2022 VIRTUAL CELEBRATE RESEARCH DAY

POSTERS

RESIDENT AND FELLOW POSTER COMPETITION CATEGORY
MT-RNR1 and Aminoglycoside Hearing Loss

INTRODUCTION
Aminoglycosides (AG) are first line antibiotics in neonatal sepsis. AG-induced Hearing Loss (HL) is related to the presence of a mitochondrial mutation in the gene encoding 12S-rRNA (MT-RNR1) (Figure 1). This mitochondrial mutation is transmitted from mother to 100% of her offspring. MT-RNR1-mutation may trigger AG-HL in a dose-independent manner (Figure 2). Ballana, et al., (2006), found that 63% of subjects who had MT-RNR1-mutation have developed HL. Of those, 22% had history of AG exposure. The most common MT-RNR1 mutation, A1555G-mutation, has been identified across different ethnic backgrounds with a frequency that ranges from 16.2% in Spain and 13.3% in China to 0.09% in Taiwan. Given the high incidence of the MT-RNR1-mutation and its 100% inheritance rate, China and UK has added it to its newborn screening. The incidence of MT-RNR1-mutation in British Columbia (Canada) is unknown.

METHODS
Babies at BC Women’s Hospital were included in the study. Parents were enrolled between November 2021 and March 2022 after obtaining a written, informed consent. DNA was collected from patient’s buccal saliva samples using ORAcollect-DNA-ORC-100 (DNA-Genotek). DNA was extracted and purified using QiaSymphony. MT-RNR1-A1555G assay was developed and validated by testing the DNA samples (QuantStudio-RT-PCR-Platform).

RESULTS
200 patients were recruited between November 2021 and March 2022. None of the samples that were genotyped for the MT-RNR1-A1555G were positive. Of these patients, 44 were exposed to AG. Figure 3 shows patients’ ancestry.

OBJECTIVES
The aim is to determine the prevalence of the MT-RNR1-A1555G mutation and to identify those at risk of MT-RNR1-associated-HL in British Columbia, Canada.

FUTURE DIRECTION
In this study, we found that none of the patients recruited have the MT-RNR1-mutation. Therefore, we suggest an expansion of our study to increase the number of cases to better represent the general population. If sufficient number of cases were found, then we suggest adding MT-RNR1 testing to the maternal prenatal-workup. Once a mother is diagnosed to carry the mutation, her children should have an alert on their files to prevent them from receiving AG throughout their lives in fear of developing sever, irreversible sensory-neural HL.

CONTACT
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INTRODUCTION

Intimate partner violence (IPV) is being increasingly recognized as a concern for health and wellbeing, particularly in the adolescent population (World Health Organization, 2018). IPV refers to behaviour causing “physical, psychological, or sexual harm to those in a relationship” (World Health Organization, 2012). Recent data shows that women age 15-19 are the most likely age group to experience IPV within Canada (Canadian Centre for Justice and Community Safety, 2021). At an increased risk of experiencing future episodes in their lifetime (DSHS, 2021). A history of IPV is associated with long-term health implications and higher rates of healthcare system utilization, which continues even after the intimate partner violence has ended (Campbell, 2002, Rivara et al., 2007, Fishman et al., 2013).

Current programs addressing IPV in adolescents across the country have focused primarily on prevention (LaPointe & Amato, 2015). There is very little evidence on approaches to supporting adolescents who have already experienced IPV. Current regional treatment centers for IPV in British Columbia do not have youth specific treatment options for adolescents.

OBJECTIVES

The purpose of this project is to develop an evidence-based and developmentally appropriate model of care for adolescents between the ages of 13 and 18 who have so far not experienced intimate partner violence, which will then be implemented in a local region within British Columbia.

FRAMEWORK FOR MODEL DEVELOPMENT

The initial model will be developed utilizing a theoretical framework, which given the paucity of evidence in treatment of youth experiencing IPV, will rely on evidence for treatment of adolescents who have experienced non-intimate partner violence, adults who have experienced intimate partner violence, and qualitative studies of adolescents who have experienced intimate partner violence. Following this, we will engage community members in reviewing the model, including experts with expertise in interventions for intimate partner violence or domestic violence and local youth between the ages of 13 and 18. Once the model has been reviewed, it will be implemented in a local community and further evaluated to assess for improvement in well-being and reduction in intimate partner violence experiences among participants.

CONTRIBUTING LITERATURE

In adult populations, community-based approaches include psychosocial education, safety planning, and providing social supports and clinical approaches include psychotherapy or motivational interviewing have been used (Trabold et al., 2018). Both have evidence suggesting improvements in well-being and rates of IPV (Trabold et al., 2018, Rivas et al., 2013).

Interventions for youth who have witnessed domestic violence typically incorporate trauma treatment, such as cognitive behavioural therapy, as well as focus on social supports, with improvement in psychiatric symptoms (Walshen & MacMillan, 2013).

Adolescents have unique social factors compared to adults which play a role in their lives, including parental influence, school, and development of their own identity and resiliency factors (Korkmaz & Överlein, 2020).

Themes from adolescents’ experience with intimate partner violence highlight the importance of the response from parents and schools (Korkmaz & Överlein, 2020). Adolescents are more comfortable speaking to friends and family rather than accessing formal services regarding intimate partner violence (Moore, et al., 2015). Factors important to youth in an IPV intervention program include gender and sexual orientation inclusivity, the acknowledgement of psychological and emotional violence as IPV, and education on healthy vs unhealthy relationships (Debnam & Kumold, 2019).

REFERENCES


We will formalize our proposed model based on the described literature and then seek input from community members. Though this post did not focus specifically on perpetrators of intimate partner violence, we aim to also develop a framework for youth who have perpetrated IPV, to be integrated into our proposed model.

KEY MODEL CONSIDERATIONS

Inclusive

Trauma informed

Psychosocial education

Safety planning

Community supports

Parental education

School awareness

Screen for further mental health supports
Background

- Cytomegalovirus (CMV) is the most common virus that spreads from mothers to infants during pregnancy.
- In Canada, the number of individuals who test positive for the virus in individuals of childbearing age is estimated to be 40-54%.
- Congenital CMV infection results in serious health problems in children, including neurodevelopmental disabilities and is the leading cause of non-hereditary sensorineural hearing loss.
- Early diagnosis of babies with cCMV can reduce lifelong health impacts by initiating early treatment and connection to physician subspecialists and allied health teams including but not limited to audiology, ENT and developmental services.
- If there is concern for cCMV when a child is born, initial assessment and testing must be done within the first 3 weeks of life in order to reliably determine eligibility for treatment.
- Treatment with valganciclovir lasts 6 months; following treatment, children need long-term pediatric development and hearing follow up.
- In BC, and throughout most of Canada, there is no coordination of care of management; specialists work in distinct silos using shared guidelines of care. Care is fragmented, making continuity of care challenging.
- In preliminary focus groups, pediatric and family medicine providers have recommended a partnership model of care where subspecialists work together to coordinate early introduction of care.

We Asked…

- What are caregiver and healthcare provider perceptions regarding current models of care for cCMV?
- What aspects of care can be improved?

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- What aspects of care can be improved?

Methods

- Two online surveys were developed; one for caregivers with lived experience of cCMV and another for health care providers who deliver care to families and children affected by CMV.
- Surveys for caregivers were distributed across Canada by way of newsletter, website, social media platforms and healthcare clinics.
- Surveys for healthcare providers were distributed across BC through listservs and snowball sampling.
- Data was collected through a REDCap database.
- Descriptive analysis was done on quantitative survey data using SPSS.
- Qualitative data was thematically analyzed, coded and their frequency counts reported using Nvivo 12.
- Due to sampling method response rate was not able to be computed.

Caregivers advocated for...

- Education and awareness about CMV
- Improved access to testing and results
- Community of peer families and supports

Providers advocated for...

- Redesign in the current standard of care
- Access and delays to care to be addressed
- Accessibility to multidisciplinary teams

Conclusions

- Caregivers across Canada have concern for poor antenatal CMV education, inadequate healthcare provider awareness of cCMV resulting in delayed diagnosis and missed opportunities for treatment, delays in access to care and lack of coordinated care among healthcare services. Caregivers are advocating for improved sense of community as it relates to shared experiences with other families affected by cCMV and improved coordination of multidisciplinary supports. Healthcare providers in BC share these concerns of delayed or missed diagnoses and are advocating for a redesign in the current standard of care. Providers are asking for improved accessibility to multidisciplinary supports in a coordinated approach, including but not limited to early childhood development services, audiology, psychology, social work and ENT physicians.

