Environmentally Sustainable Kidney Care Case Study

Iron Sucrose Intravenous Push in Hemodialysis

Human activity is driving climate change and damaging Earth's life-sustaining systems. This can be addressed through innovation and action, with healthcare leaders playing a key role in reducing environmental impacts. The following case study highlights how one team tackled this challenge that can inspire and inform similar efforts across other renal programs.

Health Authority: Fraser Health Authority (FH)
Setting: in-centre Hemodialysis (HD) units
Project Lead: Dr. Ada Chiu

Problem statement:

Intravenous (IV) iron is routinely administered for anemia management in patients receiving hemodialysis care. At FH, iron sucrose (Venofer®) is one of the most commonly administered medications in HD units. It has been typically administered as 100 mg dose diluted in 100 mL of sodium chloride 0.9% over a 1-hour infusion. This infusion method generates significant medical waste. However, an alternative method exists—administering the medication by pushing the medication into IV tubing directly (i.e. IV push), which can reduce medical waste.

Project goal:

To reduce medical waste by changing iron sucrose administration in HD from IV infusion to IV push.

Approach:

- **Team composition**: The project team included pharmacy specialists, clinical nurse educators, the FH Parenteral Services Team, and renal program leadership.
- **Guiding principles:** The team applied quality improvement principles with a focus on patient safety, practice culture, and policy change.
    - Patient safety:
        - Conducted an environmental scan, including literature review, product monograph audit, and review of practices in other Canadian HD units to ensure the iron sucrose administration using IV push is safe for patients and evidence-based.
    - Practice culture:
        - Assessed nursing workflow using a time trial to confirm the practice change would not increase workload.
        - Delivered targeted education with consideration of previous IV iron administration experience by renal pharmacists and clinical nurse educators via in-person sessions, emails, and nursing huddles, two to three weeks prior to implementation.
    - Policy change:
        - Updated the parenteral drug therapy manual based on information from the literature and product monograph to reflect a shorter IV push duration (i.e., 2 to 5 minutes, per product monograph).
        - Professional practice confirmed the scope of both RNs and LPNs to administer IV push.
- **Implementation & measurement**
    - Rolled out the practice change iteratively across multiple FH HD units.
    - Estimated impact on medical waste using data from chart reviews and PROMIS to calculate average monthly iron sucrose

doses.
    - Gathered staff feedback through surveys to guide further implementation efforts.

Results & Impacts:

- **Patient safety:** No reported patient adverse events
- **Staff experience:** Positive feedback citing ease of administration via IV push, time saving, reduced need for infusion pumps, and lower plastic use.
- **Direct waste reduction:** Estimated reduction of 129 kg of medical waste per month, equivalent to 1,548 kg per year (enough waste to fill 77 standard garbage cans) across three in-centre HD units and five community dialysis units across the region.
- **Cost savings:** Estimated annual savings of $153,360 per year due to reduced use of IV tubing and minibags in FH.
- **Indirect waste reduction:** Save on equipment purchase and repair, i.e., infusion pumps, and space to store the equipment.
- **Spread of practice change:** Successfully implemented across HD units in Surrey Memorial Hospital, Royal Columbian Hospital, and Abbotsford Regional Hospital and their associated community dialysis units between November 2023 and July 2024.

Limitations:

- Broader impacts were not quantified. Additional benefits may include improved patient experience, and indirect waste reduction, the latter from reduced use of infusion pumps (e.g., lower housekeeping human resources and supplies used for pump cleaning, and reduced energy consumption).
- Patient partnership was not included. Involving patient voices in the process may yield additional insights in terms of communication about the change and evaluation.

Key Takeaways:

- Taking time to deeply understand the current practice enabled more effective planning and roll-out.
- Engaging frontline staff early helped uncover what matters to them, and proactively and effectively address practice change.
- Defining data requirements in advance allowed for timely evaluation and sharing of measurable impacts.
- Closing the feedback loop by sharing outcomes with staff helped reinforce the value of the practice change.
- Aligning with the program's Go Green Project supported consistent messaging across clinical teams.