

Community of Practice: Choosing Wisely in Paediatrics

Moderator:

Dr. Jeremy Friedman

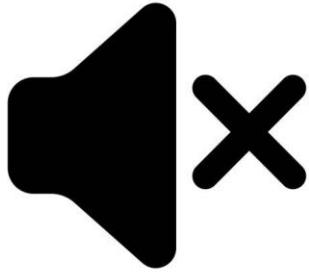
Associate Paediatrician-in-Chief

Director, SickKids Choosing Wisely Program

Hospital for Sick Children



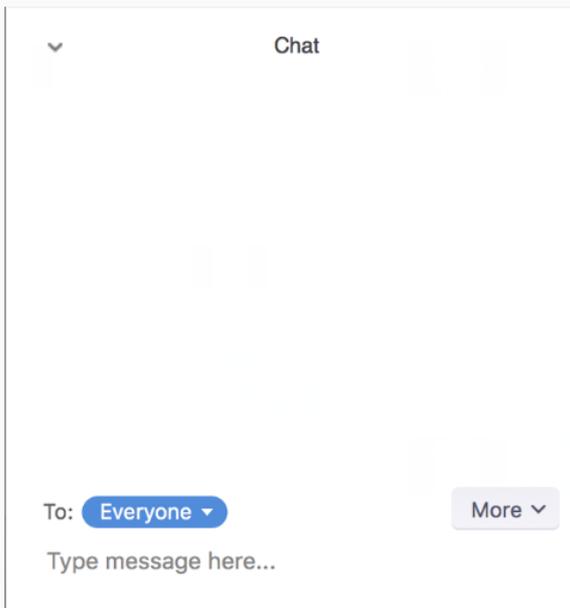
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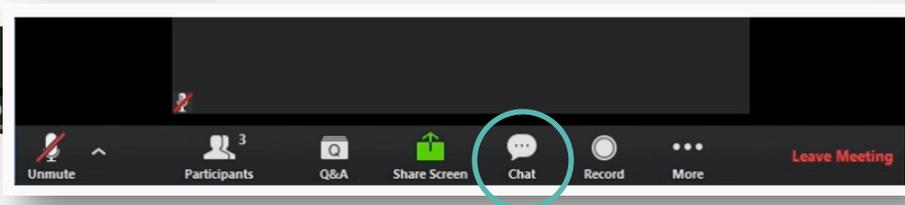
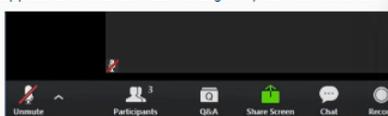
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Agenda

Item	
1	Welcome and Updates
2	Presentations High Flow Nasal Cannula Oxygen in Bronchiolitis: Something Else we Should be Choosing Wisely? Dr Claire Seaton and Dr Megan Cox Antibiotic Prescription Patterns for Suspected Urinary Tract Infections in the Alberta Children's Hospital Emergency Department. Dr. Dana Stewart Saline-lock versus Continuous Infusion: Maintaining Peripheral Intravenous Catheter Access in Children Dr Sepideh Taheri and Dr Frances Yeung
3	Q&A

Welcome (and welcome back)!

The Choosing Wisely in Paediatrics Community of Practice (CoP) mandate is to foster knowledge sharing and collaborative learning to promote high-quality, value-added care by focusing on overutilization of certain tests and therapies. Facilitated through:

- Building capacity in QI / resource stewardship (Choosing Wisely) by sharing lessons learned and successful initiatives
- Supporting continuous QI / resource stewardship (Choosing Wisely) efforts
- Promoting consistency in recomm locally, provincially and nationally
- Supporting spread of evidence-based best practices
- Developing a central repository for idea sharing
- Engaging in new opportunities for collaboration

Children's Healthcare Canada

- **The Choosing Wisely in Paediatrics Health Hub**
 - Connects individuals with “like” peers across Canada to share information and exchange resources
 - Provides information (including recordings) from past webinars and updates on upcoming events
 - **Visit <https://choosingwisely.squarespace.com/>**

Children's Healthcare Canada
Health Hub

Choosing Wisely

Connect with Us!

Next Webinar – Fall 2021 (TBD)

If you are interested in presenting, have resources you wish to share, or would like to be added to the mailing list, please email lauren.whitney@sickkids.ca

High Flow Nasal Cannula Oxygen in Bronchiolitis: Something else we should be Choosing Wisely?