Future Directions

- This work is part of a larger health system redesign project led by a coalition of reproductive and pediatric infectious diseases specialists at BC Children’s and BC Women’s Hospital with the aim of bridging sites to create a collaborative program to provide combined maternal and infant care for perinatal infections, including CMV.
- This research is grounded in the knowledge that no program or policy should be implemented without the input from those that are directly affected by such change. The caregiver and provider insights collected in this research will inform the develop a program that is responsive to its stakeholders needs.
INTRODUCTION: In Canada, the average age of cerebral palsy (CP) diagnosis is close to 19 months, later than what clinical guidelines call for. This can lead to delays in providing CP-specific intervention during a critical window of neuroplasticity where infants can benefit the most from therapy. Current evidence also links a timely diagnosis to better long-term health outcomes, family resilience, satisfaction with the healthcare system, and overall quality of life for the child and family members.

OBJECTIVES:
- To decrease the diagnosis age to under 12 months and facilitate early intervention
- To develop a new diagnostic and follow-up clinic for high-risk infants

METHOD A: FAMILY CENTERED CLINIC
- Resource Package
  - Assessment summary in lay language
  - Post-clinic Experience Survey
  - Mindful approach (i.e., clinic introduction sheet)

METHOD B: CREATING A NEW PRACTICE

OUTCOMES AND SIGNIFICANCE:
Standardized service delivery to ensure consistency in:
1) identification of high-risk infants
2) quality of care & enhance patient experience
3) referrals for early intervention and support

We are already ramping up to a capacity increase by 20-30 patients in the first year

NICU: Total of 200-300 High Risk Infants per year

Next steps:
- Knowledge translation initiatives with community and primary care clinicians
- Expansion of the clinic to increase assessments availability for all high-risk children in BC

INC. CPEDC – CP Early Diagnosis Clinic, NICU – Neonatal Intensive Care Unit, AACPDM – American Academy for Cerebral Palsy and Developmental Medicine, GMA – General Movements Assessment, HINE – Hammersmith Infant Neurological Examination, DAYC – Developmental Assessment of Young Children, AIMS – Alberta Infant Motor Skills

*HIGH RISK Factors for CP:
- GA < 32 weeks
- VLBW < 1500 g
- Cystic Periventricular Leukomalacia (PVL)
- Intraventricular Hemorrhage (IVH) Grade III-IV
- Moderate to severe neonatal Encephalopathy
- Neonatal meningitis
- Congenital CNS defects
- Genetic abnormality associated with CP
- Placental abruption
- Apgar < 7 at age 5 minutes
- History of stroke
- Clinical/developmental risk factors for CP

NFUP – Neonatal Follow Up Clinic, CPEDC – CP Early Diagnosis Clinic, NICU – Neonatal Intensive Care Unit, AACPDM – American Academy for Cerebral Palsy and Developmental Medicine, GMA – General Movements Assessment, HINE – Hammersmith Infant Neurological Examination, DAYC – Developmental Assessment of Young Children, AIMS – Alberta Infant Motor Skills

First Appointment
- 3-6 months old of age
  - Parent interview
  - GMA
  - Physical exams, including standardised tests (e.g., HINE)
  - Family conference to discuss diagnosis and care planning
  - Provide resources package
  - Referrals for early intervention

New Practice
- Two weeks phone follow-up

Second Appointment
- 8-12 months of age
  - Developmental assessment (DAYC / AIMS)
  - Confirm diagnosis if unable to make diagnosis at the first visit
Urinary tract infections in infants less than 60 days old: a retrospective review of BCCH Pediatric clinical practice from 2015-2021.

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INTRODUCTION
Urinary tract infections (UTIs) are the most common bacterial infections in infants two months of age and younger. The optimum duration of antibiotic therapy and when to switch from intravenous (IV) to oral antibiotics are frequently debated topics in clinical practice. Recent systematic reviews have shown no significant difference in recurrence rate for infants with UTIs treated for <3 days of IV antibiotics compared to >4 days IV antibiotics.1

OBJECTIVES
The primary objective of this study to assess the recurrence of UTIs in infants less than 60 days of age depending on the duration of IV antibiotic treatment and was defined as recurrence of the same microbiological culture proven UTI within 30 days of primary episode. Secondary outcomes included length of stay in hospital, duration of IV antibiotics, readmission to BCCH for a UTI within 30 days, all cause readmission at BCCH within 30 days and presentation to BCCH with a different organism UTI within 30 days.

METHODS
Ethical approval for this study was obtained: H21-02632. A list of all patients younger than 60 days of age with a diagnosis code of UTI was obtained. Patients presenting to BCCH, who had a pure growth of a single bacterial organism, collected by a sterile technique were included. Infants with a UTI who were treated for presumed or proven meningitis were excluded. Retrospective chart review was performed for all included patients.

RESULTS
Table 1: Demographic details

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total patients (n = 94)</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>75 (79.8%)</td>
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<tr>
<td>Female</td>
<td>19 (20.2%)</td>
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<table>
<thead>
<tr>
<th>Age in days</th>
<th>Median Days [Min, Max]</th>
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<tbody>
<tr>
<td>Median</td>
<td>32.5 [5.0, 59.0]</td>
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<table>
<thead>
<tr>
<th>Patients admitted to BCCH</th>
<th>Admitted</th>
<th>Not admitted</th>
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<tbody>
<tr>
<td>Admitted</td>
<td>87 (92.6%)</td>
<td></td>
</tr>
<tr>
<td>Not admitted</td>
<td>7 (7.4%)</td>
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<tbody>
<tr>
<td>Isolated</td>
<td>82 (87.2%)</td>
<td>5 (5.3%)</td>
<td>5 (5.3%)</td>
<td>1 (1.1%)</td>
<td>1 (1.1%)</td>
</tr>
</tbody>
</table>

• Duration of antibiotic therapy was defined by calendar days and not by hours of completed therapy. The timing of switch from IV or IM antibiotics to oral antibiotics in this study was variable.
  - 79 (84%) of infants received long courses of IV antibiotics (> 4 days IV therapy). All of the 15 infants who received short course of IV antibiotics (<3 days IV therapy) before switching to oral, were aged between 1-2 months.
  - The total antibiotic duration varied from 6 day to 16 days, with 77 infants (82%) receiving 9-11 days of total antibiotic therapy.
  - 5 (5.3%) patients in this study were found to have bacteremia at time of UTI diagnosis. These patients were all treated with longer IV courses of therapy, (10-14 days) and had significantly longer lengths of stay (LOS) in hospital – median LOS was 12 days compared to median LOS of 6 days for non-bacteremic infants (p = 0.003). All patients had renal ultrasounds performed, 67 (71%) were done while an inpatient, with 27 (29%) performed post discharge.
  - 6 patients had a recurrent UTI within 30 days of the first UTI. 5 were recurrence of the same organism as the original UTI and 1 patient had a recurrence of UTI with a different organism. These patients all received long course (>4 days) IV antibiotic therapy for management for their first UTI. 3 (50%) of infants with recurrent UTI were aged with grade 3 or 4 reflux on subsequent imaging.

REFERENCES


DISCUSSION
Based on this cohort of patients from our centre, a short course of IV antibiotics was not associated with UTI recurrence. Although our sample size is small, our rates of UTI recurrence are similar to international published studies. An earlier switch from IV to oral antibiotics may be considered in select infants with UTI. Shorter IV courses correlated with shorter length of stays in hospital, which may have benefits for both patients and families with quicker return to the home environment and reduced health care costs.

This area is the focus ongoing an ongoing quality improvement project within our department, as we translate research into clinical practise for our population. Future studies with larger numbers, addressing the issue of bacteremic versus non bacteremic UTI in this young age group, may add clarity on the optimum duration of IV versus oral antibiotics in this population.
Introduction

Bronchiolitis is a very common pediatric condition, representing the most common diagnosis of patients admitted to the CTU at BCCH. However, evidence-based treatment is limited beyond respiratory and hydration support. High flow (HF) is an important tool in providing respiratory support in bronchiolitis, and its use is increasing. In the 2019-2020 respiratory season, approximately 50% of patients admitted to BCCH for uncomplicated bronchiolitis received HF. HF has dosimeters compared to conventional low-flow (LF) oxygen, including higher costs, more difficulty weaning, and is classified as an aerosol-generating medical procedure. HF is a relatively new intervention, only being used on inpatient wards at BCCH since 2017. Until recently, there has been a paucity of evidence-based guidelines on its use in bronchiolitis. Since 2019, multiple randomized control trials have demonstrated that HF is beneficial in patients who “fail” low-flow oxygen and other supportive therapy, preventing escalation to non-invasive respiratory modalities in some patients. However, these same trials have not shown a benefit in early HF initiation vs low-flow oxygen support for bronchiolitis, with equal length of stay, ICU admission, intubation, and duration of respiratory support [1,2]. Starting HF without clinical benefit increases health-care utilization and costs, and potentially increases length of hospital admission. To help guide effective use of HF in bronchiolitis a bronchiolitis guideline was implemented in August 2021, which emphasized supportive measures, including LF, prior to initiation.

