2022 VIRTUAL CELEBRATE RESEARCH DAY

PRESENTATIONS

RESIDENT ORAL COMPETITION CATEGORY
Development of Evidence-Based Bronchiolitis Management Tools: HFNC use in Bronchiolitis, and a Gap Analysis of Current Bronchiolitis Management

Dr. Megan Cox  
PGY-3 Pediatrics, University of British Columbia

Dr. Claire Seaton  
Department of Pediatrics, BC Children’s Hospital, University of British Columbia

Lynn MacIsaac  
Professional Practice Lead Respiratory Therapy, BC Children’s Hospital
Background

Evidence:
• Minimal guidance on HFNC in bronchiolitis
• Increase in HFNC in ED & wards, locally & broadly
• Variation in initiation, weaning

Covid-19 Pandemic:
• AGMP & provider safety
• Less bronchiolitis → Less provider confidence in management
• Verbally expressed desire for Provincial bronchiolitis guidelines
Number of patients admitted to BCCH receiving HFNC

- PICU
- ED
- Ward
- Total

HFNC permitted on wards

Season:
- Dec 2015-Mar 2016
- Dec 2016-Mar 2017
- Dec 2017-Mar 2018
- Dec 2018-Mar 2019

Number of patients
Evidence

Efficacy:
• **Does** decrease PICU admissions & PPV, *when used as a rescue* from failing LFNP
• **Conflicting** evidence on rate of ICU admissions and PPV between HFNC vs. LFNP
• **Does not** affect length of stay, intubation rate, duration of therapy

Potential for harm:
• Up to 16x more expensive than standard therapy
• AGMP with implications for COVID-19 transmission & PPE use
Aims:

1. Provide an evidence-based guideline for the use of HFNC in low-risk infants 29 days to 1 year with bronchiolitis admitted to secondary or tertiary care centres.

2. Assess the needs of provincial pediatric care providers to inform the development of a comprehensive provincial bronchiolitis care pathway.
HFNC Guideline:

Guideline development:
- Evidence based guideline with expert review
- Review by Provincial Stakeholders

Implementation:
- Published to SHOP
- Provider education – Residents, RN’s, RT’s
Guideline
HFNC Guideline:

Expansion:
- Choosing Wisely Canada
- Inclusion in Provincial webinars, Child Health BC respiratory resources document

Evaluation:
- Initially on hold [226 → 31 bronchiolitis admissions]
- Participation in multi-centre VIP/AAP study
Bronchiolitis Gap Analysis:

**Development & Distribution:**
- 15 question survey distributed to 15 sites across BC
- Based on CPS & Choosing Wisely principles
- Distribution kindly facilitated by provincial stakeholder

**Demographics:**
- 78 responses across 4 health authorities
- Responses from RN, MD, RT, and PCC's
Bronchiolitis Gap Analysis:

Results:
- 17% had pathway, 30% unsure
- 78% agreed their practice would benefit from a bronchiolitis care pathway
- 82% capable of providing HFNC
- 3/6 Health Authorities have general HFNC protocols
Current Barriers to Care:

- "Consistency among physicians is a must"
- "Pediatricians have different criteria for oxygen sats or discharge"
- "Low threshold to transfer to HLOC"
- "Limited pediatric beds"
- "Limited number of HHFC machines"
- "New to unit"
- "Not have much experience with high flow O2 therapy in infants and children"
- "Confuse with bronchospasm and/or pneumonia"
- "Adult-trained staff"
- "Staff is not comfortable … sees new-born/infants quite infrequently"
- "We see so little bronchiolitis"
- "We don’t see many pediatric patients in our department"
- "Infrequent exposure"
- "Discomfort diagnosing & treating"
- "Access to equipment & appropriate LOC"
- "Provider-to-provider variation"
- "We see so little bronchiolitis"
- "We don’t see many pediatric patients in our department"
Proposed Barriers to Guideline Implementation

**Staffing**
- Insufficient resources to keep in house
- Changes to staffing ratios
- Need for more education
- RT, RN workloads & numbers
- Roll-out responsibility

**Equipment**
- Limited number HFNC machines
- Limited monitoring
- Only RT's familiar with HFNC machines

**Institution**
- Community vs. tertiary
- Pre-existing local pathways
- Institution requirements for publishing
- Unable to admit children

- Factors to be considered in creation of pathway
- Supports a comprehensive guideline including community & tertiary scenarios
- “Having a pathway is different than using one”
Next Steps:

HFNC Guideline:
• Continue to be part of multi-centre study
• Centre-specific and overall results pending over next 1-2 years

Bronchiolitis Care Pathway:
• Summary to be reported back to Provincial stakeholders
• Advocate for support in developing comprehensive bronchiolitis care pathway
EVALUATING THE IMPACT OF POINT OF CARE TESTING IN THE EMERGENCY DEPARTMENT FOR GROUP A STREPTOCOCCAL PHARYNGITIS ON CLINICAL OUTCOMES AND RESOURCE UTILIZATION:

A Randomized Controlled Trial

Carson Gill, Clement Chui, David Goldfarb, Garth Meckler, Quynh Doan

April 8, 2022
Disclosures

No conflicts of interest

Point of care testing kits supplied by Abbott Diagnostics

Funding source: Evidence to Innovation Grant
BC Children’s Hospital Research Institute
Background

- Pharyngitis is common
- Group A Strep (GAS) causes 15-40% cases
- Throat culture = diagnostic standard
- Point of care (POC) molecular testing now available
- Antibiotic treatment shown to prevent suppurative complications and acute rheumatic fever
- Earlier treatment may result in clinical improvements and reduce antibiotic overuse
Standard of Care: Throat Culture

- Patient presents with symptoms.
- Throat culture performed.
- Results available in approximately 48 hours.
- GAS +: GAS Pharyngitis.
- No growth: Viral Pharyngitis.

Rx paper document and home icon.
Point of Care (POC): Molecular Testing

~15 minutes

GAS -
Viral Pharyngitis

GAS +

GAS Pharyngitis
Research Aim

To compare point of care (POC) testing to the current standard of care (throat culture) for children ages 3-17 years presenting to the emergency department (PED) for suspected GAS pharyngitis with regards to symptom resolution and resource utilization.
Methods

- Ages 3-17 years
- Throat pain +/- fever
- Clinician to collect throat swab for suspected GAS pharyngitis

- No throat swab required
- Prior swab/antibiotics for current illness
- Cardiac or respiratory disease
- Previously enrolled in study
- Unable to consent or assent

Culture

POC

7 Day Follow-Up
Study Objectives & Outcome Measures

1º Objective:
- Compare clinical improvement

Measures:
- Time to throat pain resolution
- Time to fever resolution

2º Objective:
- Compare resource utilization

Measures:
- Return visits to care
- Missed school days
- Missed workdays
- Length of stay

Exploratory Outcomes:
- Appropriate antibiotic use
- Cost estimates
  - Tests
  - Clinician time
  - Workdays missed
  - Ancillary testing
705 screened in ED

227 randomized

478 excluded
- Ineligible (n = 410)
- Declined (n = 39)
- Missed (n = 29)