Dr. Megan Cox

PGY-2 Paediatrics, University of British Columbia

Lynn MacIsaac

Professional Practice Lead Respiratory Therapy, BC Children's Hospital

Dr. Claire Seaton

Department of Paediatrics, BC Children's Hospital, University of British Columbia



Background

- Choosing Wisely Statements
- Significant increase in HFNC use: ED/Wards
- Wide variation in HFNC initiation and weaning practices
- Provincial → **Desire for Standardised HFNC & Bronchiolitis guidelines**

Efficacy:

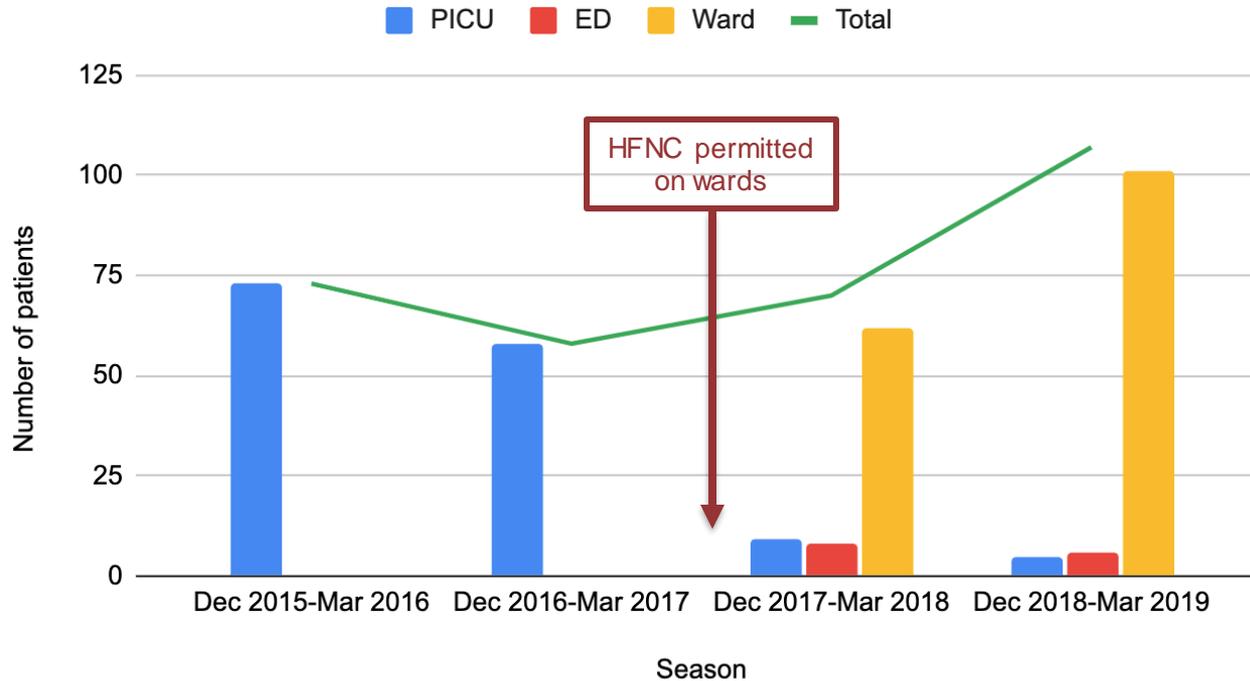
- **Does** decrease PICU admissions & PPV, ***when used as a rescue*** from failing LFNP
- **Conflicting** evidence on rate of ICU admissions and PPV between HFNC vs. LFNP
- **Does not** affect length of stay, intubation rate, duration of therapy

Potential for harm:

- Up to 16x more expensive than standard therapy
- AGMP with **implications for COVID-19 transmission & PPE use**

Relevance

Number of patients admitted to BCCH receiving HFNC



Global Aim

Reduce overutilization of HFNC in the treatment of low-risk infants with bronchiolitis by 30% at BC Children's Hospital by March 2022

Process Measures (Aiming for 80% uptake):

HFNC should only be used as a rescue for low-risk infants with bronchiolitis who fail maximum low flow O2 therapy

HFNC weaning protocol adherence



Interventions

Guideline development:

- Evidence based guideline with expert review
- Available for use Summer 2021

Implementation:

- Provider education
- CST (Cerner computer-based order system)

Evaluation: *(pending bronchiolitis season)*

- PDSA cycles monthly
- Tracking of HFNC rates & context, balancing measures

Expansion:

