

# Northumberland Clean Data Stream Initiative

Queen's Community Health Data Lake Initiative

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# Disclosure of Financial Support

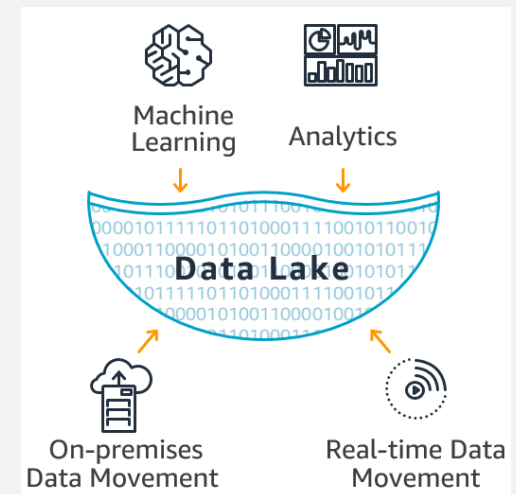
- **This program/speaker has received financial support from Hastings-Quinte Paramedic Services, Northumberland Count Paramedic Services, County of Renfrew Paramedics Services in the form of a research grant.**
- **Potential for conflict(s) of interest:**
  - M. Kathryn Brohman has received funding from Hastings-Quinte Paramedic Services, Northumberland Count Paramedic Services, County of Renfrew Paramedics Services whose product(s) are being discussed in this program.

# Mitigating Potential Bias and Learning Objectives

- Project has been approved by the Queen's Graduate Research Ethics Board where a description of potential biases have been identified and mitigation tactics evaluated.
  - Selection Bias: Paramedic services involved in the study provide a representative sample of factors that may influence the study results.
  - Confirmation Bias: Results presented to 14 services in the Eastern region and feedback was provided.
  - Measurement Bias: Coding protocols used to analyze results were taken from relevant peer-reviewed literature.
  - Observer Bias: Use of standardized and detailed protocols for data collection.
- **Learning Objectives**
  - Integrating Community Paramedicine into Discharge Care Planning and Impact for Long-Term Care
    - Clinicians will be able to understand and explore effective strategies for incorporating community paramedicine into patient discharge and care planning to improve outcomes for patients on long-term care home waitlists.
  - Identify Innovative Solutions for Primary and Emergency Care Challenges
    - Clinicians will be able to learn and examine how community paramedicine can address key gaps in emergency department triage, support unattached patients, and improve care integration in primary care settings.

# Queen's Community Health Data Lake

- A **data lake** is a centralized repository that stores **all structured and unstructured data** at scale.
  - Unlike traditional databases or data warehouses, which store data in predefined formats and schemas, data lakes keep the data in its **raw format** and apply structure only when needed.
- Why CP? Integrating **health data with social services** remains a weak point of Canada's healthcare systems – one that will become more problematic as the proportion of seniors grows.
- Datasets are emerging that highlight the interconnectedness of the health and social service sectors.
  - **CIHI** - open-data online tools that allow website visitors to examine and compare the performance of healthcare providers on multiple levels.
  - **Alberta Child and Youth Data Laboratory** - a research initiative that links and analyzes administrative databases across multiple child- and youth-serving government ministries, including health, education, justice, and Aboriginal relations.



# Five (5) Expected Benefits

- **Integrated Patient View:** Aggregates data from EHRs, IoT devices, wearables, pharmacy, and even social determinants of health.
- **Preventative and Early Detection:** Real-time monitoring creates streams data from wearables or remote monitoring devices into the data lake in real-time.
- **Research and Innovation:** Provides a clean data source for advanced analytics and AI to conduct research and develop AI models.
- **'Break down silos' to Connect Care:** Capture care data across providers to evaluate system impacts, improve care navigation, and inform future funding decisions.
- **Reporting and Regulatory Compliance:** Queen's accepts custodian responsibility and can generate reports and support inquiries.



# Phase 1: Clean Data Stream Initiative

- **Poor Data Quality is a Key Barrier to AI-Enabled CP Innovation**
  - The potential for AI innovation is only as promising as the dataset it is drawn from (Chum 2023).
- **Increased CP Documentation Burden is a Key Concern**
  - Promise of AI and data-driven practices are ushering in an increase in **CP documentation burden** (Murad, Hassan et al. 2024).
    - Healthcare providers spend more time entering data into electronic systems than interactions with patients (Shanafelt et al. 2016; Sinsky et al. 2016).