115 Culture
- Lost to follow-up (n = 11)
  Partial completion (n = 9)

112 POC
- 8 Indeterminate tests
- Lost to follow-up (n = 8)
  Partial completion (n = 10)
# Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>Culture</th>
<th>POC</th>
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</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>115</td>
<td>112</td>
</tr>
<tr>
<td><strong>Patient Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age in years (SD)</td>
<td>7.8 (3.7)</td>
<td>8.1 (3.7)</td>
</tr>
<tr>
<td>3-5 years</td>
<td>37</td>
<td>36</td>
</tr>
<tr>
<td>6-11 years</td>
<td>56</td>
<td>54</td>
</tr>
<tr>
<td>12-17 years</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Sex = female (%)</td>
<td>56 (49%)</td>
<td>47 (42%)</td>
</tr>
<tr>
<td><strong>Clinical Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median pain score at presentation</td>
<td>4/10</td>
<td>4/10</td>
</tr>
<tr>
<td>Median McIsaac score at presentation</td>
<td>3/5</td>
<td>3/5</td>
</tr>
<tr>
<td>Proportion with fever at presentation [95% CI]</td>
<td>0.66 [0.57-0.74]</td>
<td>0.71 [0.62-0.79]</td>
</tr>
<tr>
<td>Proportion of positive test results [95% CI]</td>
<td>0.30 [0.22-0.38]</td>
<td>0.25 [0.18-0.34]</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th></th>
<th>Culture</th>
<th>POC</th>
<th>p-value</th>
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<tbody>
<tr>
<td><strong>N</strong></td>
<td>115</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td><strong>Clinical Improvement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean days to throat pain resolution (SD)</td>
<td>3.9 (2.5)</td>
<td>3.9 (2.2)</td>
<td>0.940</td>
</tr>
<tr>
<td>Mean days to fever resolution (SD)*</td>
<td>2.2 (1.5)</td>
<td>1.9 (1.4)</td>
<td>0.150</td>
</tr>
<tr>
<td><strong>Resource Utilization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of return visits to care [95% CI]</td>
<td>0.30 [0.21-0.38]</td>
<td>0.25 [0.17-0.33]</td>
<td>0.410</td>
</tr>
<tr>
<td>Mean length of stay in minutes in ED (SD)</td>
<td>242 (118)</td>
<td>249 (121)</td>
<td>0.728</td>
</tr>
<tr>
<td>Mean days of school missed (SD)</td>
<td>1.9 (1.9)</td>
<td>1.7 (1.7)</td>
<td>0.752</td>
</tr>
<tr>
<td>Mean days of work missed (SD)</td>
<td>1.4 (1.9)</td>
<td>1.2 (1.7)</td>
<td>0.298</td>
</tr>
</tbody>
</table>

*If participant had fever on initial presentation in ED. Culture (N=76); POC (N=79)
### Results for Positive Tests (Sub-analysis)

<table>
<thead>
<tr>
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<th>Culture +</th>
<th>POC +</th>
<th>p-value</th>
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<tr>
<td><strong>N</strong></td>
<td>34/115 (29.6%)</td>
<td>28/112 (25.0%)</td>
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<tr>
<td><strong>Clinical Improvement</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mean days to throat pain resolution (SD)</td>
<td>3.7 (2.21)</td>
<td>3.8 (2.38)</td>
<td>0.903</td>
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<tr>
<td>Mean days to fever resolution (SD)*</td>
<td>2.0 (1.1)</td>
<td>1.5 (0.7)</td>
<td>0.056</td>
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<tr>
<td><strong>Resource Utilization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean days of school missed (SD)</td>
<td>2.1 (1.65)</td>
<td>1.6 (1.50)</td>
<td>0.224</td>
</tr>
<tr>
<td>Mean days of work missed (SD)</td>
<td>1.3 (1.62)</td>
<td>0.9 (1.30)</td>
<td>0.303</td>
</tr>
</tbody>
</table>

*If participant had fever on initial presentation in ED. Culture (N=28); POC (N=19)
Exploratory Outcomes

Stay tuned...

- Appropriate antibiotic use
- Cost estimates
  - Tests
  - Clinician time
  - Workdays missed
  - Ancillary testing
Limitations

Internal Validity:
- Non-blinded
- Self-reporting

External Validity:
- Conducted both prior and during pandemic setting
- Single centre
Conclusions

Earlier treatment for GAS pharyngitis with POC testing did not result in a significant improvement in symptom resolution or resource utilization compared with the current standard of care.

Anecdotal evidence for utility and feasibility of POC testing program at BCCH.
Future Directions

• Complete exploratory outcome analyses
• Multicenter RCT
• Evaluate societal impacts of POC diagnostic tests in future studies given the challenge of managing febrile respiratory infections amidst the COVID-19 pandemic
Acknowledgements

Dr. Quynh Doan
Dr. David Goldfarb
Dr. Garth Meckler
Clement Chui
Karly Stillwell
Greg Georgio
RA team
ED leadership & staff
Dr. Kate Maki

BCCHRI: Evidence to Innovation grant funding
References


## McIsaac Score

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<th>Criteria</th>
<th>Points</th>
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<tbody>
<tr>
<td>Temperature $&gt;38^\circ$ C</td>
<td>1</td>
</tr>
<tr>
<td>Absence of Cough</td>
<td>1</td>
</tr>
<tr>
<td>Swollen, Tender Anterior Cervical Nodes</td>
<td>1</td>
</tr>
<tr>
<td>Tonsillar Swelling or Exudate</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>3-14 Years</td>
<td>1</td>
</tr>
<tr>
<td>15-44 Years</td>
<td>0</td>
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<tr>
<td>45 Years or Older</td>
<td>-1</td>
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</tbody>
</table>
THE USE OF VIRTUAL SIMULATION TO SUPPORT RESIDENT LEARNING DURING THE COVID-19 PANDEMIC

Alex Gustafson
PGY-4, Pediatrics
Celebrate Research Day
April 8th, 2022
Simulation is a critical component of medical education, providing hands-on experience for high acuity, low frequency patient encounters.

UBC Pediatrics has a well-established simulation program.

The COVID-19 pandemic gave rise to challenges in the delivery of in-person simulation opportunities.

To facilitate learning while adhering to public health guidelines, simulations were livestreamed to allow ongoing trainee participation.
AIMS

• To evaluate the resident experience participating in virtual simulation
• To understand what aspects of virtual simulation were most valuable
• With resident feedback, improve virtual simulation delivery both during the pandemic and on an ongoing basis to distributed sites
METHODS

• REDCap based survey distributed via email
• All residents who had participated in virtual simulations from July 2021 through December 2021 were invited to participate
• 73 pediatrics residents were contacted
• BCCH site and distributed learning centres, PGY-1 through PGY-4
• Descriptive statistics were used to analyze responses and free-text questions provided additional details and context
• Survey response rate was 42.4%
• 80.6% of participants had attended simulation virtually
• 96.8% had participated in simulation with another learner attending virtually.
• 54.8% of participants attended site wide mock codes, and
• 64.5% attended academic half day simulation sessions virtually
RESULTS

- 91% of participants had a positive experience with virtual simulation.
- 91% agreed that virtual livestreaming increased their opportunities to participate in simulation.
Virtual sim was able to deliver some of the primary learning objectives of simulation.
90% would like to continue to have the opportunity to participate in simulation virtually beyond the pandemic.
RESULTS

- **Positives:**
  - Enabled a more complete perspective of the scenario by observing from above
  - Enabled better attendance at the clinical teaching provided in the debrief

- **Areas for improvement:**
  - Difficulty hearing all team members during the sim, particularly in larger, site-wide mock codes
  - Virtual attendees found it difficult to actively participate/contribute during debriefs
CONCLUSION

• Virtual livestreaming simulation increased attendance opportunities for pediatrics residents.

• Virtual attendance was well received and viewed as a valuable educational experience.

• Virtual simulation has the potential to reach residents at distributed sites and residents not on CTU (for site-wide mock codes).

• There are technical aspects that have been identified that would further improve this learning opportunity.