- Provincial distribution
- QI package
- Provincial gap analysis survey

Measures

Outcome measures

Adherence to guideline:

- *Oxygen flow rate, SpO₂, feeding status prior to HFNC initiation*
- *Weaning strategy used for discontinuation*

Rate of HFNC use in bronchiolitis

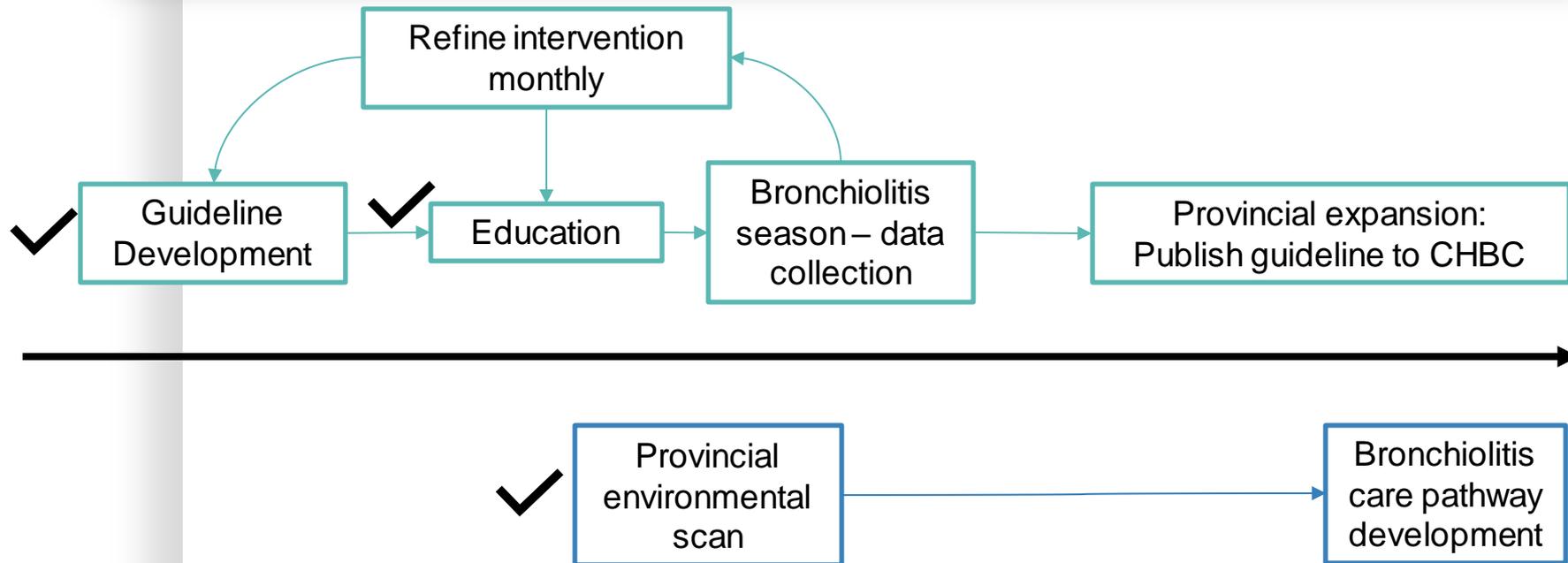
Duration of "airborne" time requiring PPE



