those at greater risk of developing adverse metabolic outcomes in response to the treatment with SGAs.

Methods
Children and adolescents commencing SGA medication are recruited. The cardiometabolic profile is assessed levels of inflammatory markers are measured. Through comparison with healthy control samples, we will determine if there is a subgroup with a baseline pro-inflammatory profile. The patient groups are assessed longitudinally at 3, 6 and 12 months to measure cardiometabolic profile. Changes in inflammatory markers will be measured in response to treatment with SGA medication.

Results
7 patients have been recruited and have had follow ups at two time points. Leptin levels have increased in the participants with the most weight gain (6-9kg) between baseline and 3 months after treatment.

Discussion
Identification of a high-risk group for weight gain is important for the promotion of physical health in these children; it would allow clinicians to work with these families to minimise the metabolic side effects of SGAs; through rational medication choice, promotion of intensive monitoring and implementation of preventative treatment regimes.

MUMPS RNA OR IgM DETECTION AS A DIAGNOSTIC METHOD- IMPLICATIONS FOR MUMPS OUTBREAKS IN A HIGHLY VACCINATED POPULATION
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A large mumps outbreak commenced in Ireland in October 2014. The users of the National Virus Reference Laboratory were informed that oral fluid collection devices would be provided to allow the collection of oral fluid for the diagnosis of suspected acute mumps infection by RNA detection. Both mumps RNA and mumps IgM detection could be undertaken on a single oral fluid sample and hence would be more accurate in acute infection than serology alone. The aim of this study was to retrospectively assess whether changing the algorithm from serological testing for mumps IgM to molecular testing for mumps RNA in oral fluid samples was beneficial for the diagnosis of acute mumps infection during a mumps outbreak in a highly vaccinated population. A total of 1455 serum and 490 oral fluid samples were submitted for laboratory confirmation of mumps virus infection. Of the sera, 448 (30.8%) tested positive for the presence of mumps IgM. A total of 251 (51.2%) oral fluids had detectable mumps RNA. Despite the limitations of this laboratory-based audit it is evident that during an outbreak, mumps RNA detection in oral fluid would be beneficial for the specific, definitive diagnosis of acute mumps infection in a highly vaccinated population. This finding has beneficial implications for future outbreaks, such as the current mumps outbreak in Ireland.
CHILDREN’S FOLLOW UP ORKAMBI REAL WORLD MULTIPLE BREATH WASHOUT STUDY (CFORMS)
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Introduction: In early 2018, Orkambi was approved for children with CF aged 6 to 11 years in Ireland. This prospective real-world study will optimise and validate novel outcome measures, not routinely used in clinical practice, across the four main Irish paediatric respiratory centres in Ireland to determine the real-world clinical impact of Orkambi in this age group, homozygous for the Phe508del mutation, and compare this to published clinical trial outcomes.

Methods: Primary outcome measures include Lung Clearance Index (LCI) and Spirometry controlled CT scans. LCI will be performed prior to treatment initiation and six-monthly intervals over 24 months. The Royal Brompton Hospital have provided LCI training and continue to provide over-reading and control subjects. CT scans have been performed on a subset of patients prior to initiation and will be performed at 12- and 24-months post Orkambi. The Erasmus Medical Centre Rotterdam will score the CT scans using the PRAGMA method and will provide age matching controls for comparison.

Results
74 CF subjects have been recruited and performed baseline LCI tests, with expected recruitment of 6 subjects at University Hospital Limerick to follow. 29 subjects have performed spirometry-controlled CT scans and 85 post Orkambi initiation LCIs have been recorded. CT scores from year one and year two will be compared with the CT score documented at baseline prior to commencement of Orkambi and will be compared to age matching controls.

Conclusion: This is a unique opportunity to carry out a relevant and meaningful real-world study that utilises Ireland’s small size, high incidence of CF, improve CF research network and paediatric healthcare developments. The outcome measures are novel in this type of study and promise to produce meaningful research data for the community.

FOOD ALLERGY IN CHILDREN WITH INFLAMMATORY BOWEL DISEASE IN IRELAND
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Background: There has been a rapid increase in the number of children with both inflammatory bowel disease (IBD) and food allergy (FA) in recent times. Many shared factors have been implicated in the aetiology of both conditions including diet, breastfeeding, antibiotics and a hygienic environment. It is believed that these factors affect the infant’s gut microbiome and hence their developing immune system. The aim of this study is to report the prevalence of ever having an IgE mediated FA in children with IBD in Ireland. We hypothesise that the prevalence of ever having a FA in children with IBD is different to the prevalence in the general population (4.5%) as reported in the literature.

Methods: A prospective observational study was done in the National Centre for Gastroenterology, Our Lady’s Children’s Hospital Crumlin, and Dublin. It included all children 0-17 years diagnosed with IBD in the Republic of Ireland over a 26-month period (December 2016- January 2019).

Results: There were 209 children diagnosed with IBD over 26 months giving an unadjusted incidence of 8.8 per 100,000 children per year. Twelve of these children were considered to have IgE mediated FA which equates to a FA prevalence of 5.7% (95% CI 3.3 to 9.8). The odds of having FA in the setting of childhood UC is 1.73 times greater than with childhood CD (95% CI: 0.51 to 5.82).

Conclusion: We report a marginally higher prevalence of ever having a FA in children with IBD when compared to children without IBD as reported in the literature. Further longitudinal research is necessary to confirm this association and understand the mechanisms underlying it.
Background: The Physiotherapy Department in CHI at Crumlin provide a weekend respiratory physiotherapy service for every Saturday/Sunday and all bank holidays. Outside of normal working hours the Physiotherapy Department also provide an on call respiratory service. Staff who have completed “on call” training are rostered to work in these services.

Method: A retrospective audit of the weekend roster and recorded statistics for the weekend respiratory physiotherapy service and on call service for 2018.

Results: In 2018 there was 114 days/839.23 hours worked at weekends and bank holidays, with the average amount of hours worked on these days being 7.36 hours. Throughout the year 1297 patients were seen and 1345 treatment sessions undertaken. The average amount of patients seen on each day was 11.38 with an average of 11.8 treatment sessions per day worked. In 2018 there was 8 “bank holidays” days worked. The average hours worked on these days being 6.7 hours worked. There was an average of 12 patients seen on these days. Outside of normal working hours in 2018 there was a total of 36 “call ins” totalling 68 hours of work. On average each call lasted 1.9 hours. The average number of calls per month was 3, February was the busiest month for “call ins” with 7 occasions where a physio was called to attend a patient. Although information is incomplete it appears that PICU 1 was the biggest source of “call ins” in 2018.

Conclusion: There is a demand within CHI at Crumlin for the respiratory physiotherapy weekend and on call service. The level of demand for this service fluctuates throughout the year.

Background: Further empirical research and comprehensive review of the literature in the area of paediatric psychogenic non-epileptic seizures (PNES) is needed, so that more accurate information surrounding its nature and treatment can be accessed by healthcare professionals, patients, and their families. Phase one was a systematic review that aimed to synthesise the evidence regarding the perspectives of children and adolescents with PNES, and the perspectives of their parents, caregivers and families. Phase two was a mixed methods study that aimed to evaluate a PNES parent information leaflet, explore parental experiences surrounding their child’s journey through diagnosis and treatment, and gain an insight into the impact of this condition on the child with PNES and their family.

Method: 

Phase One: Eight studies were identified for inclusion following searching of CINAHL Complete, Medline (Ovid), PsycINFO, PubMed and Web of Science, along with additional hand searching of reference lists. Quality assessment of articles was conducted using the Critical Appraisal Skills Programme (CASP) qualitative checklist.

Phase Two: 11 parents of children with PNES completed a postal survey that was analysed using descriptive statistics and thematic analysis.

Results: 

Phase One: Seven articles were deemed high quality, and one article was deemed moderate quality. Common threads across studies included: “legitimacy and the importance of understanding”, “distress and the social and emotional impact of PNES” and “moving forward”.

Phase Two: The parent information leaflet was highlighted as being a useful resource. Five key themes and one sub-theme were identified: Isolation and withdrawal; sub-theme: Misunderstanding PNES, Emotional turmoil, Loss of independence, Life on hold, and A new role for siblings.

Conclusion: The need for greater training for healthcare professionals about the nature of PNES and communication of the diagnosis was emphasised. Treatment processes varied significantly, highlighting the need for specific management guidelines and treatment pathways to be devised.
DIFFERENTIATED MESENCHYMAL STROMAL CELLS FOR TRANSPLANT MONITORING OF ADVERSE ENDOTHelial IMMUNE REACTIONS*

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Background: Haematopoietic stem cell transplantation (HSCT) is the only curative option for certain leukaemias and other hereditary disorders many of which can be fatal in childhood. However, HSCT has a 25% mortality rate in the paediatric population. Endothelial damage plays a role in transplant related mortality from hepatic veno-occlusive disease, thrombotic microangiopathy and graft versus host disease. Damage to the endothelium ensues from toxicity of the conditioning chemoradiotherapy and alloreactivity of donor T lymphocytes, a subset of which are specific to the vascular endothelium.

Aim: To develop an individualised, risk-adapted prophylaxis to minimise endothelial-related complications of HSCT and transplant-related mortality.

Methods: Mesenchymal stromal cells (MSC) from different sources will be differentiated into endothelial-like cells (eMSC) and subsequently immortalised (eMSC) in vitro. The resulting eMSC lines will be characterised for their functional and molecular phenotypes and compared to bona fide endothelial cells. The molecular characterisation draws on advanced computational methods, which can track cell fate decisions by integrating transcriptomics and proteomics data. eMSC will also be tested for their capacity to induce immune reactions in co-culture assays with allogeneic effector cells. Subsequently, eMSC from paediatric patients will be used for in vitro monitoring of adverse endothelial-specific alloreactions post HSCT.

Results: MSC from several sources can successfully be transdifferentiated into eMSC which – in contrast to undifferentiated precursors – give rise to alloreactive T lymphocyte reactions. In addition, immortalisation of MSC does not change the phenotype of eMSC, allowing the generation of robust, stably growing cell lines for long-term in vitro monitoring purposes.

Conclusion: eMSC qualify as an endothelial-like cell source for the detection of endothelial-specific adverse immune reactions, warranting the use of bone marrow-derived eMSC in paediatric HSCT patients.

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DIETETIC MANAGEMENT OF COELIACS IN CRUMLIN AND TALLAGHT CENTRES

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Intro: Coeliac disease (CD) is an autoimmune condition in response to gluten. The treatment is a life-long gluten-free diet (GFD). Poor compliance with a GFD can have a number of negative sequelae including micronutrient deficiency. Dietetic support is essential to improve compliance. International expert guidelines recommend dietetic support ideally within 1–2 weeks of diagnosis, at 3–6 monthly intervals in the first year, and annually thereafter. There is currently no dedicated dietetic service for children with CD in the Children’s Hospital Group.

Method: A retrospective audit of all children with CD seen by a Registered Dietitian (RD) in Crumlin and Tallaght centres in 2018 was carried out. Data was collected from medical records, dietetic notes and referral cards. Descriptive characteristics, time of diagnosis to dietetic consult and referral to community services was recorded.

Results: A total of 132 patients were seen between the two centres. The mean age was 8.9 years. 63 new and 9 review patients patients were seen in Crumlin and 36 new and 24 review were seen in Tallaght. Mean time from referral to consult was 6 weeks.

Conclusion: Current service provision for children with CD falls short of best practice guidelines. Waiting times significantly exceed best practice guidelines and follow up is limited. Inadequate dietetic input will negatively impact on patient care and the consequences of poor support in our paediatric population may have long-term effects into adulthood.
INCIDENCE OF HEARING LOSS IN PATIENTS WITH A HISTORY OF CONGENITAL DIAPHRAGMATIC HERNIA
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Background:
Congenital diaphragmatic hernia (CDH) is caused by an incomplete formation of the diaphragm affecting 1/3000 births (Masi, 2010). According to one study a late onset complication of CDH is sensorineural hearing loss occurring between 0.5 and 5 years of age (Masumoto et al, 2007). The incidence of late onset hearing loss in survivors of CDH varies in the literature from 26% to 100% (Fligor, 2005, Walton et al, 1991, Robertson et al, 2002). The mean age of onset is reported as 3 years and 6 months and is most commonly a high frequency sensorineural hearing loss (Masi, 2010).

Method:
51 patients were identified as having attended CHI at Crumlin with a diagnosis of Congenital Diaphragmatic Hernia from 2012 to 2015. Using this timeframe allowed testing of patients from a minimum age of 3 years. Bilateral high frequency audiogram findings were reviewed and usable data identified. Patients with otitis media or binaural hearing results only were excluded.

Results:
33 patient reports were identified as having usable data for the purpose of the study. Two patients were identified with sensorineural hearing loss producing a rate of 6% hearing loss in this group when tested at age 3 or older. Neither patient had received ECMO during their treatment. Both patients identified with hearing loss showed a bilateral high frequency hearing loss pattern similar to findings in the literature.

Conclusion:
The rate of 6% hearing loss found in 33 patients with a background of CDH treated from 2012-2015 is lower than the rates reported in the literature. Patients with a diagnosis of CDH are monitored annually in audiology until the age of 8 as recommended in the literature (Masi, 2010). Rates of hearing loss are calculated on an ongoing basis as further data from the group is obtained.

INVESTIGATING EGFR MEDIATED BIOLOGICAL ACTIVITY OF TUMOUR DERIVED EXOSOMES ON THE NEUROBLASTOMA MICROENVIRONMENT.
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Background: Exosomes are membrane bound vesicles that play an important role in cancer through cell-cell communication. Our proteomics data shows that exosomes derived from drug resistant neuroblastoma (NB) cells are enriched with epidermal growth factor receptor (EGFR). We hypothesise that exosomes derived from drug resistant NB cells contain higher levels of EGFR that can drive proliferation of non-cancerous cells in the tumour microenvironment (TME).

Methods: We characterised exosomes secreted from a panel of seven NB cells by western blot, nanoparticle tracking analysis and transmission electron microscopy. Next we validated EGFR expression in these cells and their exosomes by western blot. In parallel with this study we optimized the endogenous labelling of NB derived exosomes with a BF2-azadipyrrmethene 1 (NIR-AZA 1) amphiphilic fluorophore and investigated its utility in the characterisation of exosomes by flow cytometry.

Results: Our data shows that EGFR expression pattern is cell specific demonstrating higher levels in drug resistant NB cells. NIR-AZA 1 labelled KellyCis cells can produce NIR-AZA 1 EVs up to 48 hours after exposure to this fluorophore, however this doesn’t aid in the delineation of exosomes and microvesicles by flow cytometry.

Conclusion: Next we aim to assess the influence of NB exosomal EGFR on cell viability, proliferation, colony forming and cell migration of non-cancerous cells of the TME. This study will elucidate the exosomal communication between NB tumour cells and the cells of the TME and provide a greater insight into the heterogeneity driving NB clinical outcomes.