Coinciding with the goals of the guideline, the American Academy of Pediatrics’ QI network is leading a multi-institutional project to investigate if “pausing” prior to HF initiation to implement supportive care would reduce the proportion of bronchiolitis patients started on HF. We are participating in the project, called Hi-FLO. High Flow Interventions to Facilitate Less Overuse on the CTU. To evaluate the effect of the BCCH guideline implementation and contribute to an international QI initiative to improve the care of children with bronchiolitis.

Aims

Our goal is to determine if implementation of a guideline emphasizing supportive care prior to starting HF reduced overutilization of HF. The specific numerical goals are consistent with the broader Hi-FLO project and based on pilot studies conducted in two US centres.

<table>
<thead>
<tr>
<th>Primary Aims</th>
<th>Process Measure</th>
<th>Balancing Measures</th>
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<tbody>
<tr>
<td>Reduce the proportion of infants with bronchiolitis treated with HFNC by 30%</td>
<td>80% of patients started on HFNC will be appropriately started on HF as per the BCCH bronchiolitis guidelines</td>
<td>≥ 90 days of stay, ≤ 1 patient of stay</td>
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</table>

Methods

The BCCH guideline “High Flow Nasal Cannula In Bronchiolitis (<1 Year) Guideline” provides guidance on criteria for how to initiate and wean HF in patients with uncomplicated bronchiolitis. After official implementation, we worked with respiratory therapy leadership to promote the guideline in the relevant departments at BCCH and provided education around the rationale for the guideline’s recommendations. We emphasized optimizing supportive care as a potential intervention to prevent need for HF initiation, including nasal suctioning, minimal handling, enteral or IV hydration, and LF oxygen. A summary of the education methods is displayed in Table 1.

Table 1: Guideline education summary

<table>
<thead>
<tr>
<th>Education Method</th>
<th>Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email materials to staff and residents</td>
<td>Respiratory Therapy and Nursing</td>
</tr>
<tr>
<td>Display board on CTU</td>
<td>Participants at education and implementation with RT leadership</td>
</tr>
<tr>
<td>Primrose rounds presentation</td>
<td>Providing guidance to CPAP providers on guideline</td>
</tr>
<tr>
<td>RT consultation and support</td>
<td>Display board on CTU</td>
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An example of the information summarizing and promoting the guideline is shown in Figure 1. To determine if there was a change in HF implementation rates after release of the guideline, as per the Hi-FLO protocol we are comparing bronchiolitis admissions in the 2021-2022 respiratory season to a baseline of the 2019-2020 respiratory season. The 2019-2020 season was not due to the atypical number of bronchiolitis admissions due to cold. Data on admissions will be obtained from PHSA Performance Measurement and Reporting (PMR) which records data on all admissions, including length of stay, discharge diagnosis, and patient demographics. Data about HF implementation will be obtained via chart review. Prospective data during the implementation period has also been collected by RTs, providing additional information about if the guideline was considered, and clinical status at time of HF initiation. Inclusion criteria and specific data collected is shown in Table 2.

Table 2: Data collection

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
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<tbody>
<tr>
<td>Age: birth to 34 months of age</td>
<td>HF-related deaths or HFNC intolerance</td>
</tr>
<tr>
<td>Discharged between November 1, 2020, and March 31, 2021 (baseline) or November 28, 2021, to March 31, 2022 (intervention)</td>
<td>Hemodynamically significant cardiac disease requiring cardiac medications</td>
</tr>
<tr>
<td>Yes/No choices in diagnosis of bronchiolitis (J21 and its subcategories)</td>
<td>Chronic disease (bronchopulmonary dysplasia) on home oxygen and/or diuretics</td>
</tr>
<tr>
<td>Requires home oxygen or airway clearance support at baseline for any reason</td>
<td>Significant neumococcal disease requiring assistance with breathing or feeding</td>
</tr>
<tr>
<td>Requires home oxygen or airway clearance support at baseline for any reason</td>
<td>Requires home oxygen or airway clearance support at baseline for any reason</td>
</tr>
<tr>
<td>Patient presenting with apneas (J21) and its subcategories</td>
<td>Requires home oxygen or airway clearance support at baseline for any reason</td>
</tr>
<tr>
<td>Transferred from outside facility</td>
<td>Requires home oxygen or airway clearance support at baseline for any reason</td>
</tr>
</tbody>
</table>

Figure 1 — Infographic summarizing the HF in bronchiolitis guideline

Table 3: Baseline time period admission demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline (n=177)</th>
<th>Intervention (n=172)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in days (mean) ± SD</td>
<td>19.6 ± 17.6</td>
<td>18.6 ± 16.9</td>
</tr>
<tr>
<td>Sex (Percent male)</td>
<td>56.0%</td>
<td>58.7%</td>
</tr>
<tr>
<td>Weight in kg (mean) ± SD</td>
<td>8.9 ± 3.1</td>
<td>7.5 ± 2</td>
</tr>
<tr>
<td>Length of stay in hours (mean)</td>
<td>9.9 ± 4.5</td>
<td>9.8 ± 4.1</td>
</tr>
<tr>
<td>Patient length of stay in hours</td>
<td>79.0 ± 25.3</td>
<td>80.0 ± 24.4</td>
</tr>
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The full data collection for the intervention period is pending, but we have completed collection of preliminary data collected by bedside RTs. 40 admissions had data collected, recording 35 high flow starts, however not all admissions met criteria and we are limited in filtering without more data from PMR. The six patients who preliminarily meet criteria and complete data on HF treatment had an average age of 20.3 ± 71.8 days, were 83.3% male, and had an average weight of 6.7 ± 2.4 kg. The average time on HF was 53.4 ± 38.8 hours for the baseline group and 25.9 ± 14.5 hours for the intervention group. Of admissions that were started on HF and had data collected for each intervention, 8/35 (22.9%) were started on the wand. 17/32 (53.1%) had been started on LF prior to HF, and the guideline was explicitly considered in 17/28 (60.7%). At least 13 patients 32.5% had been transferred to the ED already on HF.

Summary and Next Steps

The baseline data shows that there is no statistically significant difference in the recorded demographics and HF start length of stay between the patients started HF and not, which with the literature suggesting HF does not affect length of admission. We had not anticipated the relatively high number of HF starts, and the very low number started outside the ED. Although it’s a small sample size of only 6 patients, the intervention group also does not differ in demographics. It is likely the shorter length of HF in this small sample size also represents a recording bias favouring shorter HF treatments, and we will wait until we have the complete data set before drawing conclusions.

We await the full data to complete our analysis and see if our aims have been met. With the implementation of CST, projects of this nature and data collection could potentially become much easier, and pathways could be directly incorporated into the order process. Future QI work in this area could look at standardizing and improving the HF weaning process in bronchiolitis.

References

Updating the BC Children's Hospital’s Guideline for the Management of Medically Unstable Patients with Eating Disorders, An Interdisciplinary Quality Improvement Project

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BACKGROUND

The BC Children’s Guideline for the Management of Unstable Patients with an Eating Disorder Admitted to the Medical Unit (EDO Guideline) is a widely used tool across the province. It provides rationale for the BC Children’s pre-printed order set and guidance for health care providers in patient management. This clinical tool was last updated in October 2016. Since then, literature on the care of unstable patients with an eating disorder has evolved. Within BC Children’s Hospital, multiple parallel documents were created by different disciplines to meet the gaps of the existing EDO Guideline. Confusion emerged from the lack of consistency between these tools.

OBJECTIVE

To update the EDO Guideline to meet the specific needs of nurses and physicians.

METHOD


Interdisciplinary online survey, assessing:
- Use of the 2016 EDO Guideline
- Most useful sections of the EDO Guideline
- Use of other collateral tools
- Specific needs (resources, information)
- General comments

Interdisciplinary workshop with members of the Eating Disorder Interdisciplinary Collaboration QI project:
- Presentation of survey results
- Identification of knowledge translation gaps
- Review and define the purpose of each existing tools

Nursing Procedure Document

EDO Guideline update

Interdisciplinary workshop:
Updated EDO Guideline presentation
- Discussions on local practices versus literature content
- Content clarification

EDO Guideline reviewed and updated

Content reviewed by eating disorder experts

Final EDO Guideline update

Vocabulary review for transition to CST Cerner

BC Children’s T7 Quality of Care Committee

Final publication on Shared Health Organizations Platform (SHOP) for local and provincial use

RESULTS

.ONLINE SURVEY RESULTS

The EDO Guideline is widely used by all respondents. Needs identified by the survey’s respondents:

- Accessible and practical tools for Emergency Department physicians.
- Specific practical tools for nurses (bedside care).
- Resources for families.

WORKSHOPS AND EXPERT FEEDBACK

- Procedure document: "Nursing Management Of Unstable Patient With Eating Disorders Admitted To The Medical Unit" created.
- Abbreviated nursing “cheat sheet” for inpatient care updated and made available in SHOP as addendum to procedure document.
- "Meal Support Guidelines and Family Based Therapy Resources" for patients and families updated and made available in SHOP as addendum to procedure document.
- Admission criteria reviewed based on recent literature, modified according to local practices and adapted for provincial use in BC.
- Emergency Department algorithm developed for provincial use.
- Refeeding Syndrome Risk table created: risk stratification and inpatient management according to refeeding syndrome risk.
- Implementation of thiamine supplementation recommendations.
- Hypoglycemia protocol added to guideline.