• Future research is needed to determine the efficacy of virtual simulation in achieving the core skill objectives of the simulation curriculum.
ACKNOWLEDGEMENTS

• Mia Remington, project mentor
• The UBC Pediatrics Residents
• BC Children’s and Women’s staff participating in mock codes during the pandemic
Regional Variance in Childhood Nephrotic Syndrome Outcomes in British Columbia

Laura Kim, Marisa Catapang, Nonnie Polderman, Cherry Mammen, Robert Humphreys, Eleonora Jugnauth, Douglas Matsell

Division of Nephrology, BC Children’s Hospital, Vancouver
Background
Nephrotic Syndrome

- One of the most common pediatric renal diseases
- 2–7 per 100,000 children
Induction prednisone dosing for childhood nephrotic syndrome: how low should we go?

Matthew Sibley⁴ · Abishek Roshan⁴ · Alanoud Alshami⁴ · Marisa Catapang⁴ · Jasper J. Jöbsis⁴ · Trevor Kwok⁴ · Nonnie Polderman⁴ · Jennifer Sibley⁴ · Douglas G. Matsell⁴ · Cherry Mammen⁵,6 · on behalf of the Pediatric Nephrology Clinical Pathway Development Team

Fig. 2 Distribution of cumulative induction prednisone dose. This histogram reveals a normal distribution of cumulative induction prednisone dosing (mg/m²) in the study cohort treated in BC, Canada from 1990 to 2012. The solid vertical line (2546 mg/m²) represents the median prednisone dosing while the dotted vertical lines represent the first and third quartile dosing thresholds (2040 and 3091 mg/m² respectively)
Clinical Pathway

- Childhood Nephrotic Syndrome Clinical Pathway developed by BCCH in 2013
  - Structured
  - Evidence-based
  - Prescriptive care plan
- Goals:
  - Standardize management of kids with NS across BC
## Scheduled Visits during Year 1

<table>
<thead>
<tr>
<th>TEST/REVIEW</th>
<th>0 w*</th>
<th>4 w</th>
<th>6 w**</th>
<th>12 w</th>
<th>6 m</th>
<th>9 m</th>
<th>12 m</th>
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<tbody>
<tr>
<td>• Document date and time to remission</td>
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<tr>
<td>• Record growth (height, weight)</td>
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<tr>
<td>• Check for swelling</td>
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<tr>
<td>• Other signs of prednisone side effects (eyes, bone, skin)</td>
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<tr>
<td><strong>Lab testing</strong></td>
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<tr>
<td>• Urinalysis, microscopy, and PCR</td>
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*No regular blood testing needed*
Regional Care

Prince George

Kelowna

Surrey
Objectives
Objectives

- To assess clinical characteristics & outcomes of children with NS at BCCH vs. at regional sites
  - Were demographics comparable?
  - What was their induction prednisone exposure?
  - What were their relapse rates?
  - Did they receive pathway-recommended care?
Methods
Study Design

- Retrospective Cohort Study
  - Children with NS treated at BCCH or a regional clinic
- Eligibility:
  - **Inclusion**: 1-17 year olds, new onset idiopathic NS from 2013-2019, at least 1 year of follow up
  - **Exclusion**: secondary causes of NS, steroid resistance, incomplete induction due to early relapse, < 6 months pathway exposure
Study Design

- Data collection from BC Children’s charts and private clinic EMR (Accuro)

- Patients were classified as BCCH vs. Regional Clinic (Surrey, Prince George, or Kelowna)
Study Design

- Annualized Relapse Rate:
  - Adjustment of total number of relapses over first 2 years from when induction prednisone was started, or until an SSA was started (whichever soonerest)
Study Design - Prednisone Exposure

“Long Induction”  
4095 mg/m²

“Short Induction”  
3360 mg/m²
Data analysis was completed using descriptive statistics, two-tailed t-tests, Chi-square test, comparison of medians, or Fisher’s exact tests as appropriate.
Results
Identification of Patients

BCCH Clinical Database
(includes Surrey & Prince George)
$n=136$

Kelowna Clinical Database
$n=15$

Total
$n=151$

Ineligible
Limited information ($n=1$)
Most of first year follow-up outside our center ($n=15$)
Diagnosis made outside BC ($n=14$)
Secondary NS ($n=3$)
$n=33$

Total Cases with Idiopathic NS
$n=118$

Excluded
Relapse during induction ($n=18$)
Steroid resistance ($n=17$)
Non-Minimal Change Disease ($n=14$)
$n=49$

Cases eligible for audit
$n=69$
### Patient Demographics

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Number of patients</td>
<td>69</td>
</tr>
<tr>
<td>Sex female (%)</td>
<td>25 (36)</td>
</tr>
<tr>
<td>Median age at presentation in years (IQR)</td>
<td>5.0 (5)</td>
</tr>
<tr>
<td>Admitted at presentation (%)</td>
<td>35 (51)</td>
</tr>
<tr>
<td>Primary clinic location (%)</td>
<td></td>
</tr>
<tr>
<td>BC Children’s Hospital</td>
<td>52 (75)</td>
</tr>
<tr>
<td>Surrey</td>
<td>8 (12)</td>
</tr>
<tr>
<td>Prince George</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Kelowna</td>
<td>7 (10)</td>
</tr>
<tr>
<td>Frequently relapsing course (%)</td>
<td>30 (44)</td>
</tr>
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## Characteristics at Initial Presentation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>BCCH clinic (52)</th>
<th>Regional clinics (17)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (female)</td>
<td>19/52 (37)</td>
<td>6/17 (35)</td>
<td>0.926</td>
</tr>
<tr>
<td>Age at presentation in years</td>
<td>5.1 (6)</td>
<td>4.7 (4)</td>
<td>0.624</td>
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<tr>
<td>Physician at presentation</td>
<td></td>
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<tr>
<td>Emergency physician</td>
<td>46/52 (89)</td>
<td>15/17 (88)</td>
<td>0.980</td>
</tr>
<tr>
<td>Pediatrician</td>
<td>4/52 (8)</td>
<td>1/17 (6)</td>
<td>0.980</td>
</tr>
<tr>
<td>Family doctor</td>
<td>1/52 (2)</td>
<td>1/17 (6)</td>
<td>0.980</td>
</tr>
<tr>
<td>Nephrologist</td>
<td>1/52 (2)</td>
<td>0/17 (0)</td>
<td>0.980</td>
</tr>
<tr>
<td>Days to contact with nephrology</td>
<td>1.5 ± 5.1</td>
<td>0.6 ± 0.9</td>
<td>0.474</td>
</tr>
<tr>
<td>Admitted at presentation (%)</td>
<td>24/52 (46)</td>
<td>11/17 (65)</td>
<td>0.184</td>
</tr>
<tr>
<td>Hematuria (%)</td>
<td>7/52 (17)</td>
<td>1/17 (8)</td>
<td>0.474</td>
</tr>
<tr>
<td>eGFR (mL/min/1.73m²)</td>
<td>130 ± 38</td>
<td>125 ± 26</td>
<td>0.692</td>
</tr>
<tr>
<td>Short Course Induction (12 weeks)</td>
<td>35 (67)</td>
<td>12 (71)</td>
<td>0.379</td>
</tr>
</tbody>
</table>
Prednisone Exposure - Induction (short course)

**BCCH:**
Median: 3400  
IQR: 3328 - 3539

**Regional:**
Median: 3460  
IQR: 2911 - 3561

Comparison of medians: $p=0.674$
Relapse Rates

Days to First Relapse from Prednisone Induction Start

- BCCH: Median 146 [104-175]
- Regional: Median 128 [86-260]

Frequently Relapsing Course

- BCCH: 51%
- Regional: 67%

p=0.730

p=0.360
Annualized Relapse Rate over 2 years

Median: 3.5
IQR: 1.5 - 5.3

Median: 2.4
IQR: 1.3 - 4.5

Comparison of medians: p=0.803
Pathway Fidelity

**Nephrology Clinic Visits in First Year**

- **p=0.655**
- BCCH: 4.2 ± 1.2
- Regional: 4.0 ± 1.8

**Food Record in First Year (%)**

- **p=0.135**
- BCCH: 67%
- Regional: 47%

**Ophthalmology Visit in First Year (%)**

- ***p=0.014**
- BCCH: 87%
- Regional: 59%
Discussion
Children with NS have similar characteristics, receive comparable care, and have similar clinical outcomes whether they attend BCCH or regional clinics.