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Background: In neuroblastoma, both cellular and molecular tumour microenvironment (TME) components play an essential role in disease progression and response to treatment (Borriello et al., 2016). TME cells secrete various macromolecules, such as proteoglycans, polysaccharides, glycosaminoglycans, glycoproteins and fibrous proteins such as collagen and fibronectin. Hyaluronic acid (HyA) – a principal constituent of neuronal microenvironment and a key modulator of the metastatic process. The aim of this study was to demonstrate and reinforce that Hyaluronic acid-collagen scaffolds support the growth of a panel of commercially available NB cell lines and advance our understanding of the neuroblastoma microenvironment and how it affects cancer progression.

Method: The scaffolds were fabricated using freeze-drying techniques that were developed initially for bone tissue engineering applications and extensively reported in relation to physical and biological properties including defined pore size, height and porosity (Curtin et al., 2018). NB cell lines were grown on varying concentrations of HyA and collagen scaffolds for 30 days with subsequent imaging, staining DNA content measurement and biomarker expression analysed at various time points.

Results: Results showed support of NB cells and altered growth characteristics depending on higher and lower HyA concentrations. We identified that Coll-HyA scaffolds universally support the growth and colonisation of 4 different neuroblastoma cell lines (Kelly, KellyCis83, IMR32 and SH-SYSY), with cell type-specific proliferation rates.

Conclusions: Concluding altering the environment can lead to different potential of cells. A higher HyA concentration may be of use to better study the migration/metastases of NB cells.

References:

LOCAL TUMOUR MICROENVIRONMENT DICTATES INVASION STRATEGIES IN NEUROBLASTOMA
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Background
Invasion is the first step of metastasis. In neuroblastoma, half of the patients have metastatic spread at the time of diagnosis representing the most aggressive form of the disease. Therefore, elucidating of the molecular basis of this process may guide novel strategies for anti-metastatic drug discovery and therapy.

Method
We cultured cancer cells from patient-derived and cell lines xenografts in Matrigel and collagen gels using organoid assay coupled with time-lapse microscopy throughout 5 days.

Results
We investigated the change in circularity and area in either a collagen or a Matrigel matrix for 8 cell lines: Kelly, KellyCis83, CHP212, NB1691, SHEP, SHEPDOX, SH-SYSY and Lan1. Each cell line demonstrated the same phenotypical changes and migration patterns regardless of tested matrices. For the organoids examined their circularity and growth area as well as tested the nutrient requirements of DMEM and L15 media. In collagen-DMEM environment, organoids formed 95% spheroids and 5% “sea urchins”. In collagen-L15: 80% spheroids, 13% elongated shapes and 7% mesenchymal shapes. In Matrigel-DMEM: 55% “Sea urchins”, 27% elongated shapes, 9% spheroids and
9% neuronal shapes. In Matrigel-L15: 42% spheroids, 17% elongated shapes, 17% “sea urchins”, 17% cysts and 8% neuronal shapes. The data suggests that the nutrient rich media L15 promotes more diverse phenotypes.

Conclusion
The data suggests that the migratory dynamic of neuroblastoma cells rely upon a portfolio of mechanically and molecularly distinct strategies to interact with the local environment causing the described and potentially other morphologically and functionally diverse phenotypes. In collagen I, neuroblastoma organoids either were indolent and dyed in 4-5 days or grew collectively, without protrusions. Contrary, in basement membrane gels (Matrigel), organoids from the same tumour invaded with protrusions and disseminated cells which had an amoeboid mesenchymal phenotype. Importantly, cells predominantly invaded collectively using neuronal, mesenchymal, lateral branching strategies and “sea urchin”.

OPTIMISING STANDARD PARENTERAL NUTRITION PROVISION IN OLCHC: A PILOT STUDY IN CARDIAC INFANTS

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Background: International guidelines recommend IV lipid emulsions as integral to PN, and that standard solutions should be used over individualised PN solutions in the majority of paediatric patients. Standard lipid solutions are not currently available for use in OLCHC, thus standard PN solutions without lipid are used, or patient specific PN solutions are ordered at significant expense and notable wastage. Commercially available standard lipid solutions provide practical challenges to implementation due to their short shelf life and requirement for appropriately calibrated pumps. The team examined potential effects of facilitating access to standard lipid solutions in OLCHC.

Methods: Macronutrient provision to patients <10kg with and without standard lipid solutions was examined and tabulated at different PN volumes using Microsoft Excel. A retrospective audit of patient specific PN orders from CHC and PICU2 July-December 2018 was undertaken to identify those where nutritional provision could be matched by standard PN with standard lipid solution.

Results: In 2018, Standard PN for <10kg infants comprised 8% of all PN orders. Projected nutritional benefits of including standard lipid solutions in these orders include:
- Significantly increased energy intake (up to 36%)
- Optimised percentage energy from lipid and carbohydrate to within recommended limits,
- Optimised non-protein energy: amino acid ratio to within recommended range
- Delivery of Vitlipid® and Solvito®
Macronutrient provision could have been matched with standard PN plus lipids in 15% (n=22) of patient specific PN orders for CHC & PICU2 (Jul-Dec 2018), saving €2,263 in 6 months.

Conclusion: Benefits of standard lipid solutions outweigh practical challenges. Their use would optimise PN provision, and reduce costs by decreasing patient specific PN usage and wastage. A pilot study to introduce standard lipid solutions on CHC and PICU2 will be undertaken in order to streamline processes around prescribing and delivery, analyse the effects on PN cost and wastage, and determine optimal stock levels to minimise wastage.
THE POPULATION INCIDENCE OF CHILDHOOD GONADOBLASTOMA OVER 20 YEARS IN THE REPUBLIC OF IRELAND.

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Background: Gonadoblastoma (GB) is a rare tumour of the gonads presenting in childhood or adolescence. It is a lesion composed of a mixture of germ cells at different stages of maturation, with low malignant potential. It is associated with disorders of sex development, most commonly Turner mosaic syndrome with Y chromosome material (TMSY), and 46XY gonadal dysgenesis (GD). Little is known about the natural history and incidence, however prophylactic gonadectomy is recommended.

Objectives: To determine the incidence and clinical features of GB presenting in childhood in the Irish Republic (Rol) from 1999-2018 inclusive.

Methods: A retrospective review of children and adolescents with a diagnosis of GB was undertaken using the records of the National Cancer Registry Ireland (NCRI) and the Departments of Endocrinology, Pathology and Surgery at the main children’s hospitals.

Results: Fifteen cases of gonadoblastoma were identified, all except one phenotypically female. Fourteen patients had prophylactic gonadectomy and one presented with an ovarian mass. Eight had TMSY (age at gonadectomy 2 weeks – 14 years). Seven of these patients were phenotypically female and one was phenotypically male. Seven cases of 46 XY GD (all female phenotype) were diagnosed with gonadoblastoma with an age range of 4 months – 15 years at time of surgery. Four of these were unilateral. In the remaining three cases, one patient had bilateral gonadoblastoma, one had unilateral dysgerminoma and contralateral gonadoblastoma and the third had bilateral dysgerminoma with features of gonadoblastoma.

Conclusions: This is the first reported population incidence rate of GB in children with a 20 year annual incidence of gonadoblastoma in Rol of 1/100,000 live births. The data supports the recommendation for elective gonadectomy in high risk conditions. Due to the wide age range in presentations, however, the timing of gonadectomy should be individualised, based on underlying diagnosis and following multidisciplinary team discussion.

TOWARDS ESTIMATING THE INCIDENCE OF RARE DISEASES IN A PAEDIATRIC POPULATION, BORN IN IRELAND IN THE YEAR 2000.

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Background: The EU recognises rare diseases (RDs) as chronic, life threatening with delays in establishing a diagnosis and treatment. The Irish National Plan for RDs (2014) recommended epidemiological studies of RD prevalence to improve both cost efficiencies and care of patients with RD’s. This study aims to derive the incidence of paediatric RD and number of paediatric RD mortality for children born in the year 2000.

Methods: National population based study of RD patients born in Ireland in the year 2000. Cases were identified using electronic/manual records from: the National Paediatric Mortality Registry office; Clinical, Cytogenetics and Molecular genetics database; Radiology and the Hospital In-Patient Enquiry system (HIPE). In addition a detailed analysis of 10 years national death registration information for RDs from 2006-2016 was undertaken along with a 2year study (2015-2016) of inpatient RD deaths.

Results: There were 54,789 livebirths in 2000. Clinical, Cytogenetic and Molecular Genetics identified 603, 121 and 77 cases of RDs respectively. On-going HIPE searches (two major centres) identified > 1100 cases of RD. 69 of 105 deaths from the 2000 cohort had a RD. Of all deaths on the Register (2006-2016), (n=4044) aged 0-14, 58.56% (n=2368) had a RD diagnosis; Neonates, 56%, Post-neonates, 58%, Children aged 1-14 years, 64%. Of the total (n=234) inpatient deaths with a RD from 2015-2016, 52.6% (n=123) were cared for at the two major centres

Conclusions: This study to-date has identified > 1900 RD patients presenting by age 17 giving a
minimum incidence of 3.5% for paediatric RDs. 65.7% of paediatric mortality cases for the year 2000 cohort and 58.6% of all cases from 2006-2016 had a RD confirming the serious nature of these disorders. We expect the final figure to be higher when we complete analysis of all the HIPE and sub-specialty data from these major centres.

ERYTHROPOETIN AS A TREATMENT MODALITY IN HYPERHAEMOLYSIS COMPLICATING SICKLE CELL ANAEMIA
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Introduction:
Hyperhaemolysis Syndrome (HS), a severe haemolytic transfusion reaction, is a rare complication in children with Sickle Cells anaemia (SCA) who require transfusion. Red cells are obliterated leading to a worsening of anaemia after transfusion. Erythropoietin has been reported as a treatment modality. This case series examines the experience in our tertiary Paediatric Haematology centre, of treating anaemia with Erythropoietin in children with SCA complicated by HS.

Methods:
Patients were identified from the SCA patient database at Our Lady’s Children’s Hospital, Crumlin, Dublin in 2018 and a chart review performed.

Results:
Three children being treated with erythropoietin following HS were identified.

Patient 1:
Diagnosed with SCA at birth. Transfusion programme started aged 3 years 6 months due to silent infarct on MRI brain.
Transfusion programme stopped aged 3 years 10 months as hyperhaemolysis suspected.
Hb(Haemoglobin) at its nadir 5.7 g/L. Erythropoietin commenced with good effect to date.

Patient 2:
SCA diagnosed aged 2 years. First transfusion aged 15 years due to crisis with Hb 6.5g/L. 5 weeks later admitted with abdominal pain and splenomegaly. Hb 7.45g/L and then fell to 5.7g/L. Treated with Immunoglobulin(IVIG) as diagnosis of HS was suspected. Commenced on erythropoietin. Hb maintained > 6 g/L since then with Erythropoietin 3 times a week.

Patient 3:
SCA diagnosed aged 1 year. At age 4 years, 3 admissions with chest crises and associated anaemia.
Hb fell to a nadir of 4.9 g/L post transfusion and episodes were treated with IVIG and IV methylprednisolone. Another chest crisis at 4 years 7 months precipitated trial of erythropoietin with good effect.

Conclusion:
HS is a rare complication of SCA which can cause significant worsening of anaemia that is difficult to treat. Erythropoietin can be used to maintain acceptable levels of haemoglobin to avoid transfusion.

TAKAYASU ARTERITIS PRESENTING IN AN 11 YEAR OLD BOY
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Introduction:
We present a case of Takayasu arteritis in a Caucasian Irish 11 year old male.

Background:
Takayasu Arteritis, which usually involves the Aorta and its main branches is an idiopathic granulomatous vasculitis of unknown aetiology with significant associated morbidity and mortality.

Case Presentation:
A previously well Caucasian eleven year old boy, with no past medical history of note, presented with an insidious onset of persistent, intermittent abdominal, flank and back pain, waking him form sleep and exacerbated by exercise.

Examination was normal, including pulses and 4 limb Blood Pressure measurements. Inflammatory markers on presentation- CRP(90) and ESR(120)- were markedly raised. Full blood count, renal and liver profiles were normal.
CT Angiogram showed upper periaortic soft tissue surrounding the origin of the coeliac axis and superior mesenteric artery (SMA) causing marked stenosis of the SMA.
An extensive infectious work up was performed which proved negative including exclusion of tuberculosis.
PET scan confirmed uptake in the proximal abdominal aorta with associated periaortic soft tissue suggestive of Aortitis.
A diagnosis of Takayasu arteritis- large vessel granulomatous vasculitis, was made.
Treatment was instigated with high dose intravenous methylprednisolone for three days followed by high dose oral prednisolone and subcutaneous methotrexate at a dose of 15mg/m² weekly.

Inflammatory markers slowly began to normalise with immunosuppressive treatment. Follow up ultrasound at one month showed interval improvement in the aortic mass with increase in the aortic lumen size. On corticosteroid wean a further ultrasound 6 weeks later showed no improvement in the mass and was associated with a rise in inflammatory markers. Biologic therapy with adalimumab subcutaneously has since been added with plan for serial imaging to assess response to therapy.

Conclusion: This is a rare presentation of a large vessel vasculitis- Takayasu arteritis in a male child of Caucasian origin.

**PFAPA – THE IRISH EXPERIENCE IN A TERTIARY AUTOINFLAMMATORY CLINIC**

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**Introduction:**

Periodic fever, aphthous stomatitis, pharyngitis and cervical adenitis (PFAPA) syndrome is the most common autoinflammatory disorder in childhood. This study examined the clinical features and management of children with PFAPA attending a tertiary Autoinflammatory Clinic.

**Methods:**

A retrospective observational chart review of all children with confirmed clinical or suspected PFAPA attending the autoinflammatory clinic at Our Lady’s Children’s Hospital, Dublin from January 2016. Data were collected on basic demographics, route of referral, symptoms and signs and inflammatory markers during disease episodes (febrile) and non-episodes and therapeutic agents used.

**Results:**

Thirteen children were identified as having PFAPA. The median age of disease onset was 16 months. The route of referral was via Immunology (4 patients), Rheumatology (6 patients) and Infectious disease (3 patients). All children presented with episodic, recurrent febrile episodes with a range of associated features- aphthous ulceration in 7 children, tonsillitis in 5, pharyngitis in 3, stomatitis in 1, cervical adenitis in 7, lethargy in 6, rash in 4, anorexia in 4, abdominal pain in 5, vomiting in 3, loose stool in 4, joint complaints in 2 and 1 patient with bruising. 69% of patients had documented raised inflammatory markers during a flare, with 84% having high serum amyloid A (SAA) levels.