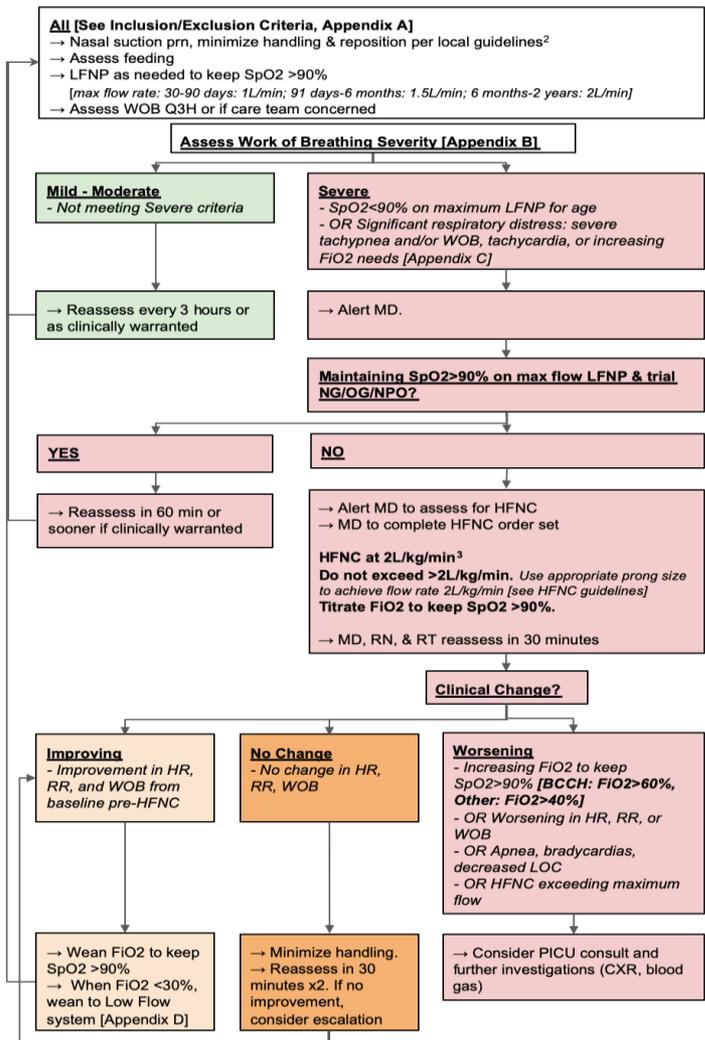
Balancing measures

- *Escalation of care (PICU, PPV, intubation)*
- *Wean failure*
- *Length of stay*
- *Rates of investigation*
- *Aspirations with feeding*
- *RT workload*

Intervention



Guideline



LFNP - low flow nasal prong system; SpO2 - oxygen saturation; WOB - work of breathing; FiO2 - fraction inspired oxygen; NG - nasogastric; OG - orogastric; NPO - nil per os; HFNC - high flow nasal cannula system; MD - physician; RN - bedside nurse; RT - Respiratory Therapist; HR - heart rate; RR - respiratory rate; LOC - level of consciousness; PICU - Pediatric Intensive Care Unit; CXR - chest x-ray; CHD - congenital heart disease; CLD - chronic lung disease; GA - gestational age; VLBW - very low birth weight.

Baseline Data

12:29

Q10. In your institution, how long should infants meet the following criteria prior to discharge home?

Mild to no respiratory distress ^

Less than 6 hours

6 - 24 hours

Greater than 24 hours

Unsure

Adequate oral feeding and hydration v

Maintaining oxygen saturations without supplemental O2 v

Q11. By your best estimate, what percentage of infants (30 days - 1 year old) presenting with bronchiolitis receive the following investigations or therapies at your institution?

0 10 20 30 40 50 60 70 80 90 100

Chest X-ray

Guideline implementation & evaluation – On hold:

2019-2020: **226** admissions

2020-2021: **31** admissions

HFNC Gap Analysis:

- 3/6 Health Authorities have general HFNC protocols
- 0/6 HA's have HFNC guidelines specific to bronchiolitis

Bronchiolitis Gap Analysis:

- 15 question survey distributed to 15 sites across BC, to be completed by the Patient Care Co-ordinator and Lead Pediatrician at each site.

Next Steps

- ❑ Data collection & PDSA cycles → *once bronchiolitis season occurs*
- ❑ CST rollout → *Summer 2021*
- ❑ Provincial HFNC guideline distribution → *in discussion*
- ❑ QI package distribution - ****opportunity for collaboration****
- ❑ Province-wide bronchiolitis care pathway → *upcoming*

Antibiotic Prescription Patterns for Suspected UTI's in the ACH Emergency Department

Dr. Dana Stewart

R3 FRCPC Emergency Medicine Resident

Dr. Shawn Dowling

Sanjana Sudershan

Tak Fung

Chel Hee Lee

Faculty/Presenter Disclosure

Relationships with financial sponsors: None

- Any direct financial relationships including receipt of honoraria: **None**
- Memberships on advisory boards or speakers' bureau:
None
- Patents for drugs or devices: **None**
- Other: financial relationships/investments: **None**



2yo female

CC: Fever

Urine Color.	Yellow
Urine Appearance	Clear
Urine Specific Gravity	1.010 [≤ 1.030]
Urine PH..	> 8.5 [5.0-8.5]
Urine Leukocyte.	Large [Negative]
Urine Nitrite	Negative [Negative]
Urine Protein.	0.3 [Negative g/L]
Urine Glucose.	Negative [Negative mmol/L]
Urine Ketones	Negative [Negative]
Urine Blood.	Small [Negative]
Urine WBC	> 30 [0-2 /HPF]
WBC Clumps present.	
Urine Epithelial Cells.	Few [/HPF]
Urine Amorphous Material.	Few [/HPF]
Urine Bacteria	Few [/HPF]
Urine RBC	3-5 [0-2 /HPF]