CONCLUSION

These new tools will hopefully lead to an improvement in the interdisciplinary collaboration and consistency of the care given to the eating disorder population at BC Children’s Hospital.

NEXT STEPS

This project is part of an ongoing larger QI strategy to improve interdisciplinary collaboration on T7 for this patient population. Feedback from health care providers on the updated EDO Guideline, the Nursing Procedure document, the Cheat Sheet and the Patient Handout will be collected and reviewed within the monthly QI meetings held as part of this larger QI strategy.
Sunny Hill Health Centre at BC Children’s Hospital, Vancouver, BC; Department of Pediatrics, University of British Columbia, Vancouver, BC

BACKGROUND AND OBJECTIVES

- Sunny Hill Health Centre (SHHC) is a tertiary developmental pediatric facility at BC Children’s Hospital.
- SHHC shares a responsibility in developing resources and promoting relationships across the health service system. This includes knowledge sharing with community providers, improving referral and system inefficiencies, and helping families to access resources within their communities.
- The Neuromotor Program at SHHC provides care to a wide variety of patients with neuromotor disorders, including cerebral palsy (CP).
- To help address provincial gaps regarding early CP diagnosis and management, we have developed a neuromotor physician-to-physician (PTP) phone/teleconference consult service.
- Our objective is to connect community pediatricians with a developmental specialist in neuromotor disorders.
- Goals include:
  - better support for community providers in diagnosing and managing patients with neuromotor conditions
  - earlier diagnosis of CP in the community
  - shorter wait time for CP diagnosis and tone management

PROJECT PLANNING PROCESS

- Developed goals of service based on Tiers of Service Framework
- Involved stakeholders
- Developed project measures
- Drafted surveys and referral pathway
- Analyzed/implemented survey results and feedback
- Developed CP resource package
- Developed referral form and service schedule
- Opened service to selected group of community pediatricians (~15 physicians)
- Low referral number
- Expanded service to additional ~40 pediatricians
- Posted referral form to Sunny Hill/BCCH website
- Promoted service in BC Pediatric Society Newsletter and in UBC Pediatrics Department Newsletter

FUTURE DIRECTIONS

The PTP consult service is the first of its kind at SHHC. Future research will focus on collecting additional community data to determine if our service is having the desired impact. We plan to perform additional surveys to compare pre- and post-intervention data and monitor outcome measures. Longer-term plans include expanding this service model to other areas of developmental pediatrics in BC.

Project Contact: Mia Francl, Developmental Pediatric Subspecialty Resident at SHHC
Email: s16761@phsa.ca

We conducted needs-assessment surveys with community pediatricians.

LEVEL OF INTEREST IN PTP SERVICE

- 77% interested
- 8% not interested
- 15% not sure

LEVEL OF COMFORT IN MAKING CP DIAGNOSIS

- 69% comfortable
- 36% somewhat comfortable
- 25% not at all comfortable

LEVEL OF COMFORT MANAGING INCREASED TONE IN PATIENTS WITH CP/INCREASED TONE

- 36% comfortable
- 25% comfortably managing increased tone
- 15% comfortably managing increased tone with ongoing specialist support
- 77% not at all comfortable

Outcome Measures

- Pediatrician confidence in CP diagnosis/tone management
- CP diagnosis in the community
- Pediatrician access to CP resources for diagnosis and management

Process Measures

- % of referrals related to CP/tone management
- Average time for documentation
- Average wait time (from referral to appointment date)

Balance Measures

- Workload added to the team
- No. of 2nd consultations for the same case
- No. of cases referred to SHHC for CP diagnosis after consultation service provided (delay in diagnosis)

NEEDS ASSESSMENT SURVEYS

Figure 1. PDSA Cycle for Needs Assessment Surveys

We launched the PTP consult service in October 2021. To develop this service, we applied a Plan-Do-Study-Act (PDSA) model.

- Sent survey reminder
- Extended response deadline
- Developed clinic schedule/referral process and resource package based on responses
- Monitored and logged responses
- Low response rate

- Drafted pediatrician needs assessment survey questions
- Involved stakeholders (e.g. administration /quality and safety team members)
- Planned list of survey recipients
- Created/launched online survey
**BACKGROUND**

**Transition from Residency to Fellowship**
- A significant transition, often requiring a move of institution, province, or country to continue training

**Cardiology Fellowship**
- 3 year fellowship focused on congenital and acquired cardiovascular diseases spanning the fetus to young adult
- Initial steep learning curve familiarizing oneself with interpreting and performing specialty-specific investigations (ECG, echocardiography, stress tests)

**Competency-Based Medical Education**
- Launched Canada-wide in pediatric cardiology in 2020 and 2021
- Requires trainees to demonstrate competence in various aspects of clinical practice ranging from medical and procedural proficiency to expertise in communication and collaboration
- Uses entrustable professional activities (EPAs) to gauge learner competency

**PURPOSE**

**Orientation**: hospital and clinic tour, overview of program requirements, administration, EPAs, assessment tools

**Skill acquisition**: Simulation experiences covering common on call emergencies and introduction to echocardiography and ECGs, consultation, call, order writing

**Team building**: Bonding with co-fellows during simulation experiences and socials.

**Wellness and resiliency**: Introduction to wellness resources and opportunities to socialize with co-fellows and department.

**OVERVIEW**

3 day long Pediatric Cardiology Fellows Bootcamp, the first of its kind in Canada, that offers exposure to simulation, multidisciplinary workshops, lectures, and social events meant to acquaint the new fellows with the department, hospital, and city.

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**BOOTCAMP CURRICULUM**

### Day 1

**MORNING**

- Fellowship program overview
- BCCH Basics
- BCCH tour + scavenger hunt

**AFTERNOON SIMULATION**

- Simulation intro
- PALS simulation and cardiac arrest
- Temporary pacemakers and pacing leads

**EVENING**

- Discover Vancouver activity

### Day 2

**MORNING**

- Cardiology crash course: Consults, what to expect on call, ECG and echo intro

**EVENING**

- Departmental welcome dinner

### Day 3

**MORNING**

- Basics of assessment
- Subspecialty session

**AFTERNOON SIMULATION**

- Bradycardia requiring pacing
- Cyanotic spell in Tetralogy of Fallot patient
- Tachyarrhythmia and SVT

**EVENING**

- Casual dinner out with other fellows

---

**NEXT STEPS**

**Evaluation of learning**: Participants will self-evaluate their competency and familiarization with different bootcamp contents pre- and post-bootcamp to gauge degree of learning

**Evaluation of sessions**: For interval improvement each year

**Teaching opportunities for senior fellows**: Opportunities for session development and teaching evaluation

**Wellness and resiliency**: Discussion surrounding resiliency, time management, stress management, and wellness resources

**Simulation**

- Introduction: how to use monitors, AED, pacing leads, and temporary pacemakers
- PALS simulations: cardiac arrest, bradycardia, tachycardia, cyanosis

**Social Activities**

- Discover Vancouver: activity to explore the city (e.g., bike tour, scavenger hunt, ice cream crawl)
- Departmental welcome dinner: opportunity for fellows and their families to meet staff and other departmental members

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**Bullet indicates primary session lead**: ♦ fellow, ■ staff, ○ allied health

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**Lectures**

- Fellowship program overview: Fellowship program structure, rotations, educational sessions, journal clubs
- BCCH Basics: CST Cerner, IT access, security access, dictation
- Cardiology crash course: Components of a cardiology consult, overview of what to expect on call, introduction to where to find and how to use echo and ECG machines as well as their software
- Subspecialty session: Overview of different subspecialty rotations and objectives (i.e., cardiac cath, electrophysiology, echo, wards, consult)
- Basics of assessment: Overview of EPAs and assessment in the newly launched competency by design curriculum

**Workshops**

- BCCH tour and scavenger hunt: Scavenger hunt and tour of the hospital, clinic areas, wards, and coffee shops
- Clinic orientation: Meet the clinic admin and allied health
- ECG Basics: How to do an ECG and troubleshoot common problems
- Echo Basics: Introduction to the machine, software, and common views
- Documentation and management plan workshop: Components of a good dictation; how to communicate with colleagues inside and outside BCCH; basic components of a good management plan
- Order writing workshop: Order writing workshop with pharmacy
- Wellness in fellowship: Discussion surrounding resiliency, time management, stress management, and wellness resources

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**Evaluation of learning**: Participants will self-evaluate their competency and familiarization with different bootcamp contents pre- and post-bootcamp to gauge degree of learning