11 patients had a significant response to an initial trial of corticosteroids. Colchicine was the treatment of choice (11). Tonsillectomy was performed in 5 patients. Biologic agents, Anakinra (2) and Adalimumab (1) were instituted in those refractory to colchicine.

Conclusion:

This study gives an overview of the burden of disease imposed by PFAPA on an Irish population. The majority of patients had relief of symptoms with an initiation trial of corticosteroid. Colchicine was the most frequently used therapeutic agent to prevent disease flares. Tonsillectomy and biological agents are potential alternative options.

**ETHINYLEOSTRADIAL MEDICATION ERRORS IMPACTING PUBERTAL INDUCTION IN ADOLESCENT FEMALES ATTENDING THE ENDOCRINE CLINIC**

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**Background:** Oral ethinylestradiol (EE) is used for pubertal induction in adolescent females who fail to enter or complete puberty as expected. EE is not an authorised medication in Ireland outside of combination combined oral contraception formulations. Use in pubertal induction is off-label. Typically a pubertal induction regimen starts at a very low dose with small incremental increases to mimic physiological puberty over a 2-2.5 year period.

**Methods:** We describe three cases of errors which occurred during pubertal induction with oral EE.

**Results:** Patient A endured a dispensing error from a community pharmacy due to inadvertent dispensing of a product with a sound-a-like name which is widely used for hormone replacement therapy in adult menopausal females. The cumulative effect for Patient A was 10 times the dose of oestrogen than had been prescribed. The error was picked up after 18 months by the clinical team. Due to poor
compliance Patient A does not appear to have suffered adverse outcomes. Patient B also endured a dispensing error at the community pharmacy. A microgram to milligram dispensing error resulted in 1000 times the prescribed dose. The error was noted when she developed unexpected uterine bleeding. Patient B has suffered an adverse outcome. Patient C also endured a dispensing error at the community pharmacy as new prescription with an increased dose was not dispensed and she remained on the previous lower dose. As a consequence Patient C has had a 6 month delay in her induction regimen.

**Conclusion:** The above noted medication errors underline the difficulty with prescribing in paediatrics - namely off-label use, difficulty sourcing small doses, non-paediatric formulations and dose calculations, along with lack of community pharmacy experience/knowledge of the prescribed indications. We have formulated a patient information leaflet for parents outlining these risks and educating them regarding the correct formulation. We plan to audit all our adolescent girls undergoing pubertal induction to ensure that the correct medication is currently being dispensed. Alternative options now widely in use internationally such as the transdermal oestrogen patch have also been introduced to our practice but require similar caution and patient education.

**PROVOCATION OF PAEDIATRIC HEARTS - A SAFE & SMART SOLUTION**

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**Background and Aims:** Provocation challenges are used to diagnose certain inherited life-threatening cardiac conditions; treatment can prevent malignant arrhythmias and sudden death. Provocation medications are administered to unmask pathognomonic conduction characteristics on real-time electrocardiography. Pre-prepared rescue medications are administered should a ventricular arrhythmia be unintentionally provoked. These high-risk medications, in line with safety agency recommendations, should be delivered using smart-pump technology. They are also often unlicensed and expensive. We investigated the utilisation of smart-pumps and development of a guideline to optimise medicines management and safety of these procedures in Our Lady’s Children’s Hospital, Crumlin.

**Methods:**

Published literature and current practices, including those in other paediatric and adult hospitals in Ireland and the UK, were reviewed to ascertain appropriate dosing and administration in the paediatric population. Multi-disciplinary input from nursing, cardiology, pharmacy and biomedical engineering was sought in guideline development.

**Results:**

Evidence for such challenges in paediatrics is sparse. Suitable dosing was agreed and an indication-specific smart-pump drug library created. The ‘PCA Therapy’ module was employed to deliver repeated weight-based doses of the provocation medication (Ajamline) in a controlled and timely manner; the rescue medication (Isoprenaline) was programmed as a continuous infusion. An auxiliary calculator was developed in Microsoft Excel to direct staff on preparation of both infusion solutions and bolus doses of medications to be manually administered (Magnesium and Isoprenaline). In 2017, relevant staff were trained, and the ‘Ajamline Challenge’ guideline was approved and implemented in the Cardiac Catheterisation Laboratory (CCL) and Cardiac Day Unit. Estimated cost savings of €19,400 were realised due to reduced wastage of unused medications. Further savings are likely due to decreased utilisation of the CCL.

**Conclusion:**

Multi-disciplinary collaboration and health technology can improve the safety and cost-effectiveness of high-risk cardiac diagnostic procedures in the paediatric setting. Similar processes for other provocation challenges are under development.

**DIRECT OBSERVATIONAL STUDY OF INFUSION ERRORS ASSOCIATED WITH SMART-PUMP TECHNOLOGY IN PAEDIATRIC INTENSIVE CARE**

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**Background and Aims:**

Smart-pump technology and standardised concentration infusions (SCIs) are advocated to reduce infusion errors in the high-risk paediatric intensive care unit (PICU) setting. In 2012, the PICU of Our Lady’s Children’s Hospital, Crumlin
implemented a smart-pump drug-library of SCIs; infusion data is auto-transferred to the PICU clinical information management system. This study aims to determine the frequency, severity and distribution of smart-pump infusion errors.

**Methods:**
All infusions were directly observed at the bedside and compared against both medication orders and auto-populated infusion data. Identified deviations were categorised as either medication errors or discrepancies. Five opportunities for error (OEs) were identified: programming, administration, documentation, assignment, and data transfer. Error rates were calculated as: number of infusions with errors, and number of errors per OE. Pre-agreed definitions, multi-disciplinary consensus and grading processes were utilised.

**Results:**
1023 infusions for 175 patients were directly observed on 27 days between February and September 2017. 74% of patients were under 1 year, 32% under 1 month. The drug-library accommodated 96.5% of all infusions. SCIs were most common (72%), followed by 13% maintenance fluids (13%) and total parenteral nutrition (10%). Compliance with the drug-library was 98.9%. 55 infusions had ≥ 1 error (5.4%); a further 67 (6.3%) had ≥ 1 discrepancy. From a total of 4997 OEs, 72 errors (1.4%) and 107 discrepancies (2.1%) were observed. Documentation errors were most common; programming errors were rare (0.32% OE). Errors were minor, with just one requiring minimal intervention to prevent harm.

**Conclusion:**
These error rates are low compared to similar studies. This study has demonstrated the benefits of smart-pumps and auto-populated infusion data in the paediatric intensive care setting.

**A COMPARISON OF CPAP COMPLIANCE IN TREATMENT OF OBSTRUCTIVE SLEEP APNOEA IN A TRISOMY 21 AND NON TRISOMY 21 PATIENT POPULATION.**
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\(^b\)School of Medicine, University College Dublin (UCD), Dublin

**Background**
Studies have shown that continuous positive airway pressure (CPAP) therapy for obstructive sleep apnoea (OSA) in children with Trisomy 21 (T21) is challenging to sustain and thus adherence to treatment is reduced. The aim of this study was to assess adherence to treatment of children with T21 versus those without T21 attending our NIV service at OLCHC.

**Methods**
We randomly selected a group of both T21 and non T21 patients from our NIV database. We retrospectively examined the download data from the in-built software on their CPAP devices. We collected data on the hours of usage, leakage and average AHI. The mean values of the group were calculated and statistical significance was determined through the Student’s t test.

**Results**
Sixteen T21 and 20 non T21 patients were identified. When comparing the two groups, there was no statistical difference identified in the average hours of usage (5.51 hrs versus 5.87 hrs, p=0.44), average leakage (33.3 versus 38.3, p=0.17) and average AHI (7.01 versus 4.4, p=0.16).

**Conclusion**
These results do not indicate any statistical difference between the T21 and non T21 cohorts and indicate that adequate CPAP adherence may be achieved irrespective of T21 diagnosis.

**REDUCING TIME TO EXTRA CORPOREAL MEMBRANE OXYGENATION (ECMO) DURING EXTRA CORPOREAL CARDIOPULMONARY RESUSCITATION (ECPR) IN CHI CRUMLIN**
Sunimol Joseph (ECMO Co-ordinator, CHI, Crumlin), Suzanne Cronly (Anaesthesiologist CHI, Crumlin), Ann Marie Gallen (Clinical Perfusionist, CHI, Crumlin), Mary M. Gorman (Resuscitation officer, CHI, Crumlin), Marie Moyles (Clinical Nurse Manager, Theatre, CHI, Crumlin)

**BACKGROUND**
ECPR is defined as the rapidly-deployed application of venoarterial ECMO in patients with, during cardiopulmonary resuscitation resistant to return of spontaneous circulation (ROSC). ECPR is a rare event, requiring the coordination of several clinical teams. Extra Corporeal Life Support Organization (ELSO) data suggests superior survival rates compared to conventional Cardiopulmonary Resuscitation (CPR). A Longer Time to ECMO (TTE) is associated with reduced survival rates and permanent end organ injury.
In CHI, Crumlin the median TTE is 45 minutes (range 22minutes - 107 minutes). We identified a need to develop a multidisciplinary quality initiative to design and implement an ECPR algorithm to improve outcome for cardiac patients who suffer a cardiorespiratory arrest resistant to ROSC by June 2019.
METHODS
- Developed stakeholders map and communication plan to highlight project objectives.
- Retrospective audit of ECPR data from January 2011 to July 2018.
- Process map explored to identify and detail the barriers to ECMO initiation.
- Performed multidisciplinary simulations to evaluate current TTE practice.

RESULTS
- Developed a comprehensive algorithm and used multiple simulations to test its effectiveness, outlining each team member’s role within an identified timeframe.
- Implemented a new ECPR alert system.
- Secured a dedicated sole purpose storage facility for ECMO equipment.
- Considered a watcher list of potential ECMO candidates for Cardiac Paediatric Intensive Care Unit.

CONCLUSION
In CHI, Crumlin there is currently no ECPR programme, ECPR is a rare occurrence which is often initiated out of hours. The process must be streamlined for maximum efficiency and favourable patient outcomes. This project facilitated the implementation of a new alert system, preprimed circuits stored in a sole purpose store room, an algorithm to identify individual roles within the multidisciplinary team and highlighted the possible need for an in-house theatre nurse. With ongoing simulation training we hope to further reduce TTE thus, improving survival rates and neurological outcomes.

HOME OXYGEN THERAPY - A DRUG LIKE ANY OTHER
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Department of Respiratory Paediatrics

Background:
Home oxygen services play a vital role in supporting children with breathing difficulties with a wide variety of underlying medical conditions, many of whom will wean out of oxygen over time. However, unlike other medical prescriptions which need to be reviewed 6 monthly, oxygen is continues to be supplied until the prescriber requests in writing for it to be removed. The HSE cost is €684 /year for hire of an oxygen concentrator. Our aim was to review oxygen prescribed in OLCHC.

Methods:
Air Liquide, the main supplier of oxygen services, provided a list of all children prescribed oxygen between 1/1/2010 and 31/1/2019 by OLCHC and who are currently supplied oxygen. Clinical records were reviewed for data.

Results:
82 patients were prescribed oxygen over 8 years and are living all over the Republic of Ireland. Almost half (43/82) were prescribed oxygen for respiratory causes including chronic lung disease of prematurity, cystic fibrosis and interstitial lung disease. The other causes were congenital heart disease (n=13), Trisomy 21 (n=10) and other (n=16). The median age was 3 (range 0.1-20.3) years at time of oxygen prescription. The length of time on oxygen was 2.7 (range 0.1-9) years. The main prescribers were cardiology, neonates and respiratory. 56/82 children were reviewed in OLCHC within the last 12 months.

Conclusion:
On review of the notes it can be difficult to assess if children are still using oxygen particularly when many are often followed up by several clinicians and/or multiple hospitals. A formal review process should be put in place for children on oxygen so it can be titrated appropriately and removed in a timely manner when no longer needed.

NEONATAL ENCEPHALOPATHY: HYPOXIA-INDUCIBLE FACTOR AND HYPOXIC RESPONSIVE CYTOKINES FROM NEONATE TO EARLY CHILDHOOD
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Background and Aims: Neonatal Encephalopathy (NE) is associated with hypoxia-ischaemia and induction of inflammation. Persistent inflammation is associated with brain injury in this cohort. HIF-1α (hypoxia-inducible factor-1 alpha) mediates the responses of mammalian cells to hypoxia/ischemia by inducing the expression of adaptive gene products (e.g., vascular endothelial growth factor (VEGF) and erythropoietin (EPO). The aim of this study was to evaluate associations between VEGF
and EPO and HIF 1α in NE at birth and early childhood.

**Methods:** We included infants with NE who had therapeutic hypothermia as well as a cohort of children post-NE at school-age and a group of children with non-NE cerebral palsy. All groups were compared to age-matched controls. Whole blood samples were treated with lipopolysaccharide (LPS). Whole blood RNA was isolated, cDNA was synthesized and analysed by quantitative PCR for expression of HIF1α and multiplex cytokine analysis for VEGF and EPO. Statistical analysis was performed using ANOVA and t-test with Graphpad Prism Version 7.0.

**Results:** HIF-1α was increased children with non-NE CP (p<0.04) versus controls and there were non-significant increases in neonatal NE and childhood NE versus controls. Higher EPO was seen in neonates with NE compared to age-matched controls as well as decreased VEGF. At school-age children post NE were significantly LPS hyporesponsive (p<0.05) compared to controls with similar VEGF responses.

**Conclusion:** Alterations in the HIF 1α pathway are found in children with NE at birth and later in childhood. Children with non-NE CP have significantly increased HIF1α. Persistent changes in systemic inflammation are found in childhood in children who have CP and also those with non-NE CP. EPO and VEGF are dysregulated in neonates with NE compared to controls and also through to childhood. There was a significant relationship between HIF1α and EPO in the CP cohort. This pathway could be targeted with propyl hydroxylases as in other disorders related to hypoxia.

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**A QUALITY INITIATIVE TO IMPROVE THE SAFE TRANSPORTATION OF NON-CRITICAL INFANTS AND CHILDREN WHO REQUIRE TRANSPORTATION ABROAD FOR TREATMENT OR INVESTIGATIONS ABROAD**

Margo Byrne*, Martina Kennedy** and Rita Mackey***

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**Background:**
The transfer of critically ill children is traditionally supported by the Irish Paediatric Acute Transport Service (IPATS) however, there is no structured pathway identified for the nurse led or nurse/doctor led transportation of non-critical infants and children. With increasing numbers of non-critical infants/children requiring transport abroad for investigations, specialised treatment and transplantation, specific education and training is required for nurses caring for these children. This study day aims to support registered nurses to develop the required knowledge, skills and attitudes to care safely for non-critical infants and children who require transportation abroad.