FOR _____ DATE _____

ADDRESS _____



REFILL _____ TIMES

Cefixime 100mg PO daily
X 10 days

DISPENSE AS WRITTEN

PRODUCT SELECTION PERMITTED

DEA NO. _____ ADDRESS _____

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Total Pharmacy Supply, Inc

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Antibiotic Prescription Practice for Pediatric Urinary Tract Infection in a Tertiary Center

Mohammad Alghounaim, MD, Olivia Ostrow, MD,†‡ Kathryn Timberlake, PharmD,§
Susan E. Richardson, MD,||,¶ Martin Koyle, MD,# and Michelle Science, MD‡***



The image shows the exterior of the Alberta Children's Hospital during the blue hour. The building is a multi-story structure with a prominent curved section. The facade is composed of large, rectangular panels in shades of blue and teal. Numerous windows are visible, many of which are illuminated from within, casting a warm yellow glow. The windows are framed in a bright yellow color. A large, horizontal sign is mounted on the building, featuring the text "Alberta Children's Hospital" in a bold, sans-serif font. The word "Children's" is in a larger, yellow font, and "Hospital" is in a smaller, white font. A small red heart icon is placed between "Children's" and "Hospital". The sign is set against a dark blue background. In the foreground, there is a paved area with several green benches and small, white, cylindrical bollards with glowing lights. A few bare trees are visible on the left side of the frame. The sky is a deep, clear blue, indicating twilight. The overall atmosphere is modern and welcoming.

Alberta Children's Hospital

What's the Problem?

- Antimicrobial resistance
- Antibiotic related side effects
- Health care costs
- Unnecessary testing
- Repeat future visits

Recommendation

5 Don't empirically start antibiotics for children over three months of age with low risk of urinary tract infection (UTI) without evidence of nitrites or significant pyuria on urine dipstick. Do stop antibiotics if the urine culture is negative.

Urinary tract infections (UTIs) are a common infection in children and a leading cause for acute care visits in paediatrics. The diagnosis is often made on the basis of clinical symptoms, pyuria on dipstick analysis, and confirmed by a positive urine culture. Since urine culture results are not immediately available, clinicians often empirically prescribe antibiotics to patients for suspected UTIs. However, since UTI symptoms are often nonspecific and urinalysis has varying sensitivity and specificity, children over three months of age that are low risk should not receive empiric antibiotics without evidence of nitrites or pyuria on urine dipstick. Empiric antibiotics should be discontinued if final urine culture results are negative.

Aim

What proportion of patients treated with an empiric antibiotic for a suspected UTI go on to have a negative urine culture?

Methods

- Single centre, retrospective cohort study from February to December 2019
- 3 months to < 18 years old
- Discharged from the ED – “suspected or confirmed UTI”

Exclusion Criteria

No antibiotic prescribed during initial ED visit

Underlying GU tract abnormalities

Admitted to hospital

Already being treated with antibiotics at time of ED visit

IV antibiotics

Definitions

UTI = positive **urinalysis** & positive **culture**

Urinalysis

- > 5 WBC/hpf
- Positive nitrates
- Positive leukocyte esterase
- Presence of bacteria

Definitions

UTI = positive **urinalysis** & positive **culture**

Positive Urine Culture:

- $> 1 \times 10^7$ CFU/L of a single or predominant uropathogen

Definitions

Negative Urine Culture:

- No bacterial growth at 24 hours
- $\leq 1 \times 10^7$ of a single/predominant uropathogen
- Mixed growth

Results

972 patients met inclusion criteria

577 excluded

395 patients in the final analysis

Patient Demographics



Female: 89.9%



Median Age: 4.9 years old



**Urine Collection Method:
81.3% midstream**

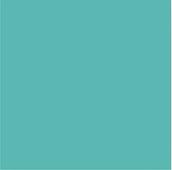
Results

50.4% of patients who received antibiotics had a negative urine culture

Antibiotic	n (%)
Cefixime	335 (84.8)
Septra	16 (4.1)
Nitrofurantoin	19 (4.8)
Ciprofloxacin	1 (0.3)
Amoxicillin/clavulanate	13 (3.3)
Cephalexin	7 (1.8)
Amoxicillin	3 (0.8)
Other	1 (0.3)

Organism	n (%)
E. Coli	169 (86.2)
Klebsiella	5 (2.6)
Proteus	6 (3.1)
Enterobacter	4 (2.0)
Other	12 (6.1)

Follow Up Type	n (%)
Not specified	214 (54.2)
Family physician	144 (36.5)
EDMD	13 (3.3)
Pediatrician	24 (6.1)



Next Steps

Local QI Initiative → protocol
to follow up all negative urine
culture results

It works!