There is variable access to pathway-recommended allied health care for our patients with NS:
- Access to pediatric-specific care outside of Vancouver?
- Role for Zoom/Telehealth in improving this?
Discussion

- Regional care is a key component to increasing equitable care to children with NS across BC

- The NS Pathway likely played a role in the improving standardization of care
Extra Slides
Clinical Pathway

- Uncomplicated Nephrotic Syndrome: Steroid sensitive, infrequently relapsing, no atypical features

<table>
<thead>
<tr>
<th>Typical features</th>
<th>Atypical features (red flags*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥1 year</td>
<td>Age ≤1 year</td>
</tr>
<tr>
<td>Transient hypertension or normal BP (BP &lt;95th for age,</td>
<td>Hypertension</td>
</tr>
<tr>
<td>sex, and height)</td>
<td>(BP ≥95th for age, sex, and height)</td>
</tr>
<tr>
<td>Normal renal function (eGFR ≥90 ml/min/1.73m²)</td>
<td>Abnormal renal function (eGFR &lt;90 ml/min/1.73m²)</td>
</tr>
<tr>
<td>Lack of or mild hematuria (&lt;20 RBCs/HPF)</td>
<td>Significant or gross hematuria (≥20 RBCs/HPF)</td>
</tr>
<tr>
<td>Steroid sensitive NS</td>
<td>Steroid resistant NS</td>
</tr>
</tbody>
</table>
Prednisone Exposure - Induction (pre-pathway)

Median: 2546
IQR: 2041 - 3091
Relapse Rates

**Days to First Relapse from Prednisone Induction Start**

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical</td>
<td>254 (145–388)</td>
</tr>
<tr>
<td>BCOH</td>
<td>146 (104–175)</td>
</tr>
<tr>
<td>Regional</td>
<td>128 (86–260)</td>
</tr>
</tbody>
</table>

**Frequently Relapsing Course**

<table>
<thead>
<tr>
<th>Group</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical</td>
<td>27%</td>
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<tr>
<td>BCOH</td>
<td>51%</td>
</tr>
<tr>
<td>Regional</td>
<td>67%</td>
</tr>
</tbody>
</table>

P-values:
- Days to First Relapse: p=0.730
- Frequently Relapsing Course: p=0.360
Canadian pediatric cardiology simulation curriculum developed at BCCH and aligned with newly launched Canadian competence by design curriculum

Sabine L. Laguë, PhD, MD and Shreya Moodley, MD
sabine.lague@phsa.ca

April 8, 2022
Disclosures

None.
Competency By Design (CBD)

Based on the global movement towards competency-based medical education

4 stages of training:
- Transition to discipline,
- Foundations of discipline,
- Core of discipline
- Transition to practice

Clear objectives at each training stage, with entrustable professional activities (EPAs) to encourage observation and assess competency.
3 year fellowship focused on congenital and acquired cardiovascular diseases spanning the fetus to young adult.

Canadian pediatric cardiology fellowship programs transitioned to CBD in 2020 and 2021.
Competency by Design

Pediatric Cardiology

- Medical expertise
- Medical acuity
- Procedural acuity
- Communication
- Counselling
- Palliative care

Introduction
Methods
Results
Discussion
Competency by Design

Simulation as a possible solution
Simulation

Benefits

Knowledge translation

Team building

Analysis of learning

Communication

Technical skills

Safe environment

Introduction

Methods

Results

Discussion
Objectives

Develop a paediatric cardiology simulation curriculum aligned with the newly launched CBD curriculum that will allow for practice of:

1. PALS
2. Common on-call specialty-specific emergencies
3. High-stakes low-volume procedural skills
4. Challenging or high-stakes communication scenarios
5. Working as a team
Methods

Pediatric Cardiology EPAs
- Transition to Discipline: 3
- Foundations: 10
- Core: 21
- Transition to Practice: 2
- Total: 36
Methods

Determined which EPAs could be signed off during a simulation session.

Determine which EPAs could not be formally signed off during simulation, but would benefit from being practiced in a simulation session.

Explored Royal College Objectives to ensure that key competencies that could be reinforced by a simulation session were included.
Curriculum Overview

3 year curriculum comprised of 4 annual half-days

Educational content streams:
- High-fidelity simulation
- Procedural skills
- Counselling and communication
High Fidelity Simulation

Types of Stations

- PALS
- Stabilizing the cardiac newborn
- Stabilizing the hemodynamically unstable child
- Caring for the sick child with a known underlying cardiac condition
High Fidelity Simulation

PALS

* Cardiac arrest
* Bradycardia
* Tachycardia
* Shock
High Fidelity Simulation

Stabilizing the cardiac newborn

* Heart block in a newborn
* Cyanotic newborn - etiology not yet diagnosed
* Unstable neonatal arrhythmia
* Acute hypoxemia in transposition of the great arteries
* Newborn with coarctation of the aorta
* Hypercyanotic spells in Tetralogy of Fallot
High Fidelity Simulation

Stabilizing the hemodynamically unstable child

- Undifferentiated syncope or collapse
- Prolonged QT syndrome
- SVT requiring cardioversion
High Fidelity Simulation

Caring for the sick child with a known cardiac condition

- **Single ventricle**: Acute hypoxemia in an infant with hypoplastic left heart and Norwood (Stage 1) circulation
- **Cardiomyopathy** patient presents with collapse
- **Pulmonary hypertension** patient presents in crisis
- **HOCM** patient presents with chest pain
Procedural Station

Content

- Pericardiocentesis in cardiac tamponade
- Balloon septostomy to create an atrial communication
- Ventricular assist device (VAD) troubleshooting
- Running and interpreting cardiac stress tests
- ECG reading for common pathologies (e.g. SVT, long QT, myocarditis)
- eMurmur and other auscultation tools
Procedural Station

Rationale

Practicing high-stakes, low volume critical procedures.
e.g. pericardiocentesis, balloon septostomy

Troubleshooting complex, but less common interventions
e.g. ventricular assist device troubleshooting

Practicing common daily skills
e.g. auscultation and ECG reading, cardiac stress tests
Communication and Counselling

Approach

- Introductory workshop on the topic
- 1:1 role playing with a standardized patient (SP) in an interaction observed by a staff
- **Feedback** opportunity for the learner from both the SP and the staff (and potential for an EPA)
- **Reflective learning:** interaction will be video recorded for later individual reflection
Communication and Counselling

**Topics**

- Diagnosis disclosure + breaking bad news
- Goals of care
- Prenatal Counselling
- Phone consult
- Consent
- Adolescent counselling

---

*Introduction*
Curriculum Layout

Year 1
- Simulation
- Simulation
- Procedure
- Counselling
- Simulation

Year 2
- Simulation
- Procedure
- Counselling
- Simulation
- Simulation
- Counselling