**Method:**
A pilot day was carried out on the in November 2018, adopting a multi-disciplinary team approach, with a registration of 18 participants. The Irish Air Corp facilitated a talk, promoting the collaboration between healthcare professionals and the Air Corp. Workshops were conducted to allow interaction with transport equipment, documentation and discuss real life scenarios with experienced facilitators. Following this, participants were divided into groups, where each group was given a case study. Participants provided feedback on the nursing care of their case study, showcasing the understanding and consolidation of the information provided throughout the day.

**Results:**
Participants completed an evaluation, with 93% of participants rating the day as excellent. Participants noted the day provided a greater awareness and understanding of the processes involved to ensure a safe transfer of the infant/child abroad. The use of case studies evaluated well, with participants emphasising the value of hearing about real life situations.

**Conclusion:**
The implementation of this study day has led to the identification of 30 nurses suitable to partake in this activity. Ongoing evaluations continue on the ward, post completion of a transfer abroad, to ensure quality of the education being provided. Following the initial pilot, this study day continues to be developed as a CCNE programme for all CHI hospitals.
BREAKING NEWS TO CHILDREN
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Acknowledgement: This project has been instigated and financed by the Katie Nugent Fund in aid of the Children’s Medical Research Foundation (CMRF). This is a parent-led fund, set up to support families through the journey of childhood cancer http://www.katienugentfund.com/

Background: The impetus for this study arose from parents in the Irish paediatric cancer service who highlighted the need for additional supports. The ensuing study concentrated on the social-support needs of parents of children with cancer with a view to developing the services offered to them. This abstract reports on one key finding: the parents’ experience of breaking news of a cancer diagnosis to the child with cancer and their siblings.

Methodology: Action research informed every detail of this study and guided the creation of two working-groups: a project team (consisting of parents, staff, and researchers) and a steering group (consisting of stakeholders, managers, and researchers). These groups supported the field-research, which was undertaken in two stages:

1) Semi-structured interviews/focus groups with 17 parents (from diverse stages of treatment) and 18 staff members (from 8 different disciplines). This data was analyzed with a directed content analysis which guided the creation of two surveys.

2) Surveys were distributed to 580 families in total, 232 surveys were returned from parents of children in treatment and remission, and 9 from bereaved parents.

Results: Parents experienced distress when breaking news to the child with newly diagnosed cancer and their siblings. Parents identified four supports that helped in these painful conversations: 1) receiving coaching, 2) receiving resources, 3) a family meeting with the multi-disciplinary team, 4) play therapy. When asked what supports could be
developed parents identified: 1) more resources (e.g. digital media), 2) therapeutic support, 3) more coaching, 4) formalise and standardise a family-meeting with the multi-disciplinary team which includes siblings. Parents expressed deep concern for siblings. The long-periods of time parents spent in hospital with their sick child impacted siblings which caused immense guilt for parents.

Conclusion: This data provides guidance for supporting children and their siblings particularly during the diagnostic phase.

THE ISOLATION OF BEING IN ISOLATION
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Acknowledgement: This project has been instigated and financed by the Katie Nugent Fund in aid of the Children’s Medical Research Foundation (CMRF). This is a parent-led fund, set up to support families through the journey of childhood cancer http://www.katienugentfund.com/

Background: The impetus for this study arose from parents in the Irish paediatric cancer service who identified the need for increased parental support. The ensuing study investigated the social-support needs of parents in order to guide the development of support-services. This abstract encapsulates one key finding: the impact of isolation for parents.

Methodology: Action research informed every methodological detail of this study and guided the creation of two working groups: a project team (consisting of parents, staff, and researchers) and a steering group (consisting of stakeholders, managers, and researchers). With direction from these two groups, the field research was undertaken in two stages:
1) Semi-structured interviews/focus groups with 17 parents (from diverse stages of treatment) and 18 staff members. These interviews were analysed with a directed content analysis which guided the creation of two surveys.
2) Surveys were distributed to 580 families, 232 surveys were returned from parents of children in treatment and remission, and 9 from bereaved parents.

Results: The emotional vulnerability incurred by isolation was evident, as one parent expressed “I found this stressful and soul destroying”. Parents whose children were isolated on account of infection, rated loneliness, exhaustion, boredom, being unable to leave the room, and being excluded from social activities as more problematic than parents who experienced isolation on account of a BMT. In Ireland, isolation on account of a BMT is fore-planned, the family is prepared, and a programme is generally put in place for the child. In contrast, isolation for infection is initiated unexpectedly and without preparation or a programme. Parents requested four supports to ease the strain of isolation: 1) meals for the parent, 2) play therapy, 3) volunteers to entertain the child, and 4) technology for the child.

Conclusion: These findings provide guidance for supporting parents during isolation.

THE INTRODUCTION OF THE NEW DATABASE: IPOP (IRISH PAEDIATRIC ORTHOPAEDIC PATHWAY)
Mr Patrick Kiely1, Mr Michael Leahy2, Ms. Trisha Hynd3: 1: Orthopaedic Consultant, 2: Data Manager, 3: Audit and Research CNM2; Orthopaedic Department, OLCCH

Background: Prior to the introduction of IPOP, it was difficult to ascertain how many patients were waiting for appointments and the level of urgency for each individual case. There was a clear need to develop a database that could easily group patients according to their severity, waiting time, and where they were in their patient journey. It was also difficult to gain an insight or overall understanding of the patient population for use in research due to the following:
- All notes were paper based, meaning access only by one person and place at a time.
- There was no clear method for tracking patients on the pathway.
- There was no system to alert or highlight breach of proposed timeline.

Method: A colour coded system was developed by Mr Kiely, one of the Orthopaedic Consultants, this enabled each patient’s journey to be easily distinguished by a colour code. This then led to the creation of an electronic database by the data manager which was based on the colour coding system.

Results: The database is currently being used for spinal patients and the Clinical nurse specialists
involved in their care have access and can also add updates. This has proved highly beneficial by reducing the time spent looking for patient information. It is also a very useful tool with regards research and audit as all the statistics and data can be retrieved and easily portrayed.

**Conclusion:** The IPOP system has been successful for the Spinal cohort of patients and it would be even more beneficial if rolled out for all orthopaedic patients. Due to the success of IPOP, a second consultant has begun to use it and it is hoped that all orthopaedic consultants will use the system in the future.

**INVESTIGATION OF THE FUNCTIONAL INTERPLAY BETWEEN SIGNALLING PATHWAYS AND EPIGENETIC FACTORS IN ACUTE LEUKAEMIA**

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**Background:** Knowledge of the genetic landscape of leukaemia has been slow to translate to clinical benefit. For example, poor-risk leukaemias often have mutations in epigenetic factors, but the molecular mechanisms of how this leads to treatment resistance are poorly understood.

**Aim:** To use systems biology approaches to unravel the molecular interplay between epigenetic dysfunction and altered kinase signalling in acute leukaemia.

**Methods:** I am using a combination of computational and *in vitro* investigation to investigate how the activities of kinase signalling pathways are affected by epigenetic alteration, using Polycomb Repressive Complex 2 (PRC2) loss as a model.

- **Analysis of publicly-available genomic data** using computational algorithms (e.g. DISCOVER) to determine the overlap between epigenetic mutations and changes in specific signalling pathways in different leukaemia subgroups.
- **Cellular models** of epigenetic alteration by CRISPR/Cas9 deletion of core PRC2 components in leukaemia cell lines.
- **Comprehensive molecular characterisation** of PRC2-disabled lines (RNA-sequencing, ChIP-seq, proteomics), prioritising assessment of kinase pathway activity.
- **Computational modelling** of pathways that are disrupted following PRC2 loss. Models will be tested by experimental manipulation of each pathway e.g. pharmaceutical inhibition. Incorporation of *in vitro* results will be used to refine the models, with the aims of identifying the key factors that affect epigenetic/ signalling interaction.

- The *in vivo relevance* of these findings will be tested by direct analysis of primary patient leukaemia samples from OLCHC, to identify transcriptional, epigenetic and proteomic correlates of the findings from *in vitro* models.

**Results:** Although I am in the early stages of my PhD, I have already identified a potential synergistic interaction between JAK kinase inhibitors in leukaemias with IL7R-activating mutations. These results will be confirmed in the coming months.

**Conclusions:** We hope that this work will lead to better and more targeted therapies for children and adolescents with leukaemia.

**CASE REPORT: IMMUNE THROMBOCYTOPENIA PURPURA (ITP) – AN INTRA-ORAL AND EXTRA-ORAL PRESENTATION**

Maguire J, Fitzgerald K, Fleming P (Paediatric Dental Department OLCHC, Dublin)

**Background**

A four year-old boy was referred to the Paediatric Dentistry Department by the Haematology Department at OLCHC. He had a two week history of bleeding and crusty lips and intra-oral ulceration with a history of a cough two weeks prior to this. No relevant family history was noted.

The child’s parents initially presented him to community pharmacy and medical providers who advised attendance at the Emergency Department (ED) of the nearest tertiary care paediatric hospital. Upon presentation, he had a full blood count performed as part of his work up. Initial blood results revealed platelet count of 1. The rest of his blood results were essentially normal.

**Results**

On examination, extraoral facial, limb and trunk bruising were noted. Lips were crusted with blood and surrounded petechiae. Intraoral examination revealed soft palate petechiae, areas of ulceration/petechiae in the left and right buccal mucosa and a minor bleed from the lower left mandible primary incisor. The findings were consistent with a diagnosis of Immune Thrombocytopenia Purpura (ITP) precipitated by a viral infection. Initial treatment was with tranexamic acid for five days. On review, there was a marked improvement noted with only minimal blood crusting of the lower lip.
and fewer intraoral petechiae evident. No further treatment has been required. The child is being monitored by haematology and dental specialists with regard to signs, symptoms and progress.

Conclusions

ITP is a haematological disorder defined by low platelet count. Children often develop this following a viral infection. Spontaneous bleeding or bleeding induced by trauma, may be the first clinical signs of ITP. This interesting case highlights a primary presentation of ITP with oral signs. This situation may present to a General Dental Practitioner or General Medical Practitioner in community or another Healthcare Professional and it is important to recognise the signs and symptoms and intervene appropriately.

THE ROLE OF IL-1β AND IL-18 IN REGULATING SKIN BARRIER FUNCTION

Rebecca Mahony 1, Alannah Murray 1, Sarah L Doyle 1,2

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Background: Atopic Dermatitis (AD) is the most common chronic inflammatory disease of children in developed countries, affecting around 20% of the population. A hallmark of AD is epidermal barrier dysfunction, which leads to elevated trans-epidermal water loss (TEWL). The factors that cause elevated TEWL remain elusive. IL-18 depletion almost completely abrogates disease in a mouse model and a growing number of serum biomarker studies demonstrate that IL-18 correlates with disease severity. Furthermore, IL-1β and IL-18 are associated with the regulation of vascular endothelial barrier integrity and altered tight junction (TJ) protein expression in intestinal and breast tissues. Here we assess the potential regulation of TEWL by IL-1β- and IL-18-mediated regulation of keratinocyte TJ expression.

Method: The keratinocyte cell line, HaCat, was employed to study the expression and localisation of TJ proteins following stimulation with IL-1β and IL-18, using western blotting and confocal microscopy. The effect of these cytokines on integrity of the cell barrier was measured using a FITC-dextran paracellular flux assay.

Results: Our data show that IL-1β increases the expression of TJ proteins Claudin 1, Claudin 23 and Zo-1. Functionally, we observed decreased paracellular flux in HaCats pre-treated with IL-1β, compared with untreated cells. IL-18 had highly variable effects on the expression of TJ proteins and paracellular flux did not change between HaCats pre-treated with IL-18 and untreated cells.

Conclusion: We have demonstrated that IL-1β stimulation of HaCat cells increases tight junction expression leading to decreased paracellular flux, indicating improved cell barrier integrity. We have also shown that that IL-18 has no significant effect on HaCat TJ expression or barrier integrity. Future experiments will determine if these results hold true for primary keratinocytes, corneocytes and human skin equivalent models and will investigate whether therapeutic manipulation of IL-1β could improve skin barrier integrity for AD patients.

THE BURNING QUESTION: HOW TO CARE FOR CHILDREN WITH THERMAL INJURIES AT HOME

McCan, L1; Clarkin, S1; Donnellan, S1, Marsh, E1, Magrane, R1 and Somanadhan, S2.

1. Stage 3 Integrated Children’s and General Nursing Student
2. Module Co-Ordinator, Programme Director Children’s and General Registration Education Programme. UCD School of Nursing, Midwifery and Health Systems, University College Dublin, 2018.

Introduction

This poster was developed as part of a module assessment, to critically discuss the care of an infant, child, young person and their family, on how to deal with burns in the home environment. Considering, the Burns and fires are the fifth most common cause of accidental death in children and adults and account for an estimated 3,500 adult and child deaths per year (The Johns Hopkins Hospital 2018).

Thermal injuries are an umbrella term used to classify burns, which can be subdivided into 4 types: Thermal, electrical, friction and chemical. These injuries usually occur as accidents and are most prevalent in the toddler age group (5yrs<), as they are more active and curious about the world around them. Burn injuries are also the leading cause of death of children aged 10—18 years and account for almost 90% of total injuries in this age group. Unintentional burn injuries cause physical and psychological effects on a child. It is of vital importance that parents know how to care appropriately for their child with a thermal injury at home.

Objectives: The objectives for this poster was to provide the reader with a clear understanding of
how to prevent, recognise and effectively treat thermal injuries in the home setting.

Classification of burns sustained at home:
This poster will highlight types of burns and the risk of sustaining a burn at home and when it’s time to seek medical attention.

First Aid for Burns in the Home: Do’s and Don’ts
With the incidence of household burns rising rapidly, the importance of basic first aid cannot be underestimated. If first aid is implemented promptly and correctly it can greatly reduce the pain and discomfort, reduce the risk of scarring and the need for surgery. Therefore, ensuring a correct first aid is conducted the cooling measures can be effective for up to three hours post burn (Cuttle et al., 2009).

Overall this poster critically discusses the care for children with thermal injuries at Home.

EVALUATING THE FOLLOW-UP REQUIREMENTS OF PATIENTS WITH MINOR TRAUMA INJURIES TREATED IN A NURSE LED DRESSING CLINIC
Geraldine McCormack & Tina McGarry Clinical Nurse Specialists in Burns and Plastics Our Lady’s Children’s Hospital, Crumlin (OLCHC)

Introduction: The dressing clinic at OLCHC is staffed by 2 clinical nurse specialists (CNS’s) providing expert wound care for burns and plastic surgery patients. Historically, all patients with healed wounds were referred to a consultant clinic in the out-patient department (OPD) for final review prior to discharge from the service. High non-attendance (DNA) rates were noted at OPD ranging from 9%-39% per month.

Our general perception was that the majority of patients had no ongoing problems therefore did not return for medical review. We proposed that a number of patients with minor injuries would be suitable for discharge directly from the dressing clinic.