Saha et al (2015): antibiotic
discontinuation rates increased
from **4 to 84%**



Take Homes

- UTI's are common and can be **challenging to diagnose** in the ED
- **50%** with Rx for empiric antibiotics had negative urine cultures
- We have **room to improve!**

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TABLE 2**Minimum colony counts that are indicative of a urinary tract infection**

	CFU/mL	CFU/L	Comments
Clean catch (midstream)	$\geq 10^5$	$\geq 10^8$	Mixed growth is usually indicative of contamination. Sitting a girl backward on the toilet is a good way to spread the labia when collecting midstream urine
In and out catheter specimen*	$\geq 5 \times 10^4$	$\geq 5 \times 10^7$	Mixed growth is usually indicative of contamination. Specimens from indwelling catheters are less reliable
Suprapubic aspiration	Any growth	Any growth	

*Some laboratories report only to the nearest log; therefore, clinical judgment must be applied for reports of growth of $>10^4$ /mL or $>10^7$ /L.[6] CFU Colony-forming unit

Limitations

Retrospective design

Inability to assess patient symptoms

Urine cultures are not 100% SN

Possibility for undocumented follow up

Saline-lock versus Continuous Infusion: maintaining peripheral intravenous catheter access in children.

Dr. Sepideh Taheri MB ChB, FRCPCH (UK)

Director, Clinical Teaching Unit

Children's Hospital, London Health Sciences Centre

Assistant Professor, General Academic Paediatrics, Western University

Dr. Frances Yeung MD, FRCPC

Clinical Fellow, Division of Pediatric Medicine

Suspected Child Abuse and Neglect (SCAN) Program

The Hospital for Sick Children

Background

- Peripheral intravenous catheters (PIVs) have a **high failure rate**
- Methods to maintain catheter patency include “to keep vein open” (TKO) and saline-lock (SL), with the **perception being that TKO is superior**
- **Neonatal literature** suggests that there is **no significant difference** in duration of catheter patency **between TKO and SL**

Background

- Neonatal literature suggests **SL is superior** in the following ways:
 - Less costs
 - \$18.70 AUD for TKO vs \$3.75 AUD for SL¹
 - €7.09/day for TKO vs €4.76/day for SL²
 - Less nursing time
 - Less restrictive for the infant

1. Flint A, 2008 2. Stok D, 2016

Background

- Neonatal literature suggests either no difference, or less complications in SL ^{2,3}
- Different types of complications⁴
 - More infiltration and phlebitis in TKO
 - More occlusion in SL
- No strangulation risk^{5, 6}

2. Stok D, 2016 3. Perez A, 2012 4. Kalyn A, 2000 5. Garros D, 2003 6. Lunetta P, 2005

Background

Recent pediatric retrospective study in Regina, Saskatchewan suggested TKO was not superior to SL⁷

Aim

- To prospectively compare the duration of PIV patency between TKO and SL
- To assess PIV-related complications and patient/caregiver satisfaction