**Evaluation of sessions**: For interval improvement each year

**Teaching opportunities for senior fellows**: Opportunities for session development and teaching evaluation
Outcomes in patients with pulmonary atresia, ventricular septal defect, and major aortopulmonary collateral arteries following surgical intervention: A meta-analysis

Sabine L Laguë, PhD, MD, Sripadh Upadhya, MBBS, MD, Jeff Bone, MSc, and Kevin Harris, MD, MHSc
Children's Heart Center, BC Children's Hospital, Department of Pediatrics, University of British Columbia

images by Sabine Laguë

BACKGROUNDS

- Congenital heart disease is the most common congenital condition, accounting for 0.8-1% of live births.
- Tetralogy of Fallot (ToF) accounts for 10% of congenital heart disease. It is the most common form of cyanotic heart disease.
- ToF is associated with 4 main features:
  1. Overriding aorta
  2. Pulmonic stenosis
  3. Ventricular septal defect (VSD)
  4. Right ventricular hypertrophy
- ToF ranges in severity. 15-20% have pulmonary atresia, or tissue completely preventing blood flow through the pulmonary valve.
- In ToF with pulmonary atresia blood reaches the lungs by either:
  - Patent ductus arteriosus (70%) or
  - Major aortopulmonary collateral arteries (MAPCAs) (30%), present in the most severe form of Tetralogy of Fallot with pulmonary atresia, VSD, and MAPCAs (PA/VSD/MAPCAs).

MAPCAs

Why they arise:
- To supply blood flow to the lungs in pulmonary atresia

Spectrum of pulmonary artery (PA) anatomy:
- Confluent: both pulmonary arteries come from the main pulmonary artery
- Hypoplastic: both pulmonary arteries are small; pulmonary blood flow has dual supply from both the main pulmonary artery and MAPCAs
- Completely absent: no native pulmonary arteries

MAPCA anatomy differs between patients in:
- Arterial source (descending aorta, ascending aorta, head and neck vessels, coronary arteries)
- Number of MAPCAs
- Pulmonary arteries: size and whether or not they are confluent

EVERY PATIENT’S MAPCA ANATOMY IS UNIQUE.

PALLIATIVE SURGERY OPTIONS

**RV-PA Conduit**
- Use: PA/VSD/MAPCAs + small PAs
- Result: Conduit from right ventricle (RV) to pulmonary artery (PA)
- Purpose: Promoting PA growth for future unifocalization

**Melbourne/Mee Shunt**
- Use: PA/VSD/MAPCAs + small PAs
- Result: Central-to-side shunt from the main PA to the aorta
- Purpose: Promoting PA growth for future unifocalization

Unifocalization
- Use: Multiple MAPCAs that are not connected to a main PA, but with adequate sized PAs
- Achieves: “Unifocalization” or surgical connection of vessels and MAPCAs centrally, effectively reconstructing the central pulmonary tree

Complete Correction
- Use: After any above steps or as a single surgery for less complex cases with adequate-sized PAs
- Achieves: central connection of pulmonary vessels, VSD closure, RV-PA conduit

KNOWLEDGE GAP

- No systematic reviews or meta-analyses that collate outcome data available across centres or internationally
- No objective comparison of surgical approach and outcomes
- All single centre studies
- No standard nomenclature to describe MAPCA anatomy

STUDY OBJECTIVES

To evaluate outcomes (i.e. preoperative, early, and late mortality; functional status; reintervention) in patients with PA/VSD/MAPCAs based on:

- Surgical approach
- Underlying MAPCA anatomy

METHODS

Meta-Analysis
- Protocol published on PROSPERO (CRD42021266361)
- Inclusion criteria: original research on patients with PA/VSD/MAPCAs, surgical approach, and outcomes (e.g. survival, functional status); any language
- Exclusion criteria: case reports with N<6, duplicate data sets, grey literature (not peer-reviewed)
- Search databases: 3 large international databases (Embase, Medline, Pubmed)
- Search Strategy: forward and backward snowballing technique until no new papers were resulted
- Analysis software: Covidence; two reviewers: SL, SU

NEXST STEPS

Data Extraction
- Compare outcomes (e.g. early and late mortality; reintervention; functional status) based on surgical approach and original underlying anatomy

Bias Assessment
- Formal bias assessment using Cochrane RoB tool for RCTs and ROBINS-I for non-randomized studies

FUTURE DIRECTIONS

Create a Canada-wide registry: to compare surgical approach and outcomes in PA/VSD/MAPCAs and assist in nomenclature standardization.

STUDY SIGNIFICANCE: THE BOTTOM LINE

- PA/VSD/MAPCAs is challenging to manage given variance in anatomy and surgical approach, as well as lack of standardized nomenclature.
- Our study will add: First comparison of international data on outcomes related to surgical approach and anatomy, as well as nomenclature suggestions.

ACKNOWLEDGEMENTS
We thank UBC librarian Dean Giustini for fielding search protocol questions.
Verbal autopsies to determine causes of death in young infants from Uganda

Muhammad Bilal Maqsood¹, Martina Knappett², Anneka Hoof², Douglas Mwesigwa³, Abner Tagoola³, Nathan Kenya Mugisha³, Elias Kumbakumba², Jerome Kabakyenga³, Pascal M Lavoie¹,², Matthew Wiens¹,³,⁵

¹Division of Neonatology, Department of Pediatrics, Faculty of Medicine, University of British Columbia, Vancouver, Canada; ²Center for International Child Health, British Columbia Children’s Hospital, Vancouver, Department of Pediatrics; ³University of San Francisco California, California, USA; ⁴Mbarara University of Science and Technology, Mbarara, Walimu, Kampala, Jinja Regional Referral Hospital, Jinja, Uganda; ⁵Department of Anesthesiology, Pharmacology and therapeutics, University of British Columbia, Vancouver, Canada

Background

Four million neonates die each year, mainly in low- and middle-income countries (LMICs). More than half of these deaths occur after discharge from hospitals (1,2). Diagnostic information is often extremely limited for most of these deaths (3). Ascertaining causes of deaths is important to guide strategic health planning and public health interventions (4).

Objective

To determine potential causes of post-hospital discharge mortality based on verbal autopsy (VA) reports among infants less than 3 months of age admitted with suspected sepsis.

Methods

Secondary analysis of a 6-site observational study in Uganda which enrolled 2707 infants under 6 months of age between May 2017 and March 2020.

A maximum follow-up period of 6 months post-discharge was considered. During the VA, health information and a description of events prior to death were acquired from conversations or interviews with a person or persons familiar with the deceased and analyzed by health professionals or computer algorithms to assign likely cause(s) of death.

The World Health Organization (WHO) VA instrument, with Start-Up Mortality List (ICD-10-SMoL) cause of death codes, was used to assign causes of deaths.

Cases were independently reviewed by 2 neonatologists (MBM and PML). Discordance was resolved by consensus.

Results

- Median age of infants on admission was 0.9 months (IQR=0.2-1.6).
- Median time between discharge and death was 0.2 months (IQR=0.2-1.2).
- Four (9.1%) infants were born premature.
- The frequency of assigned cause of death is shown in Figure 1.
- Reviewers were confident, somewhat confident and not confident about assigned cause of death, in 27.4%, 53.6% and 19.0% of cases, respectively.
- In about 4.5% cases, no specific diagnosis could be assigned.

Table 1. Confidence level in ascertaining cause of death diagnosis among the two reviewers, median[IQR]. Confidence Scale: 1 = Confident; 2 = Somewhat confident; 3 = Not confident.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepsis</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Other and unspecified congenital anomalies</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Other and unspecified conditions</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Malaria</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Other and unspecified conditions</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 1. Proportion of most common cause of death (%) with ICD-10-SMoL codes, N=42.

Figure 1. Proportion of most common cause of death (%) with ICD-10-SMoL codes, N=42.

Conclusion

These data shed light on the post-discharge mortality causes in young infants in Uganda. Infection may be a main cause of mortality after discharge from hospital in young infants with suspected sepsis. However, limited access to point-of-care confirmatory testing made the diagnosis uncertain in a high proportion of cases in this real-life community setting.

References

1. World Health Organization Fact sheets Newborns: improving survival and well-being (September 19, 2020)
Application of a digital point-of-care tool to assess patients with suspected beta-lactam allergies: a quality improvement initiative

Dr. Patrick R. Mckernan (1), Dr. Scott Cameron (1, 2, 3), Dr. Raymond Mak (2,3), Dr. Tiffany Wong (2,3)

Background

Beta-lactam allergies are commonly misdiagnosed in the pediatric population leading to negative outcomes including:

• use of inferior antibiotics
• increased rates of antibiotic resistance
• longer hospital stays and higher medical costs

This is a well documented problem, however, there is a lack of user-friendly tools to help healthcare providers identify and de-label low-risk patients.