Year 3
- Simulation
- Procedure
- Counselling
- Simulation
- Simulation
- Counselling
<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyanotic newborn</td>
<td>Bradycardia pacing</td>
<td>Single ventricle</td>
</tr>
<tr>
<td>ECGs and eMURMUR</td>
<td>Pericardiosenasis</td>
<td>Balloon septostomy</td>
</tr>
<tr>
<td>HOCM PALS</td>
<td>TGA</td>
<td>Goals of care</td>
</tr>
<tr>
<td>Coarctation of the aorta</td>
<td>Cardiomyopathy PALS</td>
<td>Syncope</td>
</tr>
<tr>
<td>Prenatal counselling</td>
<td>Stres test</td>
<td>Adolescent Transition</td>
</tr>
<tr>
<td>Diagnosis disclosure</td>
<td>Neonatal arrhythmia</td>
<td>Tet spell</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>TAPVR</td>
<td>Cardiogenic shock PALS</td>
</tr>
<tr>
<td>SVT Cardioversion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Introduction**

**Methods**

**Results**

**Discussion**
Sourcing Simulation Content

- Writing content de novo
- Collaborating with colleagues who have already developed simulation content for common scenarios (e.g. PALS)
- Editing existing simulation content from medical education simulation simulation portals
Curriculum EPAs

Each station is directly linked to competencies spanning all levels of training, providing exposure to 21 EPAs:

- Transition to Discipline: 3/3
- Foundations: 6/10
- Core: 12/21
- Transition to Practice: 0/2
- Total: 21/36
Transition to Discipline

#1 Assessing patients with common cardiology presentations
#2 Recognizing and providing initial management for patients with life-threatening cardiac problems, and seeking appropriate assistance
#3 Performing electrocardiograms
Transition to Discipline

#1 Assessing patients with common cardiology presentations
#2 Recognizing and providing initial management for patients with life-threatening cardiac problems, and seeking appropriate assistance
#3 Performing electrocardiograms

#2 “Recognizing and providing initial management for patients with life-threatening cardiac problems, and seeking appropriate assistance”
Foundations 6/10

#1 Assessing and initiating management for patients with hemodynamically stable presentations of a cardiac condition
#2 Assessing and initiating management for neonates with urgent presentations of suspected cardiac conditions
#3 Assessing and initiating management for children with urgent presentations of known or suspected cardiac conditions
#4 Providing ongoing management of stable patients with a known cardiac condition in the outpatient setting
#5 Communicating management plans for common cardiac conditions to patients and families
#6 Formulating and implementing discharge plans for patients with common conditions
#7 Acquiring standard images and measurements for transthoracic echocardiograms
#8 Interpreting transthoracic echocardiograms performed on children with normal hearts or with basic functional and simple structural lesions
#9 Providing interpretation of electrocardiograms
#10 Obtaining informed consent for cardiac procedures
Foundations 6/10

#1 Assessing and initiating management for patients with hemodynamically stable presentations of a cardiac condition
#2 Assessing and initiating management for neonates with urgent presentations of suspected cardiac conditions
#3 Assessing and initiating management for children with urgent presentations of known or suspected cardiac conditions
#4 Providing ongoing management of stable patients with a known cardiac condition in the outpatient setting
#5 Communicating management plans for common cardiac conditions to patients and families
#6 Formulating and implementing discharge plans for patients with common conditions
#7 Acquiring standard images and measurements for transthoracic echocardiograms
#8 Interpreting transthoracic echocardiograms in children with normal hearts or with basic functional and simple structural lesions
#9 Providing interpretation of electrocardiograms
#10 Obtaining informed consent for cardiac procedures

#2 "Assessing and initiating management for neonates with urgent presentations of suspected cardiac conditions"
Core \[12/21\]

#1 Providing initial assessment and management for patients with a broad range of cardiac conditions
#2 Assessment and management of patients with a range of cardiac conditions in the outpatient setting
#3 Assessment and management for patients with a range of cardiac conditions in the inpatient setting
#4 Managing unstable and critically ill patients
#5 Assessing and managing patients with refractory or end stage disease
#6 Supporting adolescents with cardiac disease in the transition from the pediatric to adult care setting
#7 Detecting relevant findings through physical examination and interpreting their clinical significance
#8 Providing in-hospital cardiology consultation services
#9 Providing cardiology expertise in medical-surgical case conferences
#10 Leading an inpatient cardiology ward team
#11 Performing and interpreting transthoracic echocardiography
#12 Interpreting transesophageal echocardiograms
#13 Diagnosing significant anomalies in a fetal echocardiogram
#14 Supervising and interpreting stress tests
#15 Providing interpretation of ambulatory ECG monitoring and complex ECGs
#16 Performing, interpreting and managing the results of CIED interrogations
#17 Interpreting cardiac catheterization data
#18 Diagnosing structural anomalies in a cardiac CT or MRI examination
#19 Performing cardioversion and urgent pericardiocentesis
#20 Teaching to a variety of audiences, including peers, junior trainees, and/or other health professionals
#21 Advancing the discipline and/or patient care through scholarly activity
Core

1. Providing initial assessment and management for patients with a broad range of cardiac conditions
2. Assessment and management of patients with a range of cardiac conditions in the outpatient setting
3. Assessment and management for patients with a range of cardiac conditions in the inpatient setting
4. Managing unstable and critically ill patients
5. Assessing and managing patients with refractory or end-stage disease
6. Supporting and escalating patients during hospitalization
7. Detecting relevant findings through physical examination and interpreting their clinical significance
8. Providing in-hospital cardiology consultation services
9. Providing cardiology expertise in medical-surgical case conferences
10. Leading an inpatient cardiology ward team
11. Performing and interpreting transthoracic echocardiography
12. Interpreting transesophageal echocardiograms
13. Diagnosing significant anomalies in a fetal echocardiogram
14. Supervising and interpreting stress tests
15. Providing interpretation of ambulatory ECGs
16. Performing, interpreting and managing the results of CIED interrogations
17. Interpreting cardiac catheterization data
18. Diagnosing structural anomalies in a cardiac CT or MRI examination
19. Performing cardioversion and urgent pericardiocentesis
20. Teaching to a variety of audiences, including peers, junior trainees, and/or other health professionals
21. Advancing the discipline and/or patient care through scholarly activity

#19 “Performing cardioversion and urgent pericardiocentesis”
Each session will objectively gauge trainees’ understanding and comfort with topics both before and after a simulation session with a 5 question survey.

All sessions will provide trainees with additional resources (e.g. guidelines, reading, videos) following the session to reinforce learning.

All sessions are evaluated by trainees for quality improvement.
Without a formal simulation curriculum, learners must rely on chance opportunities during rotations or call or practice skills surrounding life-altering conversations, procedures, or high-stakes management.
Objectives Revisited

Our paediatric cardiology simulation curriculum is aligned with the newly launched CBD curriculum that allows practice of:

1. PALS
2. Common on-call specialty-specific emergencies
3. High-stakes low-volume procedural skills
4. Challenging or high-stakes communication scenarios
5. Working as a team
Conclusions

- 3 year pediatric cardiology curriculum tailored to Canada’s newly launched CBD curriculum
- Exposure to 21 EPAs
- Simulations of high-stakes management of acutely unwell patients, low volume procedural skills, and coaching surrounding sensitive communication topics.
Future Directions

1. Evaluate individual learning within our own program
2. Collaborate with other BCCH fellowship programs to have multidisciplinary simulation sessions (e.g. NICU, PICU)
3. Disseminate results so that the curriculum can be used by pediatric cardiology programs across Canada.
Movement disorders secondary to novel anti-seizure medications in pediatric populations

A systematic review and meta-analysis of risk

Dakota Peacock, PGY-1
UBC Pediatric Neurology
Outline

- Overview of movement disorders with antiseizure medications
- Systematic review methodology
- Results
- Discussion
Overview of movement disorders with antiseizure medications

- Tremor
- Ataxia
- Parkinsonism

Common culprits:
- Phenytoin
- Carbamazepine
- Valproic acid
- Lamotrigine
- Phenobarbital
- Benzos

Overview of movement disorders with antiseizure medications

Newer antiseizure medications

• Generally safer
• No dedicated analysis of newer antiseizure medications and movement disorders exists
Systematic review methodology

**Question:** Do children receiving novel antiseizure medications have an increased risk of movement disorders relative to placebo?