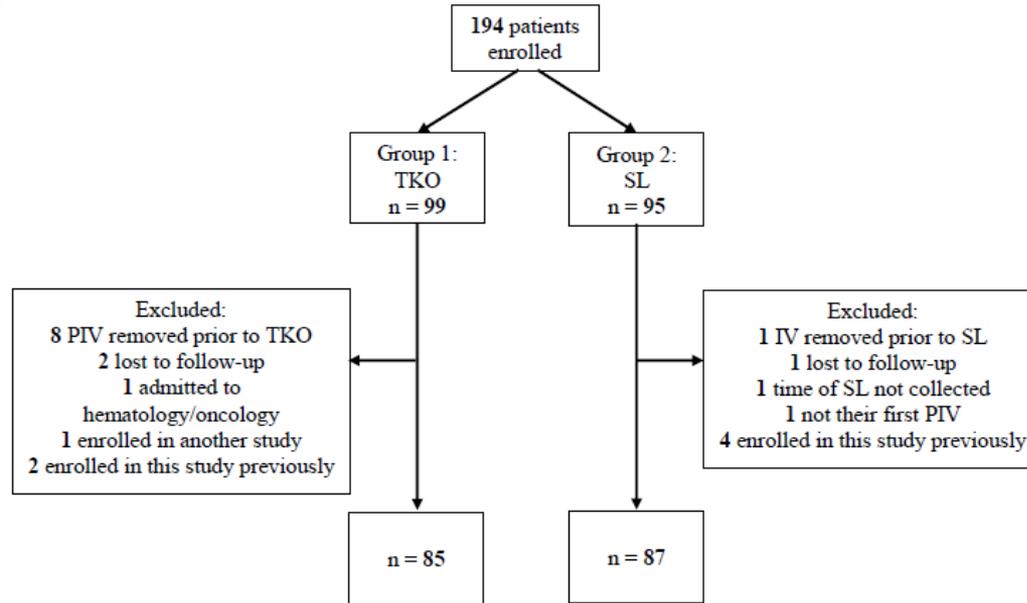
Recommendation

Don't routinely use a continuous infusion "to keep the vein open" in maintaining peripheral intravenous catheter patency in children. Do use saline lock instead.

Intervention

- Prospective time-allocated clinical trial – 3 months of TKO and 3 months of SL
- **Inclusion criteria:** 0 to 17 years of age, 18-26 gauge PIV
- **Exclusion criteria:** Known hypercoagulability, hematology/oncology service, central line, enrolled in another study involving drugs or devices
- **Outcome measures:** Duration of PIV patency
- **Balancing measures:** 1) PIV complications 2) Patient/caregiver satisfaction (survey)

Results



Results – Demographics

- Mean age (months):
TKO 59, SL 61
- No difference in location and gauge of PIV, antibiotic use, admission diagnoses

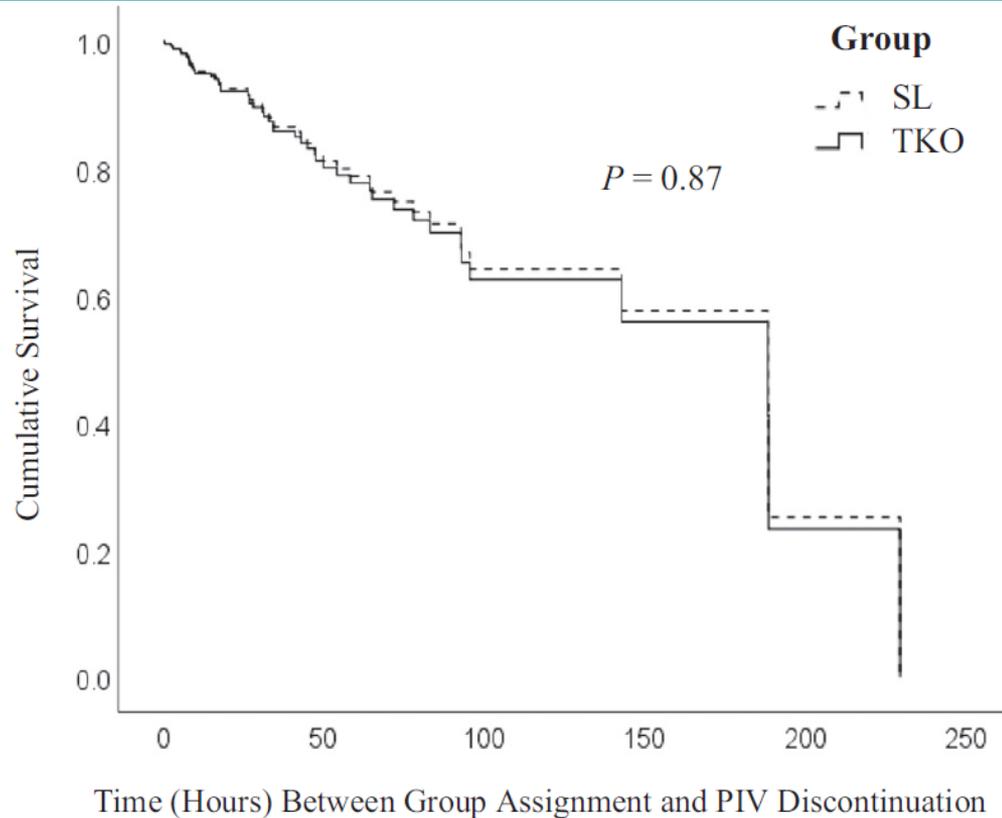
	TKO (n = 85)	SL (n = 87)	P-value
Sex, n (%)			0.05
Male	44 (52)	58 (67)	
Female	41 (48)	29 (33)	
IV fluid used prior to TKO/SL, n (%)			<0.01
NS	2 (2)	17 (20)	
D5NS	60 (71)	59 (68)	
D5 0.45NS	14 (17)	4 (5)	
D10W	2 (2)	1 (1)	
RL	6 (7)	1 (1)	

