Aim The aim of this work is to evaluate the impact of the introduction of a preterm concentrated stock bag on the need for bespoke PN in preterm babies.

Method The new concentrated PN bag was transitioned into use from November 2017. Data regarding the number of preterm patients admitted and the type of PN they received was collected from January to October 2017, (Group A), this was then repeated for all preterm patients admitted from August 2018 to May 19, (Group B), after the preterm concentrated bag was fully introduced. Preterm babies were classified as babies that were born < 34 weeks gestation as the concentrated bag was formulated with these patients in mind.

Results Group A, (n=143), had 1045 bags supplied over the collection period. 47% of the PN bags supplied were bespoke PN bags, largely due to the need to provide PN in a smaller volume than the 130 ml/kg/day that the preterm stock bags available at that time. Group B, (n=118), had a total of 965 bags supplied, 16% of these bags were bespoke PN. The reasons behind requiring bespoke bags included the need for manganese free bags, requiring a reduction in glucose and a high electrolyte requirement in patients especially those with stomas. This has resulted in an overall reduction in spend on preterm PN of 34% and a reduction in compounded PN spend of 69%.

Conclusion This work has highlighted several benefits of introducing preterm concentrated PN bags. Firstly having concentrated preterm stock bags available on the ward has meant that a larger proportion of babies are maintained on stock PN without recourse to compounded PN. Secondly this has preserved the compounding capacity of our technical services unit so when a patient requires a bespoke bag that facility is available. Also, capacity for the compounding service has been preserved across the hospital minimising the need to outsource compounding. Finally the neonatal unit has seen a reduction in overall PN costs in this patient group. The introduction of this bag has been instrumental in reducing the need to outsource PN bags to commercial compounding units during periods of high demand, meeting national recommendations on the management of aseptic compounding capacity.³

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P18 PROVOCATION OF PAEDIATRIC HEARTS – A SAFE AND SMART SOLUTION

Moninne Howlett*, Anne Fitzpatrick, Terence Prendiville. *Children's Health Ireland at Crumlin*

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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 pathognomic 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.¹ They are also often unlicensed and expensive.² We investigated the utilisation of smart-pumps and development of a guideline to optimise medicines management and safety of these procedures in an Irish tertiary paediatric hospital.

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.^{3 4} 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 (Ajmaline) 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 'Ajmaline Challenge' guideline was approved and implemented in the Cardiac Catheterisation Laboratory (CCL) and Cardiac Day Unit. Estimated cost savings of €19,400 were realised between January 2017 - October 2018 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.

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P19 DIRECT OBSERVATIONAL STUDY OF INFUSION ERRORS ASSOCIATED WITH SMART-PUMP TECHNOLOGY IN PAEDIATRIC INTENSIVE CARE

¹Moninne Howlett*, ¹Erika Brereton, ¹Cormac Breatnach, ²Brian Cleary. ¹*Children's Health Ireland*; ²*School of Pharmacy, Royal College of Surgeons in Ireland*

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Aims Processes for delivery of high-risk infusions in paediatric intensive care units (PICUs) are complex. Standard concentration infusions (SCIs), smart-pumps and electronic prescribing are recommended medication error reduction strategies.^{1 2} Implementation rates are low in Irish and UK hospitals.^{2 3} Since 2012, the PICU of an Irish tertiary paediatric hospital

has been using a smart-pump SCI library, interfaced with electronic infusion orders (Philips ICCA®). The incidence of infusion errors is unknown. This study aims to determine the frequency, severity and distribution of smart-pump infusion errors and to identify contributory factors to the occurrence of infusion errors.

Methods Programmed infusions are directly observed at the bedside. Parameters are compared against medication orders and auto-populated infusion data. Identified deviations are categorised as either medication errors or discrepancies. Five opportunities for error (OEs) were identified: programming, administration, documentation, assignment, data transfer. Error rates (%) are calculated as: infusions with errors; and errors per OE. Pre-defined definitions, multi-disciplinary consensus and grading processes are employed.