**Inclusion criteria:**
- Randomized controlled clinical trials of pediatric populations with novel antiseizure medications.
  - Novel ASMs: lacosamide, perampanel, eslicarbazepine, rufinamide, fenfluramine, cannabidiol, and brivaracetam.

**Exclusion criteria**
1. Mean or median participant >19 years old
2. Studies not written in English
3. Adverse events not exhaustively and quantitatively reported

**Search strategy**
1. Databases: MEDLINE, EMBASE, World Health Organization International Clinical Trials Registry Platform (WHO ICTRP)
2. References of included manuscripts screened for inclusion/exclusion criteria
3. Study sponsors and corresponding authors contacted for adverse event data when not reported exhaustively.
Results

Records identified through database searching: MEDLINE, EMBASE, WHO-ICTRP (n = 1663)
Records identified by searching references of included manuscripts (n = 729)

Records after duplicates removed (n = 1690)

Titles/abstracts screened (n = 1690)

Records excluded (n = 1566)

Full-text articles excluded (n = 103)
(No pediatric analysis, no novel ASM, adverse events not reported quantitatively, not written in English, not randomized and controlled)

Full-text articles assessed for eligibility (n = 124)

Studies included in quantitative synthesis (meta-analysis) (n = 21)
## Risk of Bias assessment

<table>
<thead>
<tr>
<th>Drug</th>
<th>Total, n</th>
<th>Low risk of bias, n</th>
<th>Some concerns, n</th>
<th>High risk of bias, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenfluramine</td>
<td>10</td>
<td>1</td>
<td>4</td>
<td>5</td>
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<tr>
<td>Cannabidiol</td>
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<td>4</td>
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<tr>
<td>Rufinamide</td>
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<tr>
<td>Eslicarbazepine</td>
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<td>1</td>
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<td>Perampanel</td>
<td>2</td>
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<td>Lacosamide</td>
<td>1</td>
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<td>1</td>
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<tr>
<td>Brivaracetam</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
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</table>
Results

Used for any indication

<table>
<thead>
<tr>
<th>Study ID</th>
<th>RD (95% CI)</th>
<th>% Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiele 2019</td>
<td>0.06 (-0.02, 0.09)</td>
<td>28.56</td>
</tr>
<tr>
<td>Miller 2020</td>
<td>0.06 (-0.00, 0.12)</td>
<td>22.04</td>
</tr>
<tr>
<td>Devinsky 2018(a)</td>
<td>0.05 (-0.03, 0.05)</td>
<td>25.39</td>
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<tr>
<td>Devinsky 2018(b)</td>
<td>0.23 (-0.09, 0.56)</td>
<td>6.93</td>
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<tr>
<td>Devinsky 2017</td>
<td>0.01 (-0.00, 0.09)</td>
<td>20.44</td>
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<tr>
<td>Elten 2020</td>
<td>0.03 (-0.02, 0.05)</td>
<td>1.34</td>
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<tr>
<td>Subtotal/ (r = 56.7%, p = 0.042)</td>
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<tr>
<td>Devinsky 10mg/kg/day</td>
<td>0.00 (-0.03, 0.00)</td>
<td>44.42</td>
</tr>
<tr>
<td>Miller 2020</td>
<td>0.00 (-0.00, 0.03)</td>
<td>50.51</td>
</tr>
<tr>
<td>Devinsky 2018(a)</td>
<td>0.00 (-0.02, 0.22)</td>
<td>5.08</td>
</tr>
<tr>
<td>Devinsky 2018(b)</td>
<td>0.00 (-0.02, 0.22)</td>
<td>5.08</td>
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<tr>
<td>Subtotal (r = 0.0%, p = 1.000)</td>
<td>100.00</td>
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<tr>
<td>Candidi 100mg/kg/day</td>
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<tr>
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<td>Estillicarbazepine</td>
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<tr>
<td>Kline 2018</td>
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<td>39.11</td>
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<td>Subtotal (r = 0.0%, p = 0.409)</td>
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<tr>
<td>Fenfluramine</td>
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<td>Anwar 1993</td>
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<tr>
<td>Hc 1986</td>
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<tr>
<td>Kohler 1987</td>
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<tr>
<td>Eklum 1989</td>
<td>0.00 (-0.02, 0.06)</td>
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<tr>
<td>Donnelly 1989</td>
<td>0.00 (-0.02, 0.06)</td>
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<tr>
<td>Court 1972</td>
<td>0.00 (-0.02, 0.06)</td>
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<tr>
<td>Campbell 1998</td>
<td>0.00 (-0.02, 0.06)</td>
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<tr>
<td>Beagley 1987</td>
<td>0.00 (-0.02, 0.06)</td>
<td>14.38</td>
</tr>
<tr>
<td>Subtotal (r = 0.0%, p = 1.000)</td>
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<tr>
<td>Lacacetamide</td>
<td>0.00 (-0.02, 0.02)</td>
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</tr>
<tr>
<td>Farkas 2019</td>
<td>0.00 (-0.02, 0.02)</td>
<td>100.00</td>
</tr>
<tr>
<td>Subtotal</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Perampanel Lege 2016</td>
<td>0.07 (0.01, 0.13)</td>
<td>100.00</td>
</tr>
<tr>
<td>Subtotal</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Rufinamide (Adolescent) Ohtsuka 2014</td>
<td>0.00 (-0.06, 0.00)</td>
<td>100.00</td>
</tr>
<tr>
<td>Subtotal</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Rufinamide (Toddler) Arzimanoglou 2019</td>
<td>0.00 (-0.12, 0.12)</td>
<td>100.00</td>
</tr>
<tr>
<td>Subtotal</td>
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<td></td>
</tr>
<tr>
<td>Overall/ (r = 38.3%, p = 0.002)</td>
<td>0.01 (0.00, 0.02)</td>
<td></td>
</tr>
</tbody>
</table>

Abnormal movements observed:
- Tremor
- Ataxia
- Myoclonus
Discussion

Data limitations

- Patient-level data not available for larger trials
- Some large RCTs did not disclose exhaustive adverse event data
  - Minimum thresholds: >2%, 5%, 10% incidence to disclose
- Safety data in RCTs was often sparse and without rigorous assessment

<table>
<thead>
<tr>
<th>Study design</th>
<th>Methods to identify adverse events</th>
<th>Methods to determine severity</th>
<th>Methods to identify causality</th>
<th>Methods to determine preventability</th>
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<tbody>
<tr>
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<td>✔️</td>
<td>✔️</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>
Interpretation for clinical practice

- Perampanel may be associated with increased risk of movement disorders
  - Open label data (n = 188) reports similar rates of tremor and ataxia (~6%)
  - Only one RCT available
  - Correcting for multiple hypothesis testing renders the perampanel finding not statistically significant

<table>
<thead>
<tr>
<th>Study ID</th>
<th>RD (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perampanel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagae 2016</td>
<td>0.07 (0.01, 0.13)</td>
<td>100.00</td>
</tr>
<tr>
<td>Subtotal</td>
<td>0.07 (0.01, 0.13)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