Results – PIV patency

	TKO (n = 87)	SL (n = 91)	P-value
Hours of PIV patency, mean (SD)	41.68 (41.71)	44.05 (41.46)	0.71

- **Mean difference = 2.37 hours**

Results - Cox Regression Survival Analysis



Results – Complications

- **No significant difference in complications:** phlebitis, infiltration/extravasation, dislodgement, obstruction, other
- One patient in the TKO group had their PIV removed by the bedside nurse due to concern for **risk of possible strangulation** by PIV tubing

Results – Patient/caregiver satisfaction

- 5-point Likhert scale satisfaction survey regarding PIV experience
 - Restriction of movement
 - Easy of activities of daily living
 - Comfort of PIV
 - Disruption of rest by PIV nursing checks
 - Overall PIV experience
- More patients in SL “agree” that PIVC restricted movement, compared to “neutral” in TKO
- No significant difference in the other aspects of satisfaction, including overall PIV experience

Limitations

- Convenience sampling rather than randomized control trial
- Single centre experience
- Satisfaction survey not previously validated, not powered for analysis due to low completion rates

Conclusion

- There was no significant difference between TKO and SL in:
 - Duration of PIV patency
 - Complications rates
 - Satisfaction in overall PIV experience
- **SL is a safe and reasonable alternative to TKO in maintaining PIV patency in children**

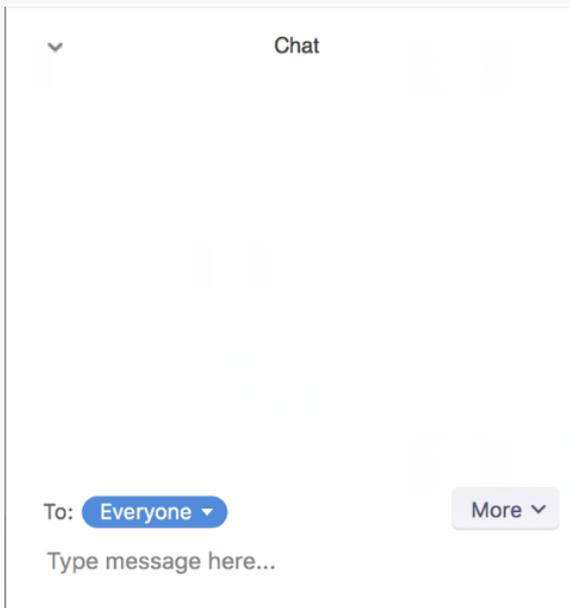
Next Steps

- Multicentre randomized control trial
- Knowledge translation and quality improvement
- Cost-analysis between TKO and SL

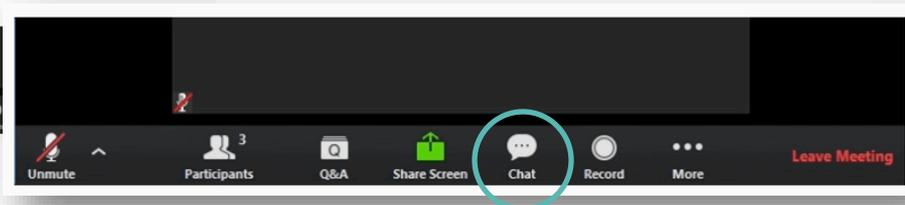
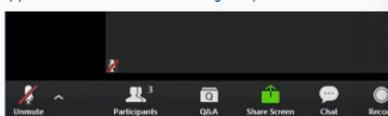
Yeung F, et al. Saline-lock versus continuous infusion: maintaining peripheral intravenous catheter access in children. *Hospital Pediatrics*. 2020.



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Q&A

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Wish to connect regarding today's session or the Community of Practice in general?

Email: lauren.whitney@sickkids.ca