Aims and Objectives:
1. Assess the cohort of patients suitable for direct discharge.
2. Assess the potential impact on DNA rates at OPD.

Methodology: A consultant led pilot clinic was run over 3 consecutive months. Patients that were deemed appropriate for direct discharge by the CNS’s were booked to this clinic for medical review and consensus agreement on their suitability for this pathway.

Results: There was a 60% DNA rate over the 3 pilot clinics. Only 12% of those that attended required a further follow up appointment.
The DNA rate in OPD fell to an average of 15.5% for 2 of the months the pilot clinic was running.

Conclusion: Patients with minor injuries are suitable for nurse led discharge. New departmental guidelines have been drafted to facilitate nurse led discharge from the dressing clinic. Preliminary data from this new service shows a significant reduction in the number of patients referred to OPD, 56 patients in 7 weeks compared to 168 patients during the same period in the previous year. Data collection is ongoing to assess the full benefits of this service including the impact on the DNA rate in OPD.

SEX DIFFERENCES IN INNATE IMMUNE FUNCTION IN PRETERM NEONATES
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Background: Male neonates are at higher risk of sepsis and have poorer outcomes following sepsis episodes than females. Sex differences in the innate immune response may account for some of the differences in sepsis outcomes between the sexes. Our aim was to study sex difference in innate immune function between term and preterm infants and examine the immunomodulatory effect of Estrogen and Progesterone treatment.

Methods:
Venous blood samples were obtained from 20 healthy term infants (10 males and 10 females) and compared with whole blood samples from 13 preterm infants (4 female, 9 male). Samples were treated with endotoxin (LPS; 10 ng/mL), 17-β estradiol (E2; 10⁻⁸ M) and Progesterone (10⁻⁸ M), alone and in combination. Samples were stained with monoclonal antibodies specific for CD11b, CD66b and toll-like receptor-2 (TLR2) and analysed using flow cytometry. Granulocytes and monocytes were identified based on light scattering properties and CD66b expression. Immune cell activation was quantified by analysis of CD11b and TLR2 expression.
Results:
Preterm female granulocytes and monocytes had lower CD11b expression following LPS stimulation compared to term controls (p<0.05), a difference which was not present among male preterm infants (p>0.05). Hormone treatments did not significantly alter immune cell activity.

Conclusion:
Term infants have robust immune following LPS stimulation. CD11b was significantly decreased in preterm females compared to term controls. These results suggest a sex difference in innate immune function but do not completely account for the difference in clinical outcome between the sexes.

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC) – IMPROVING COMMUNICATION WITH PATIENTS WHO HAVE COMMUNICATION SUPPORT NEEDS.
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BACKGROUND:
In hospital, effective communication is an essential part of each patient’s management. It is important that children and families are able to understand and make decisions regarding their healthcare and that they are able to understand health care recommendations and instructions. Many of the children and families who attend OLCHC present with difficulties speaking, understanding, reading and/or writing language. The term used for referring to this diverse group is ‘people with communication support needs’ (CSN). Some of these people may use Augmentative and Alternative Communication (AAC). Augmentative and Alternative Communication (AAC) includes all forms of communication (other than oral speech) that are used to express thoughts, needs, wants, and ideas.

METHODS:
This paper examines some of the current resources available for supporting people with CSN in OLCHC. The “Accessible Communication for Everyone” committee (ACE) is a working group in OLCHC which was established in June 2017, linking staff across every discipline of the hospital. It aims to build awareness and improve support for people with CSN. This paper will summarise and explain some of the communication supports which have been reviewed or created by ACE with reference to a single retrospective case study. A retrospective chart review was carried out of a 12-yr-old girl who is an AAC user.

RESULTS:
AAC includes simple systems such as pictures, gestures, pointing as well as more complex techniques using assistive technology. The child referenced in this paper used a combination of AAC strategies including: a communication book; social stories; Lámh sign language, an iPad app and a higher level technology system, “Tobi Dynavox”.

CONCLUSION:
The ACE committee in OLCHC has commenced projects promoting communication support for patients with CSN. It is important that this information is accessible for every hospital staff member so that people with communication needs can be heard.

YOU GIVE ME FEVER! – THE AUTOINFLAMMATORY CLINIC IN AN IRISH TERTIARY PAEDIATRIC HOSPITAL
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Background:
Auto-inflammatory disease (AID) are inherited disorders of the innate immune system that lead to pathogenic inflammation. Multiple organ systems can be involved and disease can lead to significant end organ damage. Early diagnosis and treatment may improve outcome. Diagnosis is often delayed due to the low incidence of these disorders. An autoinflammatory clinic was established in OLCHC in November 2015, to assess patients with known or suspected AID within a multi-disciplinary setting.

Aim: The aim of this study was to survey the diagnosis and management of patients attending this clinic over a 2 and a half year period.

Methods:
A retrospective observational chart review of all patients attending the Autoinflammatory clinic from November 2015 to June 2018. Age of onset, demographic details, diagnosis (if known) and management were documented. Details of any genetic analysis if undertaken were also included.

Results:
47 patients attended the auto-inflammatory clinic over the identified period. Age of onset at first symptoms ranged from birth to 15 years. A
diagnosis of AID was made in 57% with PFAPA (periodic fever, aphthous stomatitis, pharyngitis, adenitis) accounting for the majority. An undetermined AID was suspected in 40%. 3% who attended had no symptoms or features supportive of AID. 36% were found to have a confirmed genetic mutation, either benign or pathogenic. 28% had a positive family history of auto-immune or AID in a 1st degree relative. Colchicine monotherapy (32%) was the first choice of therapy followed by anakinra monotherapy (19%) or a combination of both. All treated patients reported symptom improvement on therapy with the exception of 2.

Conclusion: This study gives an overview on the spectrum of autoinflammatory disease presenting in Ireland and their current management. The majority of patients attending were appropriately referred to this clinic and had improvement in symptoms following initiation of treatment.

PHYSIOTHERAPY FOLLOW-UP OF CHILDREN SUPPORTED BY CARDIAC EXTRA-CORPOREAL LIFE SUPPORT (ECLS)
Samantha Meenaghan, Gillian Nugent, Eithne Dee, Department of Physiotherapy, OLCHC

Background: Extra-Corporeal Life Support (ECLS) is used to aid recovery in patients with severe low cardiac output syndrome. The Extra-Corporeal Life Support Organisation (ELSO) has published recommendations for the follow-up care of children after ECLS. Currently this patient cohort receives both respiratory and neurodevelopmental physiotherapy input during their hospital stay, with all referred to community services on discharge. The Bayley Scales of Infant and Toddler Development (BSID III) is considered the gold standard assessment tool for children under 42 months as it measures physical, motor, sensory and cognitive function. There has been no neurodevelopmental follow up study of this patient population in Ireland. This study aims to complete a follow-up of these patients to analyse the therapy input received or required and whether patients remain in services.

Method: A clinical cohort study of patients who received ECLS from 2012-2016. Written consent was gained from parents to contact physiotherapy community services who were then requested to complete a questionnaire. Ethical approval was obtained for this study.

Results: A total of 38 patients were identified with 21 parents consenting to contact community services. 13 questionnaires were returned with 9 questionnaires fully completed. The following information was retrieved: the number of sessions provided varied greatly, half of patients who remained in services had a neurological event during their hospital stay and required multidisciplinary team (MDT) input, and patients who were discharged from services had normal motor development with the BSID III completed on 3 patients.

Conclusion: This study was limited due to the low response rate from the community services. The information received has provided data never before obtained on this cohort of patients. Patients who had a neurological event were more likely to remain in services longer term and required MDT input.

DECODING INDUCTION OF APOPTOSIS IN NEUROBLASTOMA
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Background
Neuroblastoma (NB) is a highly malignant cancer which primarily affects children. Many patients with “high-risk” NB will develop resistance to at least one form of treatment, resulting in a 33% relapse rate, indicating a need for new forms of therapy. miRNA-based therapeutics are showing strong potential in cancer therapy. They are appealing as they target many cellular pathways to silence tumorigenesis. This project aims to assess the potential of miRNAs to induce apoptosis in NB cells, compared to the standard chemotherapeutic Etoposide.

Methods
Baseline expression of a number of apoptotic markers Apaf-1, Procaspace 9, Procaspace 3, Cleaved Caspase 3, XIAP and Smac/DIABLO was assessed using Western blotting in a panel of NB cell lines: Kelly, KellyCis83, SH-SYSY, IMR-32, SK-N-BE(2), SH-EP, Chp-212, Chp-212 Cis, NB-1691, SK-NA-S and SK-NA-S Cis24. The markers are indicative of apoptotic induction in cells treated with either Etoposide or a tumour-suppressor miRNA and can simulate this process in silico via the program APOPTO-CELL.

Results
We have established the basal level of APOPTO-CELL markers expression across 11 NB cell lines and compared with HeLa cells and 2 glioblastoma (GBM) cells: A172 and Mz256. We found that Smac/DIABLO expressed at significantly higher levels in all NB cell lines than in HeLa and GBM controls. Within the NB
panel the same proteins had differential expression with highest in SH-EP and lowest in SK-NA-S Cis24. Expression pattern of Apaf-1 followed the SMAC expression. Further validation is in progress.

Conclusion
We expect to see the differential expression of APOTO-CELL markers across tested NB cells and establish the baseline that can be used to predict response to therapeutics. Our preliminary data indicates applicability of APOPTO-CELL markers to predict NB cell sensitivity to apoptosis. This platform should facilitate screening of new chemotherapeutics and miRNA-based drugs that target apoptotic pathways.

WHAT ARE THE EFFECTS OF CARE BUNDLES ON THE INCIDENCE OF VENTILATOR-ASSOCIATED PNEUMONIA IN PAEDIATRIC AND NEONATAL INTENSIVE CARE UNITS?
A systematic review
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Background. Ventilator-associated pneumonia (VAP) is a common healthcare-associated infection occurring in the PICU. VAP can result in high rates of morbidity and mortality, prolonged hospital stay and significant hospital costs. Prevention of VAP using a bundle of evidence-based interventions has become a well-recognized strategy implemented in adult intensive care units. However, there is a paucity of evidence-based standardised care bundles for prevention of VAP in critically ill neonates and children in the NICU and PICU.

Aims and objectives. To ascertain the impact of ventilator bundles on the incidence of ventilator-associated pneumonia in mechanically-ventilated neonates and children in intensive care units.

Methods. Key computerized databases (CINAHL, Medline, Embase, Cochrane) as well as additional sources, with no publication date limitations, were extensively searched in January 2018. Inclusion criteria focused on ventilator bundles used in mechanically-ventilated neonates and children aged from 0- 18 years. After identification and inclusion, all studies were critically appraised for quality. Data was analysed and narratively synthesized.

Results. Eight studies of observational and non-randomised interventional methods design were included in the review. However, the validity of five of the eight studies which were reviewed was considered substandard. In addition, there were variations in the care bundles elements studied. Nevertheless, all these studies demonstrated that the incidences of VAP in mechanically-ventilated neonates and children were found to be significantly reduced by the use of ventilator bundles.

Conclusion. This systematic review determines that ventilator bundles impact positively on the incidence of VAP in critically ill neonates and children in the NICU and PICU. However, the variations in the bundle elements and insufficient valid evidence necessitates further research in the area to validate the findings and to ensure standardisation of clinical practice with the use of neonatal and paediatric ventilator bundles.

MYCN Expression Drives the Export of miR-17~92 Cluster Oncomirs through Extracellular Vesicles in Neuroblastoma Models in vitro and in vivo
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Background: Amplification of the MYCN oncogene (MNA) is a key prognostic factor in neuroblastoma, which contributes to a more aggressive phenotype through transcriptional regulation of oncogenic genes and miRNA. Interactions between tumour cells, neighbouring immune and stromal cells and extracellular matrix act as powerful determinants of disease progression, with extracellular vesicle (EV) encapsulated miRNAs mediating many of these processes. Our lab demonstrated increased colony forming ability and cisplatin resistance in MNA Kelly cells following incubation with EVs derived from MNA KellyCis83. We therefore hypothesised that MYCN expressing NB cells can impart their oncogenic effect through extracellular export of oncomiRs to surrounding cells.

Method: Profiling of miRNA expression in SHEP-tet (MYCN on/off) cells and EVs identified increased expression of miR-17~92 oncomiRs in the MYCN expressing cells relative to the MYCN repressed counterpart and demonstrated enrichment of several of these miRNA (miR-17-5p, miR-18a-3p, miR-92a-3p) within EVs, suggesting selective miRNA export from MNA cells to surrounding cells.

Results: Finally, we investigated the expression of miRNA correlated with MYCN, including miR-17~92
Conclusion: This study found high expression of multiple MYCN associated miRNA within the EVs of neuroblastoma cells grown across multiple platforms, supporting the role of this mechanism of intracellular communication in driving disease progression and inducing a more aggressive phenotype in recipient cells as seen in our functional study.

MEDICAL EDUCATION IN THE DIGITAL AGE
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Background
The new generation of doctors’ training and learning practises are different to previous generations; this is partially because they trained in the digital age and lived through numerous technological advancements. Medical students are a product of their time, and as such, they have high expectation of e-learning platforms. In 2015, anecdotal evidence suggested the RCSI Paediatric virtual learning pages were not meeting those expectations. From 2015 to 2018, a quality audit was conducted on these virtual learning pages.

Method
This study comprised of three phases:

1) In 2015, a stakeholder meeting was held with users of the Paediatric virtual learning pages.
2) In 2015 – 2018, a student satisfaction survey was distributed to 400 RCSI students which garnered a survey response rate of 95%.
3) User engagement with the virtual learning pages was reviewed; it examined the number of times pages were accessed and the duration of access.

Results
In 2015, nearly 75% of students reported that these virtual learning pages were not user friendly; students struggled to find information. Students requested more multimedia resources and media options that suited their learning preferences.

In 2016, virtual learning pages were made more user friendly, easier to navigate, and pages incorporated multimedia capabilities. By 2018, student engagement increased by 79% on these pages. Students gave positive feedback on the ability of these pages to allow them to set their own pace of learning, tailor their learning experiences, and conduct self-directed learning.

Conclusion
Compared to the 2015 pages, the current virtual learning pages are more in line with the students’ needs and cater to a wide range of learners by offering educational videos, podcasts, interactive modules, quizzes, and assignments.

EPILEPSY IN THE SCHOOL ENVIRONMENT - A RESOURCE PACK FOR STAFF
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Background
The word epilepsy means ‘to be seized’ in Greek. To have epilepsy means to have a tendency to have recurrent seizures. Seizures usually begin in infancy into adolescence but its prevalence increases after 65 years. In Ireland 10,000 children under the age of 16 have epilepsy. As most of these children are of school going age teacher education on epilepsy is very important.

Aim
This poster was developed as part of a module assessment, to critically discuss and design a poster for teachers and school nurses on how to manage epilepsy at school.