Objectives:

• Create a digital point-of-care tool for clinicians to assess and remove false allergy labels for low risk patients
• Create a comprehensive educational resource designed for physicians and the general public
• Enhance collaboration between primary care providers and pediatric immunologists

Methodology

We led a multidisciplinary team in British Columbia to develop an app-based point-of-care tool with stakeholders from pediatrics, immunology, primary care, obstetrics and pharmacy. The tool’s algorithm is adapted from Canadian practice guidelines [4,5] on suspected beta-lactam allergy.

• Partnership formed with Firstline to map, program and launch beta algorithm for testing.

1st PDSA cycle: technical corrections and integration of testing feedback completed. Official launch of app.

• Launch of Drop the Label website

Timeline

Jan 2020- May 2021

• Weled a multidisciplinary team in British Columbia to develop an app-based point-of-care tool with stakeholders from pediatrics, immunology, primary care, obstetrics and pharmacy. The tool's algorithm is adapted from Canadian practice guidelines [4,5] on suspected beta-lactam allergy.

May 2021

• Partnership formed with Firstline to map, program and launch beta algorithm for testing.

July 2021

• 1st PDSA cycle: technical corrections and integration of testing feedback completed. Official launch of app.

Oct 2021- Jan 2022

• Launch of Drop the Label website

Results:

Algorithm Data: patients screened N= 247

Not Allergic

5% Determined to have a possible allergy based on symptoms and clinical course. Clinical recommendation: • Refer to allergist for formal evaluation

Possible Allergy

26% Determined to be non-allergic based on a history of tolerating subsequent exposures or avoiding due to having a history of a false allergy.

Clinical recommendation: • Can safely re-prescribe

Low Risk

95% Of patients screened had beta allergy label safely removed

Website Data:

1.5K total page views
1.1K unique visitors

• Clinical resources and de-labelling forms accessed by 250 users
• Health professional resources accessed by 290 users
• Public resources accessed by 148 users

Conclusion:

This mobile app is a practical and evidence-based tool to help assess and manage patients labeled with beta-lactam allergies. Our data is consistent with the published trends that true beta-lactam allergy is relatively rare in the pediatric population. It represents an important step in removing the barriers to de-labelling in busy clinical settings. More work is required to achieve widespread awareness and usage of this tool in various practice settings.


This mobile app is a practical and evidence-based tool to help assess and manage patients labeled with beta-lactam allergies. Our data is consistent with the published trends that true beta-lactam allergy is relatively rare in the pediatric population. It represents an important step in removing the barriers to de-labelling in busy clinical settings. More work is required to achieve widespread awareness and usage of this tool in various practice settings.

Clinical Approach to Febrile Urinary Tract Infections in Young Children Presenting to the Emergency Department: A Retrospective Study of Guideline Compliance

Frances Morin, MD, Neil Desai, MB Bch BA

Background

- Antimicrobial resistance (AMR) is among the greatest threats to global health (1).
- Inappropriate antibiotic use drives AMR (2).
- Suspected urinary tract infection (UTI) is a key area of over prescription (3).
- The most important risk factor for antimicrobial resistance is previous exposure to an antibiotic (4).
- Urine cultures obtained by bag are more likely to result in growth of non-pathogenic bacteria, which can result in unnecessary investigation, treatment and hospitalization (5).
- National guidelines by the Canadian Pediatric Society (CPS) exist for the identification and management of UTI in young children.
- Catheter or suprapubic aspirate samples should be obtained in non-toilet trained children.
- First febrile UTI warrants 7-10 days of treatment.

Methods

Inclusion criteria

- Age ≥ 60 d, ≤36 mo
- Discharged from BC Children’s ED
- Primary discharge diagnosis of UTI as defined by ICD-9 and 10 codes

Exclusion criteria

- Discharge diagnosis of alternative bacterial infection
- Classification of chronic complexity defined by ICD-9 and 10 codes
- Known genitourinary anomaly or chronic kidney disease
- Antibiotic exposure in the past 3 mo

Objective: compliance with national UTI management guidelines in a pediatric emergency department (ED) setting

Secondary objective: Describe patient, provider, and external factors associated with guideline noncompliance

Objectives

- To describe patient, provider, and external factors associated with guideline noncompliance.

Methods

Randomly selected 402 charts to review.

Demographics

- 145 (36%) male
- 257 (64%) female
- Male: 123
- Female: 279

Sex

- Male: 123
- Female: 279

Vomiting

- Yes: 109
- No: 201

Antibiotics

- Yes: 283
- No: 119

Fever

- Yes: 283
- No: 119

Table 1. Demographics

<table>
<thead>
<tr>
<th>Guideline category</th>
<th>N</th>
<th>% (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirmed UTI</td>
<td>204</td>
<td>51% (0.46-0.56)</td>
</tr>
<tr>
<td>Compliance agent</td>
<td>304</td>
<td>82% (0.78-0.86)</td>
</tr>
<tr>
<td>Compliance course duration</td>
<td>303</td>
<td>72% (0.67-0.77)</td>
</tr>
<tr>
<td>Compliance test</td>
<td>295</td>
<td>48% (0.43-0.53)</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>205</td>
<td>51% (0.46-0.56)</td>
</tr>
<tr>
<td>Compliance recall</td>
<td>34</td>
<td>9.5% (0.061-0.12)</td>
</tr>
</tbody>
</table>

Table 2. Guideline compliance with testing, treatment and recall

Results

Figure 1. Logistic Regression predicting catheterization with age

The model suggests there is reduction in catheterization as age increases (regression coefficient -0.104, p=6.47e-13) There is a significant interaction term between sex and age (regression coefficient 0.083, p=0.00292). Shading represents 95% confidence interval (-0.13 - 0.077).

Figure 2. Logistic Regression predicting compliant dosing with age

The model suggests that in children prescribed oral antibiotics, guideline compliance with respect to dose, duration and frequency of antibiotic course increases with age (regression coefficient 0.035, p=0.00073). Shading represents 95% confidence interval (0.015-0.056).

Primary outcome: Guide-line compliance trends

- Most clinicians in the emergency department prescribe compliant first like empiric antibiotics with cephalexin (82% CI 0.78-0.86) (table 2).
- Alternative choices included ceftriaxone (9% CI 0.068-0.12), cefixime (4% CI 0.027-0.067), amoxicillin (0.5% CI 0.0004-0.018), TMP-SMX (0.25% CI 0.0004-0.014), and other (2% CI 0.01-0.034).
- More than half of physicians (72% CI 0.67-0.77) are compliant with respect to guideline recommended antibiotic dose, duration and frequency (cephalexin 40-60mg/kg/d tid or Qid) (table 2).
- Among those who were non-compliant with respect to prescribing cephalexin, 73% (CI 0.62-0.81) of clinicians prescribe doses too high (20% greater than maximum dose).
- Less than half of clinicians were compliant ordered a compliant urine sample collection method, and less than 10% of antibiotics were adjusted appropriately upon return of culture results. (table 2)

Results

Demographics and clinical information

- Among 402 children with a discharge diagnosis of UTI, 92% (CI 0.89-0.94) received antibiotics (table 1).
- The majority of those presenting with UTI were female (69%, CI 0.65-0.74) with reported or documented fever ≥ 38°C (65% (0.60-0.70).

Secondary outcome: Trends associated with guideline compliance

- As age increases, compliance with age-appropriate urine collection method (catherization decreases). (fig. 1).
- This effect is more pronounced in females (fig. 1).
- As age increases, compliant dosing increases (fig. 2).

Limitations

- Retrospective data
- Generalizability
- Relies on provider documentation of patient information and clinical decision making

References


Acknowledgement

We acknowledge the help of Matthew Russell and Jade Zhong in the help of data collection. We would also like to thank Jeffrey Bone for his assistance in statistical analysis.
“It’s a nightmare!”: The lived parent experiences of children with severe neurodevelopmental disorders and behavioural complexity requiring sedation

Aaron Ooi MBChB, DipPaed, PGDipClinEd, FRACP1,2, Hayley Wroott BSc2,3 & Anamaria Richardson BSc, BEd, MD, FRPC2,3
1 Department of Neuropsychiatry, BC Children’s Hospital, 2 The University of British Columbia, 3Unceded land of the Sḵwx̱wú7mesh (Squamish), xʷməθkʷəy̓əm (Musqueam) and Səl̓ílwəta (Tsleil-Waututh) Nations

Background

• In a recent provincial survey1, 36/48 (75%) and 19/50 (38%) families of children with neurodevelopmental disorders (NDD) were unable to access assessments and investigations respectively, due to behavioural complexity (e.g. aggression and self-injury). This frequently necessitates examinations and investigations under anaesthesia (EUA).
• Service gaps in care coordination, resulting in missed opportunities, need for multiple sedations, increased trauma and iniquitous access to care have been identified by existing patient parent partnerships.
• This project is encompassed within a wider EUA Quality Improvement Initiative currently being undertaken at BCCH. A multi-pronged approach including a 1) Retrospective review of patient paper/electronic clinical records, 2) Parent interviews, 3) Health provider interviews and 4) Active observation of patient journeys has/will be utilized to establish the ‘current state’, which is largely unknown.