- No studies of brivaracetam met inclusion criteria
- No significant risk of movement disorders associated with lacosamide, eslicarbazepine, rufinamide, fenfluramine, or cannabidiol.
Call to action

Multiple problems exist in literature
  • Assessment of adverse events
  • Transparency of findings

What we can advocate for
  • Power drug trials for safety
  • Use standardized assessment tools for adverse event causality and preventability
  • Call for exhaustive safety reporting and patient-level adverse event data
Child transmission of SARS-CoV-2: A systematic review and meta-analysis

Sarah Silverberg
April 8, 2022
Celebrate Research Day – BC Children’s Hospital

Study Team: Sarah Silverberg, Bei Yuan Ethan Zhang, Shu Nan Jessica Li, Conrad Burgert, Hennady P Shulha, Vanessa Kitchin, Laura Sauvé, Manish Sadarangani
Objective

Identify the secondary attack rate of COVID-19 of *pediatric index patients* amongst children and amongst adults
Definitions

Secondary attack rates = the proportion of confirmed infections among all contacts *when the number of total contacts were known*

Secondary cases = the number of confirmed infections among all contacts *when the total number of contacts was unspecified*
Methods

- Ovid MEDLINE, EMBASE, CINAHL, Cochrane Central Register of Clinical Trials, and Web of Science databases
- Search encompassed Jan 1, 2020 to March 31, 2021
- English language studies

Records screened (n = 6110)

Full-text articles assessed for eligibility (n = 446)

Studies included in qualitative synthesis (n = 40)

Studies included in quantitative synthesis (meta-analysis) (n = 13)

Records excluded (n = 5664)

Full-text articles excluded (n = 406)
Methods: Exclusions

- Adult-to-child transmission
- Neonatal (<28 days old) occurrences of transmission
- Transmission occurring in a hospital setting
- Did not contain enough information to meet definition of confirmed SARS-CoV-2 transmission
- Letters, editorials, pre-printed articles, and review articles containing no primary data
Results: Study Breakdown

- Household: 45%
- School: 33%
- Childcare: 12%
- Other Social Setting: 10%

Legend:
- Household
- School
- Childcare
- Other Social Setting
Results

457 pediatric index cases led to 355 secondary infections (149 pediatric, 206 adult)
  • Overall mean of 0.78 secondary cases per index case

• Child-to-child transmission rate = 5.7%
• Child-to-adult transmission rate = 26.4%
Results

In schools: 142 index patients led to 118 secondary infections (68 pediatric, 50 adult)
  • Overall mean of 0.83 secondary case per index case

In households: 314 index patients led to 244 secondary infections (85 pediatric, 159 adult)
  • Overall mean of 0.78 secondary case per index case

<table>
<thead>
<tr>
<th></th>
<th>Childcare (6)</th>
<th>Household (22)</th>
<th>Social Event (5)</th>
<th>School (13)</th>
<th>All Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child to Child SAR (%)</td>
<td>7.1%</td>
<td>50.3%</td>
<td>15.5%</td>
<td>2.0%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Child to Adult SAR (%)</td>
<td>31.7%</td>
<td>47.0%</td>
<td>20.6%</td>
<td>11.7%</td>
<td>26.4%</td>
</tr>
</tbody>
</table>
Results

Pooled estimate for a contact of a pediatric index case being infected as secondary case was 0.10 (95% CI 0.03-0.25), with high heterogeneity ($I^2 = 88\%$)
Results

The SAR estimate for household settings was 0.18 (95% CI 0.07-0.42), with significant heterogeneity (I² = 83%)

The SAR estimate for school settings was 0.04 (95% CI 0.00-0.28) with significant heterogeneity (I² = 91%)
Results

Pooled estimate of secondary attack ratios in close contact settings

The pooled OR estimate for adults was 0.21 (95% CI 0.05-0.91), with no heterogeneity ($I^2 = 0\%$).
Limitations

• Transmission in the absence of vaccine pressure
• Prior to Delta and Omicron waves
• Unable to collect all evidence of children who were SARS-CoV-2 positive, and yet did not transmit the virus
• Relatively mild or absent illness most children have with COVID-19 → unknown number of cases where transmission is also undocumented
Conclusions

• Children and youth appear to be less likely to transmit COVID-19 than adults

• Household transmission remains the most prominent source of child-to-adult and child-to-child transmission

• Further research is required to better understand how child transmission of COVID-19 has been impacted by the reopening of schools, the advancement of vaccines, and the development of new variants
Questions?

Select References

Big Shoes to Fill: Realities of Rural Paediatricians in British Columbia (B.C.)

V. Ward¹, J. Retallack¹, K. Miller¹,²

¹Department of Paediatrics, BC Children’s Hospital ²University of British Columbia, Northern Medical Program.

Research Days – April 8, 2022
Disclosures/Acknowledgements

• This study was an initiative of SPRUCe (Sustaining Paediatrics in Rural and Underserved Communities)

• SPRUCe is an initiative of the Rural Coordination Centre of BC (RCCbc, www.rccbc.ca)
Recruitment and retention of rural paediatricians is challenging.

Little is known about the state of rural paediatrics in BC and the reality of the province’s rural paediatricians.

Objective: to better understand rural paediatrics in BC

- Recruitment, workload, burnout, medical education
Methods

32 rural pediatricians

12 communities

96% responded

Figure 1. Map of rural subsidiary agreement communities in BC with pediatricians
• 78% of rural pediatricians felt burnt out and none wanted to increase their workload

• ½ of rural pediatricians can’t find a locum when they need/want one

• 80% of rural pediatricians are involved in teaching medical students or residents

• 50% of rural pediatricians provide outreach to surrounding communities

Burnout

Medical Education

Recruitment/Locums

Outreach
References


Eat Sleep Console:
A Quality Improvement Initiative to Improve the Care of Opioid Exposed Newborns at Victoria General Hospital

Ricki Hagen, MD, BScN
UBC Pediatrics – PGY3
UBC Celebrate Pediatric Research Day April 2022
Background: Neonatal Withdrawal

- Prolonged hospital stays
- Higher level of care

Figure 1: Counts and crude rates of hospitalizations for neonatal abstinence syndrome from 2010 to 2020, by calendar year

Aim

Improve the care of opioid exposed newborns by reducing:
• NICU length of stay
• Morphine treatment for withdrawal symptoms
Methods

Act  |  Plan
---|---
Do  |  Study

PRN

Eat
Sleep
Console
## Methods

**Planning**
- ESC Working Group
- Pediatric Antenatal Consults
- Education

**PRN Morphine**
- Spring 2020

**PRN Morphine + ESC**
- Spring 2021
  - Online modules
  - In person sessions
  - ESC Nurse Champions

**TREATMENT ALGORITHM OF THE SUBSTANCE EXPOSED NEWBORN**

1. **START**
   - Initiate ESC Care Tool and optimize non-pharmacological strategies

2. **STEP 1**
   - Are symptoms of withdrawal managed by non-pharmacological strategies?

3. **YES**
   - Continue using ESC Care Tool and optimizing non-pharmacological strategies

4. **NO**
   - Most withdrawal symptoms can be managed by optimizing non-pharmacological strategies

5. **STEP 2**
   - Start and maintain Opioid/Analgesic therapy

6. **YES**
   - Are symptoms due to opioid withdrawal?