Types of Epilepsy
Epilepsy can be categorised according to the cause or type of seizure. Causative classifications include idiopathic, Cryptogenic, Symptomatic and Photosensitive epilepsy. In at least half of all cases no cause is identified. Epilepsy may also be categorised according to the type of seizure and the 2 main categories are generalised and partial seizures. Further sub divisions include simple and complex partial seizures and six subtypes for generalised seizures. Children are usually unconscious for generalised seizures.

Psychological Effects to Consider with the Child
The child with epilepsy may have a belief that he or she is not ‘normal’ at an age where being normal and fitting in is highly important to the child. Since,
epilepsy is seen as an invisible or a hidden disability. The emotional and physical components of the child’s life must all be considered as well while caring for a child with Epilepsy. People with epilepsy are 5 times more likely to have mental health and behavioural problems. (30-50% of people with epilepsy compared with 8.5% of the general public). The emotional states that may recur include anxiety arising from the unpredictability of seizures and feelings of lack of control and helplessness. Some side effects of antiepileptic drugs can have an impact on education by causing drowsiness and causing a short attention span.

**Teachers in school may need to adapt and adjust the workload to suit child with epilepsy**
Include immediate treatment of a seizure, medication (safety re same) and prevention of seizures and management in class

**Schools need to be aware that bullying can lead to more seizures caused by stress so a zero tolerance bullying policy needs to be implemented.**

**CO-EXISTING AUTOIMMUNE THYROID DISORDERS AND COELIAC DISEASE IN AN IRISH PAEDIATRIC POPULATION**
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**Introduction:** The two major autoimmune thyroid diseases (AITD) in paediatrics are Graves’ disease and autoimmune thyroiditis. Determination of thyroid peroxidase (anti-TPO), anti-thyroglobulin (Tg) and/or TSH-receptor (TRAb) antibody titres provides evidence for AITD. Several studies have reported an association between AITD and other autoimmune disorders, including coeliac disease (CD). Current recommendations (NICE, NASPGHAN and ESPGHAN) on screening for CD vary.

**Aim:** To quantify the number of CD screens requested among patients with AITD and assess the prevalence of the condition within the group.

**Method**
LIS search was performed for patients attending endocrinology service in OLCHC who had thyroid function tests (TFTs), thyroid-specific antibodies and CD screening performed over a 4-year (2013-2017) period. Initial CD screening consisted of an IgA based tissue transglutaminase (IgA-TTG) quantitation. Undetectable results were referred for IgG Endomysial antibody (IgG-EMA) titres. All IgA-TTG positive results were referred for IgA-EMA quantitation. Duodenal/small bowel biopsies were performed to confirm diagnosis. HLA antigen typing was not carried out.

**Results:** 1040 patients had TFTs determined. Thyroid-specific antibodies were analysed in 319 (30.67%) children. 56 (5.38%) had abnormal TFTs and antibody levels ([F:M was 44:12], ages 2-17 yr). Of these, 21 (37.5%) were serologically screened for CD. Serologic signs of CD were found in 4 (19.05%). Two patients were diagnosed with type 1 diabetes mellitus, one had Down syndrome and the other had no underlying condition. Duodenal biopsies were carried out on three of the four serologically positive patients.

**Conclusion:** Screening for CD is under-requested in patients with AITD. Of the four serologically positive patients, three had additional conditions known to increase prevalence of CD. It is difficult to ascertain the prevalence of CD in this patient cohort due to low sample numbers.

Standardised CD screening should be considered in view of previously demonstrated high prevalence of the condition in children with AITD.

**PROMOTING HEALTH ADJUSTMENT FOLLOWING MAJOR SURGERY: EVALUATION OF ICANCOPE POSTOP SCOLIOSIS SMARTPHONE APPLICATION**
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**Background:**
The aim of this research is to reduce the impact of acute and chronic pain and deliver improved physical and psychological outcomes for adolescents following scoliosis surgery through the use of the iCanCope PostOp Scoliosis smartphone app.

**Methods:**
Phase1: to adapt the iCanCope smartphone application. Focus groups and interviews with Health Care Professionals (N=19), adolescents who have undergone scoliosis surgery (N=8) and their parents/guardians (N=5).
Phase2: to test the usability iCanCope PostOp smartphone application using an iterative process of
testing and refinement (2-3 adolescents and 1-2 parents/guardians per cycle).

Phase 3: test the efficacy of the iCanCope PostOp smartphone app through a pilot RCT (N=90, randomly allocated to 3 groups; treatment as usual, educational articles only or iCanCope PostOp smartphone app).

**Expected results:**
We hypothesise that iCanCope PostOp will be effective in reducing post-operative pain disability and distress in adolescents and will reduce the risk of having chronic post-surgical pain 3 and 12 months post-surgery.

**Current stage of work:**
Phase 1 analysis.

**Conclusion / Discussion:**
The proposed innovative iCanCope PostOp app will support adolescents with acute post-operative pain to self-monitor symptoms and access ‘in the moment’ pain management advice when they need it. Improving acute postoperative pain may ultimately help reduce risk of development of chronic post-surgical pain, reduce healthcare utilization, reduce opioid requirements and potential for opioid-related harms and reduce impact of unresolved or undertreated pain on mood, sleep behaviour and function leading to improved patient and family satisfaction with care.

**RAPID REHABILITATION AND ACCELERATED DISCHARGE PROTOCOL IN ADOLESCENT IDIOPATHIC SCOLIOSIS (AIS)**
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**Background:** In November 2017, the orthopaedic department introduced a new quality initiative called the rapid rehabilitation and accelerated discharge protocol for AIS patients post posterior spinal fusion (PSF). This protocol is evidence-based and in accordance with international best practice. The aim of this initiative was to optimise pain control and allow for earlier post-operative mobility, beginning the morning of day 1 post surgery. Prior to the commencement of this protocol patients did not mobilise until day 2 post PSF. A multidisciplinary team (MDT) taskforce was set up to focus on evolving and integrating the rapid rehabilitation protocol.

**Method:** An audit of all AIS patients undergoing PSF from November 2017 to March 2019 was undertaken. Data was input on an excel spreadsheet. Only AIS spinal patients were included on this protocol, all syndromic and neuromuscular patients were excluded.

The main aims of this audit were to:
- Profile AIS patients undergoing PSF
- Determine average day of discharge
- Determine what percentage of patients mobilised and sat out of bed day 1 post PSF.
- Determine symptoms experienced by patient’s day 1 post PSF.

**Results:** A total of 38 AIS patients (35 female, 3 male) were included in this protocol. 89.4% of patients sat on the edge of bed day 1 post PSF.

- Average day of discharge was day 5.39.

**Conclusion:** AIS patients undergoing PSF are discharging home earlier with 68.4% of patients mobilising day 1 post op. Further investigation is warranted to investigate the role of patient anxiety and opioid related complications in prolonging hospitalisation and delayed functional recovery at home.

**SEPSIS IN THE EMERGENCY DEPARTMENT**
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**Introduction**
Sepsis is a medical emergency that should be treated with the same urgency as a myocardial infarction. Mortality in sepsis is greater than that of a Myocardial Infarction1. It is a time-dependent clinical condition, which can affect people of all ages. Sepsis can be difficult to define. It is often used as a blanket term to refer to 4 conditions related to sepsis. Systemic inflammatory response syndrome, sepsis, severe sepsis and septic shock. A septic infection can cause multiple organ failure and ultimately lead to death. Sepsis is a leading cause of avoidable death, which kills more people than bowel, breast and prostate cancer combined (3). Sepsis occurs in only 3.4% of hospital cases but accounts for 25% of all hospital deaths (3). Healthcare professionals must query sepsis in all patients with suspected infection (4).
Aim and Objectives: This poster was developed as part of a module assessment, to critically discuss sepsis management in the emergency department and best practice to reduce mortality. To outline the at-risk groups, the critical signs and symptoms used to diagnose sepsis, as well as the escalation protocol and the desired outcome following an early intervention.

Recognition of Sepsis: Relying on a clinician only detection has proved problematic in one study over a quarter of children presenting with severe sepsis were missed (6). Using a combined method of sepsis recognition, such as, an electronic alert system and clinician’s clinical judgment, has shown to improve the detection rates of sepsis (7). Symptom presentation may vary whether the child is in cold shock or warm shock. Cold shock, more commonly seen in infants and neonates. Presents with narrow pulse pressure and prolonged capillary refill. The haemodynamic abnormality is cause due to septic myocardial dysfunction. In contrast, the characteristics of warm shock include a wide pulse pressure with rapid capillary refill. Warm shock is more common with older children and adolescence (5).

Management of Sepsis: When sepsis is suspected and diagnosed, begin taking action immediately (8). The child should be nursed in an area of high visibility for continuous monitoring of vital signs and levels of consciousness. In severe sepsis, the child should be brought into the Resuscitation area (9). Always use the ISBAR tool when communicating about a patient (8). The nurse should complete the ‘Sepsis 6’. This must be completed as soon as possible, within the first hour (8).

Nursing Care: Sepsis screening should be used on all paediatric patients either presenting unwell or deteriorating as evidenced by the PEWS or picked up by routine history and examination. Once a diagnosis is made it is recommended that Sepsis six be performed within one hour. This early intervention can be referred to as the ‘golden hour’. The transition to severe sepsis or septic shock may occur during these critical ‘golden hour’ (13). At this critical period, early intervention can result in a more satisfactory outcome. Ensuring all healthcare professionals are provided with appropriate training to identify sepsis and intervene with early intervention is imperative in all Emergency Departments. This includes 1. The ability to recognise the signs and symptoms of sepsis and high-risk groups. 2. Knowledge of the protocol for early treatment. 3. The routine escalation for patients with sepsis in the emergency department.

(4). Early detection and intervention reduced mortality, length of hospital admission, inappropriate antimicrobial use and overall healthcare costs. (4).

TRAUMA MANAGEMENT CHARTS: AN AUDIT OF PRACTICE
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Background: Trauma management protocols provide a consistent approach to patient evaluation in the acute trauma setting. A trauma management chart was introduced to our department over 6 years ago. The aim of this study was to assess current utilisation and compliance with our trauma management chart in cases of major trauma.

Methods: A retrospective chart review was completed for twenty consecutive cases of major trauma (TARN definition) presenting to OLCHC from 01/03/2016 to 01/04/2018. All charts were reviewed to assess:
(i) utilisation of trauma management chart
(ii) completeness of trauma management chart

Results: 20 cases of major trauma were identified over the study period. The trauma management chart was utilised in 30% (n=6) of cases only. Of these six cases, no trauma management chart was completed in full.

Data which was fully completed included:
(i) Initial documentation - history of event, observations, AMPLE history
(ii) ABCDE - C spine / Airway / Breathing / Circulation / Disability / Exposure
(iii) Secondary survey including a diagrammatic representation of injuries
(iv) Bloods, x rays requested
(v) Initial management plan
(vi) Teams involved in the care of the patient

Data which was partially completed included:
(i) Pre hospital information
(ii) Immunisation status
(iii) Mannitol use
(iv) Tubes use (orogastric / nasogastric / urinary catheter)

Data which was never completed included:
(i) Tertiary survey
(ii) New findings
(iii) New plan
(iv) Results
Inflammation is altered in TBI compared to controls. The NLRP3 component of inflammasome while elevated does not correlate with symptom burden. ILbeta gene transcription does. IL1beta holds promise in predicting symptom burden following mTBI. Selective inhibition of systemic inflammation targeting the inflammasome may have a future immunomodulatory role as a target in treating mTBI.

ALTERED SYSTEMIC INFLAMMATORY RESPONSE IN PAEDIATRIC TRAUMATIC BRAIN INJURY

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Aims: To evaluate systemic inflammation in TBI by exploration of the inflammasome pathway, a component of the innate immune system that regulates and induces inflammation. We examine the pathway at baseline in TBI compared with healthy control children, and in vitro in response to both LPS stimulation and melatonin therapy. Melatonin has protective effects against NLRP3 inflammasome activation and has therapeutic implications.

Methods: Whole blood was sampled from children with TBI (n=10) within 24 hours of injury and compared to healthy age-matched controls (n=8) at baseline, following stimulation with bacterial endotoxin (LPS) (10ng/ml) and melatonin treatment (10⁻³M). Granulocytes were delineated as CD66b+ and FSC, SSC-A. Measurements of mean channel fluorescence (MCF) of CD11b and TLR4 expression on FACS Canto II were recorded and analysed with Flojo software v10. Gene Expression of NLRP3 via rtPCR was recorded in 5 patients and 5 controls at baseline and following LPS and melatonin treatment.

Results: Granulocyte CD11b expression was lower in children with TBI compared to controls (p=0.04) Both upregulated CD11b with LPS stimulation. Melatonin significantly decreased this LPS upregulation. There was no significant difference in baseline TLR4 expression between TBI and controls, but LPS upregulation of TLR4 was decreased by melatonin in the TBI cohort. Inflammasome was upregulated via NLRP3 expression in children with
TBI compared to controls (p= 0.02). Melatonin significantly decreased LPS-induced upregulation of NLRP3 only in controls.

**Conclusion:** Inflammation is altered in TBI compared to controls with altered responsiveness to melatonin treatment following LPS stimulation. The inflammasome is downregulated in children immediately following TBI. Selective inhibition of systemic inflammation targeting the inflammasome may have a future immunomodulatory role as a target in treating TBI.

**IL1-β LEVELS AT PRESENTATION WITH PAEDIATRIC MILD TRAUMATIC BRAIN INJURY ARE HIGHER IN CHILDREN WITH PREVIOUS MILD TRAUMATIC HEAD INJURIES**

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**Aims:** To evaluate end components of the innate immune system, the inflammasome, in mild Traumatic Brain Injury (TBI), a pathway activated in mild traumatic brain injury and to correlate with previous exposure to head injury.

**Methods:** Whole blood was sampled from children with mild TBI at presentation with injury and compared to healthy paediatric controls at baseline. RNA was isolated and cDNA was synthesized. Gene Expression of IL1-β via rtPCR was recorded in 18 patients 5 controls at baseline. Of 18 patients, 10 had previously suffered concussion.

**Results:** Mechanisms of injury included sporting and school yard clashes, falls from bikes and falls from bed. GCS was 14 - 15/15 in all. Inflammasome was upregulated via IL1-β expression in children with previous episodes of mTBI compared to those with no previous history. (p = 0.08) The highest IL1-β, 8000 fold that of baseline. This was recorded in a child who had previously had rehabilitation following a road traffic accident 7 years previously.

**Conclusion:** Inflammation is altered in TBI compared to controls. IL1-β gene transcription was higher in those with previous episodes of concussion. Immune memory may be a factor in the clinically evident burden of symptoms following repetitive head trauma, and this warrants further exploration.