Aim

To describe the current lived parental experiences of children with NDD and behavioural complexity undergoing medical evaluation under anaesthesia at BCCH.

Methods

• Qualitative descriptive study with purposive sampling of participants. Trauma informed semi-structured interviews will be utilized to explore participants’ lived experiences. Data collection complete when thematic saturation achieved.
• An inductive thematic analysis will be performed to identify common themes, including facilitators/barriers experienced to inform future service development. Codes will be generated through a peer review process, facilitated by nVivo.

Preliminary Results

• Five interviews conducted. Characteristics of families: - Age range of child 7-17 years, (n=3), (n=2) - Locality: Surrey, Langley, Okanagan, Lumby, Victoria - Three emerging themes identified.

“X’s behaviour means that he doesn’t get proper care. It was two years ago… Ideally, he should be in every twelve months and have a check up. But the check ups have been increasingly impossible.”

Theme 1: Contributors to behavioural escalations

“Hi’s frustrated because he can’t communicate – a lot of behaviours that we’re seeing with him is all communication. He doesn’t understand so he fights you.”

“He has a non-verbal child, covering his ears and in distress… People still try to approach him. He’ll push you away, and they think ‘Oh he’s not getting me so I have to talk louder and in his face’… And that’s when I saw him smack the doctor in the face.”

Providers failing to recognize patient’s distress

Child unable to understand symptoms or need for medical evaluation

Difficulties with communication

Need to wait prior to procedure/appointment

Behavioral escalations

Theme 2: Facilitators & barriers of positive experiences when coordinating EUA

SYSTEMS

Lack an integrated system between community and hospital services

“The disconnect between offices, labs, procedures and operations centre… It doesn’t come together.”

Coordination of care dependent on parents already stretched in capacity

INSTITUTIONS

Flexibility and drive within departments to coordinate medical evaluations

Lack of communication between clinical specialties within institutions

“It took 10 hours of me phoning people to coordinate because I was dealing with two clinics, surgeons and people who organize it all. Can you guys please talk to each other?”

Lack of flexibility for patient centred care due to existing institutional protocols

“I have to keep approaching them but nobody is listening to you. These kids don’t understand what a wait is. They’re like, ‘This is the protocol we have to follow so you just have to wait.’

RESULTS being ‘lost’ within the system

PROVIDERS

Validation and understanding of parental concerns

“They have always listened, understood my concerns and they do not dismiss them.”

Flexibility in manner in which medical examinations are conducted

“I approached a clinic and checked with them if he’ll let us come at an earlier time. We didn’t have to go the waiting room and feel the crowd around us… an excellent experience this year.”

Direct and ongoing communication between providers to parents

Lack of holistic oversight

Lack of appreciation of behavioural complexity from healthcare providers

Patient

Administration of pre-sedation medications prior to procedure

Lack of child-centred and tailored approaches

“The best approach is just to take him, do it fast… try to prepare him, that’ll make him more anxious.”

Parents feeling dismissed or unheard as advocates for their child

“It feels helpless because I can’t make others understand… as a parent you start feeling like a failure.”

Theme 3: Trauma experienced by patients and parents when accessing care

Physical

Psychological

“For x-rays it took three people, myself and she was strapped… it’s traumatizing.”

“For me I go in there and hold him while he has the mask placed over… I don’t like it, but I will do it and cry afterwards if I have to. But my husband’s crying before that’s even happened. Emotionally it’s draining and stressful.”

“Just being in hospital… My son is getting more and more aggressive, scratching my husband and he is bleeding, I’m getting my hair pulled and we’re trying to wait for the sedation to actually kick in.”

“Anticipated future outcomes

• Development of a patient journey map amalgamating all four data sources to identify critical points for care coordination.
• Development of a patient-centred ‘behaviour checklist and plan’ tailored towards child’s sensory, communication and developmental needs to optimize peri-operative care.
• Consultation with stakeholders within EUA Project Group at BCCH to develop 1) A centralized intake process and 2) Implementation of an EUA algorithm to streamline coordination between services, improve quality of care and reduce the trauma experienced by patients and families.

References & Correspondence

Correspondence to: Dr Aaron Ooi, aaron.ooi@cw.bc.ca

“Listen to the parents, they’re trying to advocate for the person who can’t talk for themselves… Try to understand where they’re coming from, what they’re dealing with and a smile and acknowledgement goes a long way…”
The SPRING Study: Severe acute respiratory syndrome-related coronavirus 2 prevalence in children and young adults in British Columbia: an observational study

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1) Define asymptomatic and anti-SARS-CoV-2 IgG antibodies age in BC based on presence of serum
2) Define asymptomatic and symptomtic infection rates to support predictive modelling in BC and Canada

Introduction
- Pediatric COVID-19 cases are generally less severe than in adults with a varying proportion
considered asymptomatic
- Differences in clinical presentation complicate estimates of disease burden by age based
solely on reported surveillance data

This study aims to:
1) Estimate age- and sex-specific prevalence of SARS-CoV-2 infection in children and young adults <25 years of age in BC based on presence of serum anti-SARS-CoV-2 IgG antibodies
2) Define asymptomatic and symptomtic infection rates to support predictive modelling in BC and Canada

Methods
- Electronic survey conducted using REDCap
- Mailed a kit to provide a self-collected finger or heel prick dried blood spot sample
- Assays conducted at the provincial reference laboratory at the BCCDC

Demographics
Phase 1
- 2535 participants enrolled; 2129 samples sufficient to analyse
- Gender: Female 56.5%; Male 43.5%
- 83% had no underlying health conditions
- Ethnicity: white 84%, Chinese 4%, South Asian 3%, Mixed 14%, Unknown 17%
- Geographic distribution: VCHA 33.7%, Fraser 26.3%, Interior 6.2%, Northern 2.3%, Island 8.8%

Phase 2
- 2040 participants enrolled
- Analysed 933 participants ages 0-9yo

Phase 1 Exposure Sources
- 89% of participants reported no known COVID-19 exposures

Figure 1: Exposure Sources (if known)

Phase 1 Seroprevalence
- Overall, 6.29% of participants <10yo were seropositive (Table 2)

Phase 2
- Overall, 6.29% of participants <10yo were seropositive
- In comparison: BCCDC data from April 3, 2021, showed approx. 1% of children under 10yo were seropositive (Table 2)

Table 1: Seroprevalence by age

<table>
<thead>
<tr>
<th>Age</th>
<th>Phase 1 Seroprevalence (95% CI)</th>
<th>Phase 2 Seroprevalence (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4</td>
<td>3.17% (1.78, 5.59)</td>
<td>7.65% (4.52, 12.64)</td>
</tr>
<tr>
<td>5 - 9</td>
<td>4.09% (2.57, 6.45)</td>
<td>5.72% (3.84, 8.44)</td>
</tr>
<tr>
<td>10 - 14</td>
<td>3.24% (1.97, 5.28)</td>
<td></td>
</tr>
<tr>
<td>15 - 19</td>
<td>3.84% (2.44, 5.98)</td>
<td></td>
</tr>
<tr>
<td>20 - 24</td>
<td>7.22% (5.21, 9.92)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Comparison of study and BCCDC data

<table>
<thead>
<tr>
<th></th>
<th>SPRING: 9-9yo</th>
<th>BCCDC: Apr 3, 2021: &lt;10 yo</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPRING: 9-9yo</td>
<td>4.09% (2.57, 6.45)</td>
<td>1.0% (0.35, 10.3)</td>
</tr>
<tr>
<td>BCCDC: Apr 3, 2021: &lt;10 yo</td>
<td>1.0% (0.6, 1.6)</td>
<td>7.14 (1.27, 31.47)</td>
</tr>
</tbody>
</table>

Discussion
- Higher seropositivity in study data compared to provincially reported data
- High seropositivity amongst young adults, certain ethnicities in Phase 1 compared to other age groups

Limitations
- Sample is disproportionately white; numbers in some ethnic groups are relatively small
- May have unintended selection bias in who volunteered to participate in the study
- Over-representation of VCHA and FHA (69-78% of participants vs. 63% of BC population)
- Children & youth living in the north and identifying as Indigenous not adequately represented in cohort


Acronyms: BC Centre for Disease Control (BCCDC) Fraser Health Authority (FHA); Interior Health Authority (IHA); Northern Health Authority (NHA); Vancouver Coastal Health Authority (VCHA); Vancouver Island Health Authority (VIHA)

Funding: Michael Smith Health Research BC; Public Health Agency of Canada COVID-19 Immunity Taskforce

Table 3: Seroprevalence by health authority

<table>
<thead>
<tr>
<th>Health Authority</th>
<th>Phase 1 Seroprevalence (95% CI)</th>
<th>Phase 2 Seroprevalence (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHA</td>
<td>5.85% (4.2, 8.1)</td>
<td>7.78 (4.61, 12.86)</td>
</tr>
<tr>
<td>IHA</td>
<td>2.92% (1.14, 7.27)</td>
<td>4.44 (1.23, 14.83)</td>
</tr>
<tr>
<td>NHA</td>
<td>1.96% (0.35, 10.3)</td>
<td>7.14 (1.27, 31.47)</td>
</tr>
<tr>
<td>Unknown</td>
<td>3.55% (2.23, 5.61)</td>
<td>7.36 (4.26, 12.43)</td>
</tr>
<tr>
<td>VCHA</td>
<td>4.22% (2.99, 5.92)</td>
<td>4.17 (1.72, 8.79)</td>
</tr>
<tr>
<td>VIHA</td>
<td>4.5% (2.39, 8.33)</td>
<td>5.13 (1.42, 16.89)</td>
</tr>
</tbody>
</table>
Early onset hyponatremia in extremely preterm infants - results of interim analysis

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INTRODUCTION

• Serum Sodium [Na] is a frequently ordered investigation in the NICU and premature infants are vulnerable to hyponatremia.
• Hyponatremia can be striking in the first few days of life and can result in rapidly changing osmolality within fluid compartments which can result in cellular dysfunction and irreversible cell damage evident by increased short term and long term adverse neonatal outcomes.

