Caring for children with home ventilation and tracheostomies: Providing the right care, in the right place, at the right time

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Background

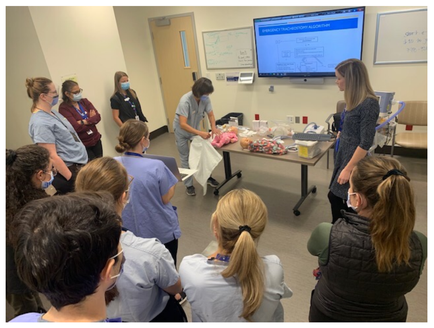
At BC Children's Hospital (BCCH), patients dependent on home respiratory support via tracheostomy or non-invasive ventilation (HTV) that require admission are routinely placed in the Pediatric Intensive Care Unit (PICU), regardless of their stability, complexity, and care needs. Considering **the limited access to PICU beds** in the province, it became a **priority to find a safe non-PICU model of care** for patients.

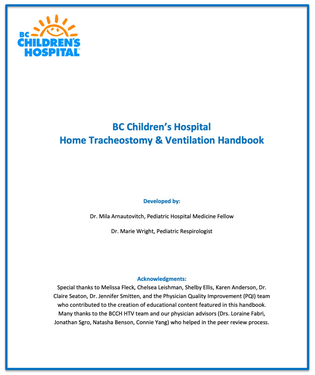
PROJECT AIM

With the goal of **providing the right care, in the right place, at the right time,** we aimed to increase by **50%** the number of HTV patients admitted to the ward during their hospital stay at BCCH, within 6 months of implementing a new model of care

CHANGES MADE

- Creation of a multidisciplinary committee joining the different stakeholders of the project
- Creation of the **Patient Needs Assessment tool** (Figure 1), used to provide admission guidelines for HTV patients
- Multi-modal education workshops were provided to physicians & nurses
- Roll-out of the project:
  - **December 2022**: HTV patients (without tracheostomies) admitted to General Pediatric inpatient wards.
  - **January 2023**: All HTV patients admitted to General Pediatric inpatient wards.
- Creation of the **BC Children's Home Tracheostomy and Ventilation Handbook,** launched in October 2023




BC Children's Hospital
Home Tracheostomy & Ventilation Handbook

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RESULTS & IMPROVEMENTS

A total of **62 HTV patients** have been admitted to the inpatient wards since this initiative, including **20 patients with tracheostomies.**

This is already translating to **over 400 saved PICU bed days.**

74% of all HTV patients admitted at BCCH were admitted to the ward during their stay, compared to **45%** pre-implementation **(representing a 64% increase).**

Since project roll out, **73%** of surveyed UBC pediatrics residents felt that this initiative was an **overall positive experience** for them as learners.

PSLS reports (Patient Safety Learning System):
No serious adverse events have been reported since implementation. Rising issues or concerns are being discussed in monthly case review meetings.

PATIENT NEEDS ASSESSMENT	GREEN Low Acuity and Dependency *SUITABLE for non-critical care unit*	YELLOW Moderate to HIGH Acuity / Dependency *MAY be suitable for non-critical care unit – discussion needed between admitting medical teams at staff or senior resident/fellow level*	RED HIGH Acuity / Dependency *UNSUITABLE for non-critical care unit and requires PICU bed*
Example Patients	• Elective non-surgical admission • Initiation of NIPPV for home	• Elective admission in higher acuity patient • PICU stepdown after acute illness or procedure • Acute admission via ED with mild-moderate respiratory symptoms or non-respiratory illness	• *Acutely unwell or deteriorating child with need for significant increase in respiratory support* • *New tracheostomy before first trach change*
Background	• No acute respiratory issues • Patient is aged > 6 months	• Acute respiratory issues • Unable to remove NIPPV mask independently	• Tracheostomy for critical airway • First tracheostomy change not completed
General medical status	• No changes from baseline respiratory support • Low risk of deterioration • No acute or chronic comorbidity requiring PICU level care	• Predictable trajectory of respiratory support • Moderate risk of deterioration • No acute or chronic comorbidity requiring PICU level care	• Acutely unwell and deteriorating patient • Unstable respiratory presentation/management • Any acute or chronic comorbidity requiring PICU level care
Monitoring and Nursing support	• Continuous cardiorespiratory and oxygen monitoring • Requires focused respiratory assessment, care, and interventions Q2-4H	• Constant visual monitoring and/or presence of a caregiver • Requires focused respiratory assessment, care, and interventions Q1-2H	• Monitoring for **unstable** respiratory or hemodynamic status • Critical Care monitoring and care including invasive monitoring
NIPPV or Tracheostomy +/- Ventilation	• Ventilation only required during sleep • On home ventilator settings and interface/mask for established NIPPV patients • Initiation of NIPPV for home	• Requires change to baseline ventilator settings or respiratory support to optimize management • NIPPV: Some daytime use, but tolerates minimum 2 hours off, BID	• Increase in respiratory support due to **unstable** respiratory distress • Unable to come off NIPPV for ≥ 2 hours BID • Using a full or total face mask due to increased respiratory needs (i.e. not home mask)
Suctioning	• No changes in baseline suctioning requirements	• Increased suctioning requirements from baseline, with generally predictable trajectory	• Recurrent episodes of desaturation/ heart rate instability related to respiratory secretions • Unpredictable suctioning requirements and/or trajectory
Oxygen	• Room air, or no changes to baseline oxygen requirements	• Increased or weaning oxygen requirements from baseline with predictable trajectory	• Increasing oxygen requirements and/or ongoing desaturations with unpredictable trajectory

Figure 1. *Patient Needs Assessment* tool, now a hospital policy document

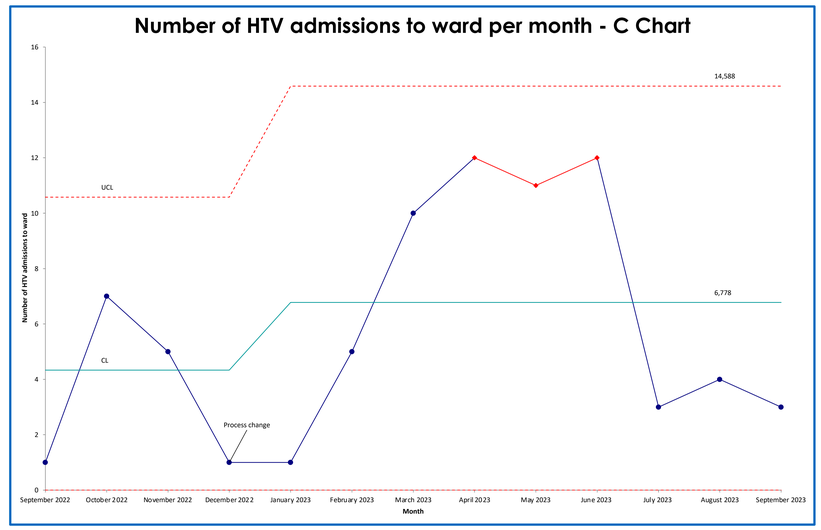

Figure 2. Number of HTV admissions on the ward per month, September 2022 – September 2023

LESSONS LEARNED

There is need for education on HTV patient management for general pediatricians.

Implementation of ward-based care is **safe and feasible** if multidisciplinary teamworking is applied.

Early results indicate **increased ward-based HTV admits and reduced PICU bed usage** since project roll-out.

NEXT STEPS/ SUSTAINABILITY

- Plan for sustained physician and nursing education on HTV patient management is being developed.
- A patient satisfaction survey is being launched to assess for the patient/family's perspective.

Acknowledgement

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