**PAEDIATRIC MILD TRAUMATIC BRAIN INJURY IS ASSOCIATED WITH SYSTEMIC INFLAMMASOME ACTIVATION AND PUBERTAL SCORING**

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**Background:** Mild Traumatic Brain Injury (mTBI) is a common childhood occurrence with a more severe phenotype in adolescence. Systemic inflammation has been demonstrated to be integral to the pathogenesis of ongoing symptoms. The inflammasome is a component of innate immunity that is involved in regulating and inducing inflammation in response to cell damage and may have a modifiable role in mTBI.

**Objective:** We demonstrated inflammasome pathway activation in response to mTBI. We hypothesized that pubertal development modulates inflammasome activation. We correlated pubertal scores with inflammasome gene transcription.

**Methods:** Children were recruited to the study following presentation to the emergency department with symptomatic head injuries (GCS 14/15; n=21) and compared to age-matched Controls (n=10). Pubertal developmental self-rating scales (PDS) with 5 rating questions were administered with a maximum score of 20. mRNA was extracted from whole blood and the Inflammasome components [Interleukin (IL)-1beta and NLR Family Pyrin Domain Containing 3 (NLRP3)] in mTBI and controls were profiled with RT-PCR analysis on the ABI 7900.

**Results:** The mean age of children recruited was 12.0(+/−3.9) years with 18 males. Both NLRP3 and IL-1β were significantly raised in the mTBI group versus controls (p<0.0001). IL-1β was significantly downregulated at 2 weeks post TBI (p<0.0001). There was a significant correlation between pubertal score and IL-1β in mTBI (p=0.04).

**Conclusion:** Inflammasome activation via the NLRP3 pathway is important in paediatric mTBI. IL1-beta activation was more prominent in children at more advanced stages of puberty. The interplay of pubertal maturity and the innate immune system may explain the greater burden of symptoms in patients during adolescence.
RISKY HUDDLE: A NURSING CONTRIBUTION TO THE PATIENT SAFETY AGENDA
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BACKGROUND: Previous research has shown that, following a patient safety incident, shared learning should focus on the systems used to deliver the care rather than the individuals involved. Risky Huddle was introduced by nursing to provide a multidisciplinary forum for shared learning from incidents. It is important to establish if Risky Huddle has a positive effect on patient safety.

METHOD: Annual figures for incident reporting from 2010 to 2018 were retrieved and analysed. Nursing and non-nursing was extracted from total reporting numbers. Incident and near-miss figures for the same period were examined. Annual percentage figures of harm caused to patients because of a clinical incident were retrieved for 2016-2018. Results were correlated with the introduction of Risky Huddle in 2012 and its further roll-out in 2016.

RESULTS: A dramatic total increase in incident reporting indicates a change in practice in relation to the recognition and reporting of patient safety issues. Reporting has increased among both nursing and non-nursing disciplines. Reporting of near-misses has also increased. The increases follow the introduction of Risky Huddle. Also, coinciding with the introduction of Risky Huddle is a decrease in the percentage of patient harm, and this level has been sustained.

CONCLUSION: Through introducing and maintaining Risky Huddle, nursing is positively contributing to the Patient Safety Agenda. Multidisciplinary Team (MDT) attendance at Risky Huddle should continue as it is proving to be a more balanced approach to risk management. This is evident from increased incident reporting in all disciplines and decreased patient harm percentage hospital-wide. Risky Huddle is now rolling-out in non-nursing areas, such as HSSD. A subsequent rise in incident reporting and a further decrease in patient harm percentage may be expected. Further attention is needed in near-miss reporting to continue to improve the recognition of patient safety issues before they cause harm.

SHORT STATUTE: WHAT’S FIRST?
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Introduction: With advancement in Genetic technology, tests in laboratories are evolving constantly. The main advancement is the shift towards Genome-wide array based technology for its higher resolution and improved detection sensitivity. Cytogenomic, rather than karyotypic approach, is used of first line. For example, due to its higher diagnostic yield, aCGH (array-Comparative Genomic Hybridisation) is used as a first line diagnostic test in patients with congenital anomalies, autistic spectrum disorder, neurodevelopmental disorders and intellectual disability. It is also suggested that short stature should be evaluated using aCGH.

Aim: To review current karyotype request and to assess whether this method is the most appropriate for the clinical features described.

Standard: European Guidelines for Constitutional Cytogenomic analysis (2019) and American College of Medical Genetics Guidelines (2013) were used as guides.

Methods: All the karyotype requests to the Cytogenetic laboratory from July 2018 to December 2018 were collected and reviewed.

Results: Total of 302 G-banding karyotype samples were identified. 168 out of 302 (56%) were either a confirmation test of suspected autosomal aneuploidy (including T21) or a parental follow up test. 34 out of 50 (68%) samples for patients with suspected chromosome abnormality and 21 out of 32 (66%) samples sent in as an investigation for a child with short stature were requested for karyotype alone. All 32 karyotype requested for short stature investigation were normal.

Discussion and Recommendation: We identified over 65% of cases with suspected chromosome abnormality and an investigation for a short stature, aCGH were recommended instead of a karyotype for its higher resolution. Requesting karyotype for a short stature evaluation is not justified. Considering its higher diagnostic yield and for improved patient management, we support the current international guideline and use aCGH analysis as a first line diagnostic test for patient with neurodevelopmental, dysmorphic features, autistic spectrum disorder and congenital malformation as well as for an investigation for short stature.
A BASELINE REVIEW OF THE ACTIVITY OF THE PICU PHARMACISTS USING ELECTRONICALLY CAPTURED DATA.

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BACKGROUND
To date there are no metrics for the clinical pharmacist service to PICU. It is accepted that use of a Clinical Information Management System (CIMS) has a role in medication safety, however there are few studies that review the information potential of a CIMS for collecting pharmacist activity.

METHOD
Additional fields and custom reports were configured in the CIMS to enable PICU pharmacists to record their activity in the following areas:
• Medicines reconciliation within 72 hours of admission to PICU
• Discharge kardex review
• Analgesia and sedation (A&S) review
• Clinical pharmacy review

Other interventions & medication error reporting continued as per normal practice.

Data was analysed using Microsoft Excel.

RESULTS
Complete data was available from July 2017 to end of 2018.

There were 1274 medicines reconciliations by a pharmacist within 72 hours of admission (78% admissions). 14% of discharge kardexes had been reviewed prior to discharge to the ward.

There was an average of 190 pharmacy reviews per 100 bed days.

A total of 780 Pharmacist A&S Plans were documented by the clinical pharmacists – an average of 2 per working day, and 48% of admissions.

Comparisons between each six month period showed a significant increase in the number of pharmacists medicines reconciliations (p <0.001). No other differences were found.

CONCLUSION
This study has shown that electronic tracking of pharmacist ward activity is possible. It has the potential to demonstrate compliance with external or internal standards and audits.

This data continues to be collected, and therefore these results will be used as a baseline to compare future activity. The findings of this study may encourage other units to replicate, providing data that can be used for comparison.

Further configuration of the CIMS to capture other metrics such as TDM, and document discrepancies in medicines reconciliation is planned.

BEAST MILK PROVISION IN INFANTS WITH UNIVENTRICULAR CONGENITAL HEART DISEASE
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Background: Breast milk (BM) is the optimal source of nutrition for infants. BM has unique benefits for infants with univentricular congenital heart disease who are at higher risk of gastrointestinal morbidity. In 2016 a quality improvement initiative was launched by the neonatal team in OLCHC. The project aim was to ensure that 100% of eligible infants <2 weeks of age admitted had access to maternal BM. Breastfeeding resources and assessment tools were developed. A weekly peer support group for mothers expressing BM was established. The prevalence of BM feeding among infants with univentricular heart disease is unknown. The aim of this study was to investigate BM provision at various time points for this group.

Methods: A retrospective review of medical and dietetic case notes of infants with a univentricular congenital heart disease was undertaken. All underwent a surgical procedure or had a hybrid/ interventional procedure as a neonate in OLCHC during the time period January 2014- December 2018. Data collected included demographics, type of feeding at three time points: peri stage 1 surgery, at 28 days (or at discharge if sooner) and at stage 2 surgery. Data was analysed using SPSS. Ethical approval was obtained.

Results: Ninety infants with univentricular heart disease met the inclusion criteria. Seventy six percent of infants received BM as their first feed (52% in 2014, 85% in 2018). At 28 days/discharge 64% received some or all BM feeds (33% in 2014, 85% in 2018). Fifty three percent of those discharged on BM feeds required calorie and protein fortification of those feeds. At stage 2 surgery (median age of 20.2weeks) 30% of infants
were still receiving some/all BM feeds (15% in 2014, 50% in 2018). There was no significant difference in weight for age z score change (from birth to discharge) in those that were receiving predominantly BM feeds versus those on predominantly formula feeds (p=0.74).

Conclusion
Quality improvement strategies can drive positive change. There has been a notable increase in the number of infants with access to maternal BM, as well an improvement in the duration of breastmilk feeding during the study time period. Approximately half the group required BM fortification. This allowed selected infants meet their well-documented high nutritional requirements. It also ensured adequate growth, as evidenced by equivalent growth indices in those that were formula fed and BM fed. These findings demonstrate that BM is a safe and achievable feed choice for this cohort.

NUTRITION INTAKES OF NEONATES WITH UNIVENTRICAL CONGENITAL HEART DISEASE
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Background: It is difficult to achieve adequate early nutrition in neonates with univentricular congenital heart disease, as they typically undergo complex surgical palliation within the first few days to weeks of life. Gastrointestinal and feeding complications are well documented. The objective of this study was to quantify time to initiate nutrition support, energy and protein intakes (compare to standard nutritional requirements).

Method: A retrospective review of medical and dietetic case notes of infants with a univentricular congenital heart disease was undertaken. All underwent a surgical procedure (Norwood) or had a hybrid/ interventional procedure as a neonate in OLCHC during the time period January 2014-December 2018. Data collected included demographics, nutritional intake, feed type and mode for first 28 days. Data was analysed using SPSS. Ethical approval was obtained.

Results: Ninety infants met the inclusion criteria (59 post Norwood, 31 post hybrid interventional procedure. Median number of days to enteral nutrition was 6 days and to any form of nutrition support was 3 days. Preoperatively 19% received trophic feeds and 39% received parenteral nutrition. The median number of days to achieve basal requirements for growth 96kcal/kg was 15 days. The mean daily calorie intake per kilogram for the first 28 days was 66kcal (24kcal on week 1, 103 kcal on week 4). The mean daily protein per kilogram was 1.5g protein for the first 28days (0.6g on week 1, 2.3g on week 4). On discharge 51.2% of infants required tube feeding and 59% required nutrient dense feeds. There was no significant difference in the mean calorie or protein intake between the Norwood and Hybrid group.

Conclusion: Reaching nutrition goals in neonates with HLHS is often complicated and delayed in the pre and post-operative period. More than half of the group required tube feeding and nutrient dense feeds on discharge. During a critical period of growth and development these infants experience nutritional compromise and frequently require nutrition support. It is necessary to develop strategies directed at improving the nutritional intake of this vulnerable group.

SUPPORTS AND CHALLENGES TO NURSE-LED RESEARCH IN CHILDREN’S HOSPITALS: A CROSS-SECTIONAL SURVEY (CoNSULT STUDY)
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1 CHI at Crumlin
2 CHI at Temple Street
3 CHI at Tallaght
4 School of Nursing and Human Sciences, DCU

Background: Research-led enquiry and translation are seen as critical to providing excellence in clinical practice by the new Model of Care for Irish Paediatrics. However, there is a recognised critical deficit in the number of individuals with the skills, ambition and time to lead major research projects. The aim of this study was to identify baseline data on research activity, skills and supports for nurses working in children’s services.

Methods: In September 2018, all registered nurses employed in the three paediatric hospitals were invited to participate in a cross-sectional survey. The clinical nursing research questionnaire was developed through adapting two previously established surveys investigating research interests/activities, skills/abilities and supports among health care providers. Data were analysed using descriptive and thematic analysis.

Results: The response rate was 25.1% (n=355). One hundred (28.2%) respondents had been involved in a research study but only 6.8% (n=24) had been a lead investigator. Twenty-one (5.9%) respondents
had a publication within the last five years. Just over a fifth had presented at a conference: 23.9% (n=85) poster and 20.8% (n=74) oral presentation. Over half (n=236; 66.5%) respondents self-evaluated their overall research skills as weak or average. Thematic analysis of qualitative data revealed six themes: time for research; incentives to engage in research; awareness and promotion of research; research training needs; supports required to enable research; and perceived challenges impacting on nurses’ ability to undertake research.

**Conclusion:** A clearer strategic vision and political commitment to establish a research supportive environment for nurses working in children’s services to conduct research is needed. Particular recommendations are: additional time, mentorship, communication, information and education. This survey is one aspect of a number of activities informing the development of a research capacity building strategy for children’s nursing at this time of reconfiguration of paediatric health services in Ireland.

**EXPLORING CHILDREN AND GENERAL NURSING STUDENTS’ REFLECTION ON THE USE OF POSTER AS AN EXPERIENTIAL LEARNING ACTIVITY AND ASSESSMENT WITHIN THE UNDERGRADUATE CURRICULUM.**

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**Background**
The development and presentation of an academic poster as an assessment for a module was created as part of an undergraduate children’s and general nursing programme in 2018 at University College Dublin (UCD). The purpose of this evaluation was to explore the nursing students’ perceptions of this type of assessment, together with its benefits and limitations, to identify whether they viewed it as an effective assessment and one which met their learning needs and the learning outcomes for the module.

**Aim**
The aim of the study was to describe students’ experiences of developing a poster as the summative assessment for the module.

**Method**
A survey questionnaire was distributed to students who presented academic posters as part of the summative assessment for one of their Stage 3 semester 1 discipline specific children’s nursing modules. A total of 19 participants completed the survey, with an overall response rate of 60%. This study received an exemption from full ethical review by the Office of Research Ethics at UCD.

**Findings**
84% of participants pointed out that this was their first time to develop and present a poster as part of their assessment. Majority of the respondents (89%) agreed or strongly agreed that the poster conveyed all the details needed to meet the learning outcomes for the module, however, 10% of respondents took a neutral stand. The majority of the respondents (85%) agreed that the poster group work encouraged them to investigate their topic thoroughly and also agreed that poster presentation provided them with opportunities for peer-learning. Over half of the respondents indicated feeling comfortable learning via group work (60%) although 40% rated their comfort level as neutral. The majority (86%) also agreed that the poster presentation was an excellent alternative medium for developing presentation skills.

**Conclusions and implications**
Overall, the poster as an assessment strategy was well received by the undergraduate children’s and general nursing students. It met their learning needs and the learning outcome for the module, however, as this was the first time, they undertook this type of assessment the need for additional support was evident in the module.