Results A total of 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. 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 are minor, with just one requiring minimal intervention to prevent harm.

Conclusion This study has highlighted the benefits of smart-pumps and auto-populated infusion data in the PICU setting. Identified error rates are low compared to similar studies.⁴ The findings will contribute to the limited existing knowledge base on impact of these interventions on paediatric infusion administration errors.

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EVALUATION OF ANALGESIC DOSES PRESCRIBED POSTOPERATIVELY FOR OVERWEIGHT AND OBESE CHILDREN

¹Nicola Husain, ²Anushka Wadwa, ¹Nanna Christiansen*. ¹Evelina London Children's Hospital; ²King's College London

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Aim In England, 17% of children aged 2–15 are considered obese and a further 13% overweight.¹ Physiological changes associated with obesity affect pharmacokinetic and pharmacodynamic parameters which may necessitate paediatric drug dose alteration although few guidelines exist to support this in clinical practice. This study aimed to:

- determine the proportion of patients at a large paediatric hospital prescribed analgesics postoperatively who are obese or overweight

- evaluate how analgesics are currently prescribed for these overweight and obese patients
- determine whether doses are altered according to published recommendations
- determine whether clinical outcomes differ for overweight or obese children compared to non-overweight children

Method Postoperative paediatric inpatients aged 2–15 prescribed paracetamol, ibuprofen or morphine (or combination thereof) were included in the six-week prospective study. Demographic (age, weight, height, gender), prescription (drug name, dose, route, frequency) and clinical (surgical specialty, pain scores, paediatric early warning scores) information was collected from medical notes and drug charts. Patients with significant organ impairment or requiring intensive care were excluded.

Body-mass-index centile (BMI-C) was calculated for each child using a validated web-based calculator and used to classify patients as non-overweight (BMI-C <91), overweight (BMI-C ≥ 91 and <98) or obese (BMI-C ≥ 98). Prescribed paracetamol and morphine doses were evaluated against patients' total body weight (TBW) and ideal body weight (IBW) and ibuprofen doses were evaluated against patients' TBW and lean body mass (LBM)² according to published dosing adjustment recommendations^{2 3} and compared against formulary dosing standards.⁴ Clinical outcome data was used to evaluate pain control and clinical status.

Results BMI-C was calculated for 198 postoperative paediatric inpatients, and of these 142 (72%) were non-overweight, 27 (13.5%) were overweight and 29 (14.5%) were obese. Complete prescription and clinical data were available for 44 non-overweight, 22 overweight and 23 obese patients who were subjected to further analysis. Formulary dosing standards were 15 mg/kg for paracetamol, 5 mg/kg for ibuprofen and 0.1–0.2 mg/kg for morphine.^[4] Mean postoperative oral paracetamol doses were 15.0 mg/TBW, 18.1 mg/IBW and 20.6 mg/IBW for non-overweight (n=43), overweight (n=22) and obese (n=23) patients respectively. Mean postoperative oral ibuprofen doses were 5.0 mg/TBW, 5.7 mg/LBM and 6.2 mg/LBM for non-overweight (n=37), overweight (n=16) and obese (n=21) patients respectively. Mean postoperative oral morphine doses were 0.14 mg/TBW, 0.17 mg/IBW and 0.18 mg/IBW for non-overweight (n=33), overweight (n=13) and obese (n=16) patients respectively. There was no significant difference in pain scores or paediatric early warning scores at 0-, 4- 12- and 24-hours post-surgery between the three cohorts.

Conclusion The proportion of patients in this study who were overweight or obese aligned with national prevalence data.^[1] Children who were overweight or obese received higher doses of paracetamol, ibuprofen and morphine compared to non-overweight children, and doses of paracetamol and ibuprofen were greater than formulary dosing standards. This suggests that doses for obese or overweight children are not adequately adjusted according to IBW or LBM which may result in drug toxicity. Guidance for prescribers is needed to aid identification of patients who are overweight or obese and to guide appropriate dose adjustment.

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