OBJECTIVE

Primary Objective: To find the prevalence of hyponatremia in extremely preterm infants in the first 14 days of life.

Secondary Objectives:
1. To find the association between hyponatremia and fluid intake/sodium intake.
2. To explore the investigations done and treatment course chosen for hyponatremia in the first 14 days of life

METHODS

• Single center (British Columbia Women’s Hospital NICU, Vancouver) 2-years retrospective study (Jan 2018 – Dec 2019)

Inclusion Criteria
GA <28 weeks
Admitted to BC Women’s NICU

Exclusion Criteria
• Infants who spent majority of their first 14 days of life in a different hospital.
• Infants undergoing surgery for Congenital Diaphragmatic Hernia (CDH), Tracheo-Esophageal Fistula (TEF), Gastrochisis, Omphalocele, Open Neural Tube defects and infants with Hypoxic Ischemic Encephalopathy (HIE).

n= 38. Ongoing data collection for a total n=100

RESULTS

Table 1: Rates of hyponatremia after controlling for repeated measures

<table>
<thead>
<tr>
<th>Rate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na &lt;135 mmol/L</td>
<td>27.8%</td>
</tr>
</tbody>
</table>

Figure 1: Percent of hyponatremia by day controlling for repeated measures

Table 2: Investigations and Treatment after Hyponatremia

<table>
<thead>
<tr>
<th>Investigations</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeat Na</td>
<td>Serum Creatinine</td>
</tr>
<tr>
<td>Change in total fluid intake</td>
<td>Change in sodium intake</td>
</tr>
</tbody>
</table>

• There was a significant relationship between total fluid intake(TFI) and odds of hyponatremia (OR=1.36, 95%CI=1.16 to 1.58, p<0.001).
• Significant relationship was noted between total sodium intake and hyponatremia (OR=1.39, 95%CI=1.18 to 1.68, p<0.001).

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CONCLUSIONS

• Early onset hyponatremia is very common in extremely preterm neonates but under-investigated in terms of cause and associated conditions like natriuresis.
• Increase in fluid and Na intake are both associated with increased odds of hyponatremia.
• Prospective studies in future can be designed to incorporate urine analysis, electrolytes and paired osmolality with serum to establish the cause of hyponatremia
• We should consider addressing fluid intake to prevent hyponatremia, as sodium supplementation does not appear to be helpful.
INTRODUCTION

The Royal College of Physicians and Surgeons has identified the approach to patient safety incidents and quality improvement projects as key competencies for Pediatricians. However, current residency trainees are not consistently formally evaluated in these entrustable professional activities.

Given the ongoing transition to competency-based evaluations and promotions, achieving these skills as entrustable professional activities will be necessary to achieve competency in this discipline.

Seeing as the PHSA has made continuous quality improvement a strategic priority, and as BC Children's Hospital is one of the largest training sites in Canada for Pediatrics residency, it is crucial to create a culture where such learnings and skill development are encouraged across all trainees.

Creating a program by which Pediatricians in training are encouraged to develop skills in approaching and analyzing patient safety incidents as well as leading quality improvement projects will generate a group of new Pediatricians who are leaders in the continuous improvement of Pediatric care.

METHODS

We will begin by conducting a survey of current patient safety teaching and direct observations. The first phase of this project will focus on analyzing patient safety incidents in the inpatient setting.

We hope to achieve this by leading monthly coaching sessions to help develop skills related to patient safety incident analysis for CTU-based senior and consult residents using the Canadian Incident Analysis Framework. Subsequently, each coached trainee will undergo a direct observation, to provide constructive feedback on their skills in addressing this specific milestone in the approach to patient safety incidents.

OBJECTIVES

Our aim is to increase the amount of patient safety teaching on the clinical teaching unit, as well as the number of direct observations and evaluations on patient safety and quality improvement skills for Pediatrics residents to a minimum of one for each senior trainee (PGY3 and 4).

SURVEY

Survey directed to senior trainees to assess the amount and type of patient safety teaching received, the amount of feedback given on these skills, as well as their learning needs.

WORKSHOP

Learning module created using the concepts from the Canadian Incident Analysis Framework for senior residents to work through patient safety incidents in a concise manner.

CHECKLIST

Checklist created for the observation and evaluation of these skills in pediatric residents, modeled off of the framework components and the entrustable professional activity key milestones.

NEXT STEPS

Learning sessions and feedback to begin in the next blocks, with monitoring thereafter of the amount of patient safety teaching provided as well as the number of direct observations completed, modeled on the assessment form above.

References

Juvenile Idiopathic Arthritis (JIA) is a heterogeneous collection of at least 7 disease categories as defined by the current ILAR classification [1]. Genetic factors result in certain ethnic groups having a greater predisposition to JIA in general and to certain JIA categories in particular. Ethnicity includes a shared genetic heritage, but also a shared language and cultural practices [2].

Canada’s free universal healthcare system and the extensive network of pediatric rheumatology centres that have collected information in ~1500 children with JIA in the ReACCh-Out cohort provide a unique opportunity to analyze how ethnicity and geographic region interact to determine the initial presentation of JIA and time to care.

**Objective**

To investigate the interplay of ethnicity and geographic region as modifiers of disease activity at presentation, time from onset to diagnosis, and the distribution of JIA disease categories.

**Methods**

- 1479 participants in the Research in Arthritis in Canadian Children emphasizing Outcomes (ReACCh-Out) cohort study (children newly diagnosed with JIA 2005-2010).
- Compared the relative proportion of JIA categories, weeks from first symptom onset to diagnosis and mean clinical Juvenile Arthritis Disease Activity Scores (cJADAS10, range from 0-30, including up to 10 active joints) across geographic regions and self-identified ethnic groups.
- Regions: British Columbia (BC), Prairies (Alberta, Saskatchewan, Manitoba), Ontario, Quebec, and Maritimes (New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador).
- Ethnicity analyzed per Statistics Canada groupings.
- We used chi-square tests and Kruskal-Wallis tests to identify statistically significant differences with a P<0.05.

**Results**

There were significant differences in JIA categories across Canadian regions (p<0.001) oligoarthritis was most frequent in Quebec (51.4%) and least frequent in the Maritimes (27.6%); enthesitis related arthritis most frequent in BC (19.1%) and least frequent in Quebec (10.9%) (Figure 1).

Participants who self-identified solely as French had a different distribution of JIA categories relative to those self-identified solely as British.

Participants who self-identified solely as Indigenous had the highest frequency of RF-positive polyarthritis (21.2%) of all ethnic groups.

There were significant regional differences in time from symptom onset to diagnosis (p = 0.01), from a mean of 36.7 weeks in Quebec, to a mean of 44.5 weeks in the Maritimes; and from 24.9 weeks among participants self-identified solely as South Asian, to 93.4 weeks among participants self-identified solely as Latin American. Participants who self-identified solely as Indigenous had an average of 25.9 weeks from symptom onset to diagnosis.

The mean cJADAS10 score varied from 7.3 in Quebec, to 10 in the Maritimes; and from 5.9 in participants who self-identified solely as Latin American, to 11.7 in those self-identified solely as Indigenous. There were also significant differences in cJADAS10 scores across JIA categories (p<0.001), with a mean of 5.4 in oligoarthritis and 16.3 in polyarthritis RF-positive.

In this cohort, children with JIA across Canada had substantial differences in the distribution of JIA categories, time from onset to diagnosis and disease activity at presentation across Canadian regions and self-identified ethnicities. These differences should be accounted for in any comparisons of JIA treatments and outcomes across the country.

**References**


**Figure 1. Comparison of characteristics at presentation to care of children with juvenile arthritis in 5 Canadian regions**