**CHILDREN NURSING STUDENT’S REFLECTION ON PATIENT SAFETY CULTURE (CONSIST STUDY)**

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**Background:** The World Health Organization (WHO) Patient Safety Curriculum Guide is designed to assist in the teaching of patient safety in universities and schools in the fields of dentistry, medicine, midwifery, nursing and pharmacology. The Curriculum guide is intended to help to build a foundation of knowledge, skills and attitudes for health-care students that will better prepare them for clinical practice and thus advance the efficiency of health-care delivery and improve patient safety. This project aims to explore the role of undergraduate children’s and general nursing students’ reflections on patient safety issues and to determine their expectations of how patient safety is being managed in the healthcare system.
Research Design: A n online survey questionnaire was distributed via info hub communication system to current undergraduate integrated children’s and general nursing students from Stage 1, Stage 2, Stage 3, and stage 4 & 4.5 (n=164) at the School of Nursing Midwifery and Health Systems, University College Dublin. A total of 38 participants completed the survey, with an overall response rate of 23%. This study received an exemption from full ethical review by the Office of Research Ethics at UCD.

Results: This project explored current safety issues at the workplace from the undergraduate children and general nursing students’ perspectives. Students highlighted that current patient/staff ratio’s in the health care system resulted in less contact time between patients and staff which may promote unsafe nursing practice. This pilot project evaluated the current curriculum related to patient safety issues and the structures, processes and guidelines used in the teaching programme. The majority of the students agreed that the healthcare system would expect students to focus on patient safety. Some divergent findings were noted however, with just over one third (34%) agreeing that they were confident to speak someone about a safety issue with similar number (34%) indicating their disagreement with this. Most students either strongly agreed or agreed that if continuous learning from mistakes occurs, incidents can be prevented.

WARD NIV – WOULD YOU/SHOULD YOU ADJUST IT?
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3. Clinical Risk Department

Background:
Non-invasive ventilation (NIV) is routinely used to manage obstructive sleep apnoea in children or support children with respiratory insufficiency while sleeping both in hospital and at home. CHI NIV guidelines advise that a child with an acute respiratory deterioration of severity that requires NIV needs to be monitored more closely in a high dependency setting. We aimed to survey knowledge and attitudes to NIV use in the acute setting at ward level.

Methods:
A ‘Google Docs’ questionnaire was sent twice to all medical and intensive care non consultant hospital doctors (NCHD) and St Peter’s ward nursing staff by ‘Whatsapp’, and to all medical and surgical consultants by email between January and March 2019.

Results:
There were 80/180 (44%) responses; 18/39 (46%) medical consultant, 45/106 (42%) NCHD and 16/35 (45%) nursing staff. The single surgical consultant reply was excluded. Only 21% (17/79) of respondents have read the NIV guideline and 40% (32/79) know where it is accessed on the intranet. Most respondents were confident in recognising the deteriorating child (82%, 65/79), rating confidence on a scale 7-10. Ten respondents would adjust NIV settings in a child admitted in acute respiratory distress who is normally on NIV at home. Almost half (35/79) would start NIV on the ward following a PICU/ PEWS call in a child with respiratory distress. Confidence to speak up regarding deviation from a clinical guideline that could compromise patient safety was assessed on a scale (1-10 (1 being lowest)); consultants 9.4, medical registrar 8.6, PICU registrar 7.8 and nursing 8.9.

Conclusion: Although only half those surveyed responded, it suggests there is lack of knowledge on best practise in using NIV at ward level in children with worsening respiratory deterioration. Recommendations are to raise NIV awareness through ongoing training, in association with further promotion of the NIV guideline.

DIETARY MANAGEMENT OF CHYLOTHORAX IN CONGENITAL HEART DISEASE
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Background:
Chylothorax can be defined as the presence of chyle in the pleural cavity resulting from impeded flow in the thoracic duct. In childhood, chylothorax is a potentially challenging postoperative complication of cardiothoracic surgery. It may have a detrimental effect on a patient’s nutritional and immunological state. Conservative treatment includes the use of a minimal LCT diet or total parenteral nutrition. The aim of this audit was to determine incidence of chylothorax and frequency of dietary management post cardiothoracic surgery in OLCHC from January 2017 – December 2018.

Method
Data was collected from PAS, EDM, Nicor, dietetic and medical records. Excel was used for statistical analysis. Comparison data was available from an OLCHC audit from 2019.
**Results:** In the period 2017-2018, 7.2% of patients (56/777) received dietary treatment post cardiac surgery vs 12.8% in 2008. Seven patients required parenteral nutrition. Fifty-nine (7.5%) patients had raised pleural triglycerides but were not treated. Of those treated with diet 39% (22/56) had a diagnosis of Trisomy 21 (T21). Median duration of dietary treatment for formula fed infants and toddlers was 28 days post chest drain removal and 10.5 days for breastmilk fed infants. Twenty three infants were receiving some or all breastmilk pre surgery with 9 (39%) returning to breastmilk by outpatient review. Preoperatively 7 were breastfeeding and 9 at outpatient review. A tailed t test showed that there was a significant drop in weight for age z score from admission to outpatient review (p<0.01).

**Conclusion:**
There is a reduction in the number requiring dietary treatment. A proposed reason is a possible higher threshold for treatment. Further research is warranted to understand the mechanisms of chyllothorax in T21, considering the high incidence in this group. Dietary treatment appears to effect maintenance of breastmilk feeding as 60% of infants did not return to breastmilk post chyllothorax management. Reassuringly, infants that were feeding at the breast preoperatively were still breastfeeding on discharge with an additional 2 infants transitioning by their outpatient review.

The OLCHC chyllothorax algorithm advises to consider breastmilk reintroduction 1 week post chest drain removal, likely positively contributing to the shorter period of dietary treatment for these infants.

There is ongoing consultation with surgeons and the cardiology team to review OLCHC’s protocol aiming to standardise care.

**COMPLEX OESOPHAGEAL PERFORATIONS SECONDARY TO INGESTED FOREIGN BODIES: A SERIES OF THREE RECENT CASES.**

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**Clinical History:**
Patient A, a 14 month old well boy, ingested a button battery unwitnessed and was presented to his GP and hospital on 4 occasions with cough and decreased intake before a chest x-ray was performed. The patient underwent OGD that identified the button battery which had eroded through the oesophagus and into the trachea. The patient underwent Sternotomy, Tracheal Resection, and Repair of Oesophageal Fistula with input from General, ENT, and Cardiothoracic Surgery. The patient has not required any subsequent oesophageal dilations and can tolerate a varied diet.

Patient B, a 3 year old girl with developmental delay ingested the metal spring of a clothes peg unwitnessed. She repeatedly presented to hospital with recurrent LRTIs and vomiting for 6 months before a chest x-ray was performed. She underwent Sternotomy, Thymectomy, Tracheo-oesophageal Fistula Repair to retrieve the metal spring. She has done well post operatively and has not required subsequent intervention.

Patient C, an 8 year old boy with Dandy-Walker Syndrome and cerebral palsy, ingested a small plastic ring who presented as a gastroenterology outpatient with a 4 month history of regurgitation and failure to thrive. On OGD, a plastic disc was identified occluding the oesophagus and could not be removed, a laparoscopic gastrostomy was inserted. He underwent Modified Sternotomy and Oesophagostomy to remove the plastic ring. He required a prolonged hospital stay but is doing well at home.

**Purpose of Presenting:** These cases demonstrate the potentially life threaten risk that foreign body ingestion can pose and the need for early radiological imaging in young children, especially for those with developmental issues.

**Main Learning Points:**
Doctors should always have a high index of suspicion of foreign body ingestion and consider imaging in young children or children with developmental issues. Theatre and radiological imaging is available for all cases.
**FEMORAL TUNNELLED CENTRAL CATHETER INSERTION AS AN ALTERNATIVE ROUTE IN CHILDREN WITH DIFFICULT VASCULAR ACCESS**

Lucy Vernon: Our Lady's Children's Hospital Crumlin, Dublin, Ireland

**Clinical History:**
A 13-month-old female with malignant degeneration of a cervical teratoma to medulloepithelioma was referred to secure venous access. The tumour caused compression of both internal jugular veins. She also had a tracheostomy in situ due to airway compromise. As the usual route of jugular venous access was not an option, it was decided to obtain femoral access. A double lumen cuffed central venous catheter (CVC) was openly inserted into the Right Saphenous Vein under direct vision, position confirmed in the inferior vena cava (IVC). The CVC functioned without issue for 7 weeks before failing to return blood. The line was revised and intraoperatively the tip was identified as migrating laterally from the common iliac vein into a tributary, potentially accounting for the lack of blood return. The line was removed, shortened and reinserted into the same sheath. It was positioned into the common iliac vein proximally to the tributary and functioned well for a further 2 weeks before again failing to return blood. At this point, the patient’s tumour had responded to chemotherapy, reduced in size and its impact on the jugular veins. The femoral Broviac was removed and a double lumen CVC inserted into the right external jugular vein.

**Purpose of presenting:** This describes our technique of open femoral CVC insertion and promotes discussion of the potential options for children presenting with difficult venous access.

**Main Learning Points:**
(a) It is always important to examine the scrotum as part of the abdominal examination in any male; this case highlights that it is equally important to take a thorough history and examine the abdomen carefully in a boy presenting with an acute scrotum.

(b) This case allows for discussion regarding closing the PPV at time of surgery or not, the potential for scrotal abscess formation, and the role of antibiotics.

**SURGERY FOR PANCREATIC MASSES IN CHILDHOOD: A 13-YEAR NATIONAL EXPERIENCE**

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**Background**
Pancreatic tumours and inflammatory disorders requiring surgery are rare in childhood, making it difficult for any one surgeon to amass significant experience in their management and to develop an evidence base for appropriate treatment. Our aim is to summarise our recent national experience with the management of these rare pathologies and highlight the benefit of multidisciplinary collaboration with our adult general surgery colleagues for these challenging cases.

**Methods**
Children who underwent interventions for pancreatic pathologies were identified using our theatre electronic record system. We retrospectively reviewed their medical records to...
collect demographic details, presenting symptoms, imaging results, laboratory investigations, adjuvant chemo and radiotherapy protocols, operative procedures performed, details of their post-operative course and follow-up.

**Results**

Ten children, ranging from 8 to 15 years of age, underwent procedures for pancreatic masses during the study period. The pathologies encountered were primitive neuroectodermal tumours in 2 patients, pseudopapillary tumours in 3 patients, autoimmune pancreatitis type II in 2 patients and pancreatitis with pseudocyst formation in 3 patients. The most common presenting complaint was abdominal pain, with 30% of patients having a palpable abdominal mass. As well as endoscopic ultrasound and biopsies, several major operations were performed jointly by paediatric and general surgeons: 4 Whipple’s procedures, 2 distal pancreatectomies, one incision and drainage of pseudocyst with gastrojejunostomy and one open gastrocystostomy. Two patients developed significant post-operative complications requiring re-intervention post Whipple’s procedures – one anastomotic bile leak and another with ischaemia of the roux limb.

**Conclusion**

With less than 1 child requiring pancreatic surgery per year, joint management with our general surgical colleagues facilitates knowledge and skill transfer from the higher volume adult service, whilst preserving the child-focused multidisciplinary team approach of the paediatric hospital.

**PROFESSIONALS CONSULTATION SERVICE IN THE CHILD SEXUAL ABUSE (CSA) UNIT**

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2 St Louise’s Unit (Assessment and Therapy Unit), Children’s Health Ireland at Crumlin, Dublin.

**Background:** St Louise’s Unit provides assessment and therapy services for children and young people where CSA is a concern. The multidisciplinary, multiagency professional’s consultation model was introduced in 2016, and adapted to a more systematic approach in 2018. Some children and young people referred to St Louise’s Unit for assessment and/or therapy, have other complexities in their lives such as concerns of other types of abuse, living in care and other health concerns (including mental health concerns). Therefore introducing additional specialist CSA services to the child’s life, may in fact add to these complexities.

**Methodology:** The interdisciplinary team came together for the Children’s Health Ireland Quality Improvement and Patient Safety Programme in 2018. A retrospective chart review of referrals to St Louise’s Unit was carried out and data from referrals from June 2018 to March 2019 further reviewed.

**Results:** For that 9 month timeframe, St Louise’s Unit received 89 referrals, with 20 directly to the Consultation Service. Consultation appointments were offered on 2 Wednesday afternoons per month. Interdisciplinary representation from St Louise’s Unit and Laurels Clinic, Tusla, An Garda Síochána, support services and other agencies involved in the child/young person’s life, all met in St Louise’s Unit for a 2 hour meeting. The outcomes were 50% of referrals were discharged, 43% forwarded for assessment and 7% referred for therapy in St Louise’s Unit.

**Conclusions:** The consultation service is a collaborative and reflective process that allows for shared thinking in complex cases and supports case progression or resolution. This structured consultation service has led to collaborative working both within the unit and with other professionals involved in the child/young person’s life where CSA is a concern. In 20 cases reviewed, the service supported professionals already involved in the complexities of the child/young person’s life with least intrusion for the child/young person.

**ASSESSING MEDICINES FOR SAFE USE IN PAEDIATRIC PATIENTS IN CHILDREN’S HOSPITAL IRELAND AT CRUMLIN**

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**Background:** Many medicinal products routinely used to treat the paediatric population have not been studied or authorised for paediatric use, which means there is widespread unlicensed and ‘off-label’ use of medicines. Medicines deemed safe in adult formulations may not be appropriate for paediatric patients.

Medicines must therefore be carefully selected based on agreed criteria including, but not limited to: licensing, excipients, administration, labelling, similarity to other products, safety and handling.

**Aim:** This service review aimed to reassess and upgrade the ‘New Product Assessment Form’ at CHI at Crumlin and to develop an assessment tool in line with European regulations governing paediatric medicines.
**Method:** A literature review was conducted. Guidance, information, and advice was sought from other healthcare institutions in UK, and European guidelines and directives informing current practise around excipients in paediatric medicines were referenced. Irish and UK pharmacy colleagues were consulted during the development of the tool.

**Results:** This is the first comprehensive ‘New Product Assessment Tool’ in CHI at Crumlin which complies with the European directives governing excipients in paediatric medicines. The document highlights clearly potential issues and risks associated with product excipients, licensing status, warning label guidance and allows for recording of rationale for selection of medicines.

The ‘New Products Assessment Form’ is intended to highlight potential issues associated with excipients and their associated acceptable daily intake (ADI), but it will also highlight other risks associated with medicines used in paediatrics e.g. inadequate labelling, translation requirements for foreign products, sound-alike/look-alike products, safety and handling, and others.

**Conclusion:** This revised assessment tool has been approved for use in the CHI at Crumlin. It will be made available to all pharmacy departments in CHI group as we move towards one hospital. It will be available to community pharmacies on request. Use of the tool should be monitored and audited.
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