7. **YES**
   - Continue with Opioid/Analgesic therapy

8. **NO**
   - Maximize non-pharmacological strategies; consider additional pharmacological treatment e.g. benzodiazepines or benzodiazepine/phenobarbital

9. **CONTINUE TO OPTIMIZE NON-PHARMACOLOGICAL STRATEGIES THROUGHOUT ALGORITHM**

**Timeline**
- 2017
- Fall 2019
- Spring 2020
- Fall 2021
Results: Population

- Total number = 44 infants
- No intervention = 21 infants
- PRN morphine = 14 infants
- PRN morphine + ESC = 9 infants

- Mean GA 38 weeks
- Mean birth weight 3060g
- Maternal stability
Results: Primary Outcomes

• NICU length of stay:
  • Increased

<table>
<thead>
<tr>
<th></th>
<th>None N= 21</th>
<th>PRN Morphine N =14</th>
<th>PRN Morphine + ESC N= 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICU LOS (days)</td>
<td>10.79</td>
<td>18.49</td>
<td>19.64</td>
</tr>
</tbody>
</table>
Results: Primary Outcomes

- Cumulative morphine dose:
  - Decreased in PRN + ESC group

<table>
<thead>
<tr>
<th></th>
<th>None N= 21</th>
<th>PRN Morphine N =14</th>
<th>PRN Morphine + ESC N= 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative morphine (mg)</td>
<td>3.56</td>
<td>19.45</td>
<td>10.71</td>
</tr>
<tr>
<td>Morphine (mg/kg)</td>
<td>1.27</td>
<td>6.59</td>
<td>3.24</td>
</tr>
</tbody>
</table>
Potential Confounder: Maternal Stability

Mother Stability by Intervention

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Y (%)</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>61.9%</td>
<td>38.1%</td>
</tr>
<tr>
<td>PRN Morphine</td>
<td>50.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>PRN Morphine and ESC</td>
<td>22.2%</td>
<td>77.8%</td>
</tr>
</tbody>
</table>
Analysis by Mother Stability

Cumulative Morphine Dose (mg) by Intervention Stratified by Mother Stability

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Mother Stability = Y</th>
<th>Mother Stability = N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std Mean Nobs</td>
<td>Std Mean Nobs</td>
</tr>
<tr>
<td>No</td>
<td>5.87 2.81 13</td>
<td>5.01 5.34 8</td>
</tr>
<tr>
<td>PRN Morphine</td>
<td>5.56 2.10 7</td>
<td>54.04 4.28 7</td>
</tr>
<tr>
<td>PRN Morphine and ESC</td>
<td>0.00 0.00 2</td>
<td>14.28 6.96 6</td>
</tr>
</tbody>
</table>

Cumulative Morphine Dose (mg) vs. Intervention and Mother Stability.
Analysis by Mother Stability

Cumulative Morphine Dose (mg) by Intervention Stratified by Mother Stability

<table>
<thead>
<tr>
<th>Intervention</th>
<th>PRN Morphine</th>
<th>PRN Morphine and ESC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 13)</td>
<td>(N = 7)</td>
<td>(N = 2)</td>
<td>(N = 22)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>7.07 (10.93)</td>
<td>6.89 (10.85)</td>
<td>8.37 (10.30)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>0.0 (0.0 – 13.4)</td>
<td>0.0 (0.0 – 18.7)</td>
<td>0.0 (0.0 – 13.4)</td>
</tr>
<tr>
<td>N (N Missing)</td>
<td>13 (0)</td>
<td>7 (0)</td>
<td>22 (0)</td>
</tr>
</tbody>
</table>

Babies with Mothers Stable in Pregnancy (n=22)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>PRN Morphine</th>
<th>PRN Morphine and ESC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 13)</td>
<td>(N = 7)</td>
<td>(N = 2)</td>
<td>(N = 22)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>2.81 (5.87)</td>
<td>2.10 (5.56)</td>
<td>2.33 (5.40)</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>0.0 (0.0 – 0.0)</td>
<td>0.0 (0.0 – 0.0)</td>
<td>0.0 (0.0 – 0.0)</td>
</tr>
<tr>
<td>N (N Missing)</td>
<td>13 (0)</td>
<td>7 (0)</td>
<td>22 (0)</td>
</tr>
</tbody>
</table>
Survey Results: Pre and Post ESC Implementation

• Level of comfort with ESC
• Confidence with non-pharmacological interventions
Survey Results: Challenges

# 1 – Providing 1:1 infant care
  • Staffing
  • Parent
• Management of diaper dermatitis
• Rooming - In
Challenges ➔ Solutions

# 1 – Providing 1:1 infant care
  • Staffing
  • Parent
  • Management of diaper dermatitis
  • Rooming - In
    • Next steps: PRN Morphine on MBU

1. SBAR
2. HCA Pilot Project

ESC Diaper Dermatitis Reference
Conclusion

• Eat Sleep Console was successfully implemented at VGH
• Reduction infant morphine requirements
• Maternal stability
• Advocate for support to deliver the standard to care
Thank you!

• Project Leads: Dr. Katrina Stockley and Dr. Marie-Noelle Trottier-Boucher
• VGH Eat Sleep Console (ESC) Working Group
• UBC Resident Research
• Qian Yang
References


Prevalence of and Factors Associated with Language Impairment in Canadian Children with Autism Spectrum Disorder

Nolan C. Lee, MD; Whitney M. Weikum, PhD; Angie Ip, MD, MHSc
Sunny Hill Health Centre for Children, BC Children’s Hospital
Department of Pediatrics, University of British Columbia, Canada

Celebrate Research Day
April 8, 2022
Conflicts of Interest

None to declare.
Background

- ASD → life-long neurodevelopmental disorder
  - impairments in social communication
  - repetitive, restricted patterns of behaviour, and unusual sensory sensitivities or interests
- Affects 1 in 66 Canadians
What does this study add?

- There has been research between ASD and language disorders since the 1970s
- Our study compares 5 selected factors within a large population ($n = 6862$)
Aims

1. To determine the relative prevalence of language impairment in children diagnosed with ASD.
2. To identify factors associated with language impairment in children with ASD.
Methods

- $n = 6862$, 61% with ASD
- Inclusion criteria: Age 0-19, assessed for ASD through BCAAN between 2010-2017
- ASD diagnosis using ADOS-2 and ADI-R
- Pearson Chi-Square used to determine statistical associations between language impairment and gender, age, ID, family history, and ADHD
Results
Relative Prevalence of Language Impairment Types

Language Impairment, by type

- Mixed Expressive/Receptive: 408 Without ASD, 479 With ASD
- Expressive: 185 Without ASD, 130 With ASD
- Receptive: 48 Without ASD, 47 With ASD
- Pragmatic: 77 Without ASD, 55 With ASD
Prevalence of Language Impairment by Gender and Age in Children with ASD

<table>
<thead>
<tr>
<th>Gender (ASD+)</th>
<th>Boys</th>
<th>44.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>41.1%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (ASD+)</th>
<th>&lt; 6 years</th>
<th>52.6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 6 years</td>
<td>23.7%</td>
<td></td>
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*p = 0.094*  
*p < 0.01*
Severity of ID and Language Impairment

(mild: $p = 0.911$, moderate: $p = 0.001$, severe: $p < 0.001$)
Family History and Language Impairment

$p < 0.01$

- No Family History: 11.7%
- Positive Family History: 19.7%
Comorbid ADHD and Language Impairment

Children with Language Impairment (%)

- Without ADHD: 46.7%
- With ADHD: 27.8%

$p < 0.01$
Conclusions

- Relatively more mixed receptive/expressive and less expressive only language impairment in children diagnosed with ASD versus without ASD
- Factors associated with language impairment in children with ASD: younger age, milder ID, +FmHx, absence of comorbid ADHD
Future Directions

- Exploring comorbid ADHD’s negative association with language impairment in ASD
- Better understand each covariate’s contribution to predicting language impairment