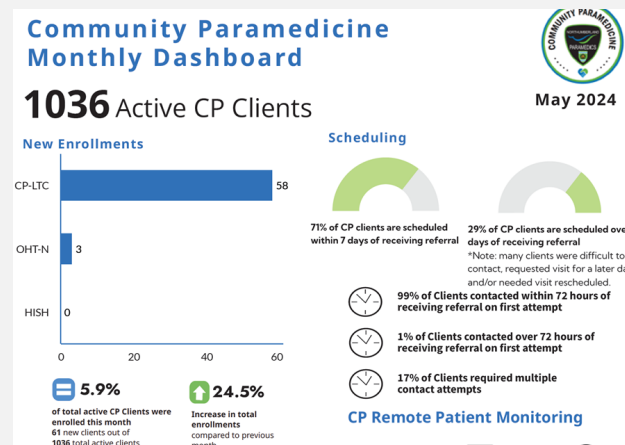
# Unexpected Outcome



CPs are under-reporting the patient-centered value they are delivering in the field.



- Leading the **Eastern Region Documentation as a CP Competence Initiative**.
  - Transform documentation from an administrative task to strategic competence? Why?
    - Enhance *high quality care provision*
    - Integrate CP *connectivity with primary care*
    - Improve *reporting accuracy to sustain funding*



- **Methodology:**
  - Phase 1: Analysis & Observation (Oct 2024 - Feb 2025)
    - **Value engineering** workshop with 24 CPs and 10 **ride-outs** to observe value creation and documentation practices.
  - Phase 2: Design Documentation Competence (Feb – April 2025)
    - Value formulas and low burden documentation procedure.
  - Phase 3: Evaluate Benefits (June 1 to August 15, 2025)
    - A/B test to evaluate the impact of new documentation competencies on *high quality care provision, connectivity with primary care, reporting accuracy to sustain funding*.

# Value Engineering: Ivy Visit



Animal-Assisted Therapy (AAT) create value by:

- Stimulating conversation
- Reducing loneliness and anxiety
- Improving mood
- Increasing activity

**How can Ivy help CPs with their assessment?**

OH Activity	Coding
Chronic Disease management	
Mobility Assessment	
Cognitive Assessments	
Mental Health	
Home Safety Scans	
Palliative Care	
Communication	
Quality of Life	
Medications	
Pain Assessment	

# Value Engineering: Ivy Visit



Animal-Assisted Therapy (AAT) create value by:

- Stimulating conversation
- Reducing loneliness and anxiety
- Improving mood
- Increasing activity

What 'value' does Ivy create?

	Value to Healthcare System		Value to Patient		
	Cost of Care	System Burden	Patient QOL	Caregiver Burden	Access to Care
Acute Care				4 - Reduced lost wages by providing treatment	
Chronic Care		2 – Education and <b>Reduced Risk</b> reduces ED visits			
Preventative Care	1 - <b>Early recognition</b> reduces specialist costs		6 – <b>Educate &amp; Improve mental health</b> to improve health.		5 - Reduced risk by travelling to patient
Coordinated Care			3 - <b>Collaboration &amp; referrals</b> improve health		

# A Hypothetical Story

- Molly a CP patient, during the last visit her daughter (who was visiting from Calgary) shared some concerns about her mother forgetting important dates and appointments.
  - The CP program schedules a follow-up visit with Molly to conduct a **cognitive assessment**.
- The CP conducts the cognitive assessment and asks Molly if she likes puzzles or games. Molly tells the CP she loves crossword puzzles and says she will get her daughter to pick her up a book.
- During the visit, the CP also...
  - Completes a home safety scan based on a note from the last visit about a safety concern.
  - Conducts a pain assessment as the patient describes some hip discomfort.
- **Documentation Scenario #1:**
  - Later that day..
    - The CP makes a referral to Ontario Health at Home to address Molly's hip discomfort.
    - Makes notes in the EMR that **they think** would be helpful to other CPs and Molly's doctor.
    - The visit gets recorded as a **cognitive assessment**.

# Documenting Value: Activities

- Instead of 1 activity, the CP conducted 5 activities during the visit.

OH Activity	Coding
Chronic Disease management	
Mobility Assessment	X
Cognitive Assessments	X
Mental Health	
Home Safety Scans	X
Palliative Care	
Communication	X
Quality of Life	
Medications	
Pain Assessment	X

# Documenting Value: \$\$

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- What value is created by a cognitive assessment?
  - 1 – Early recognition may reduce specialist costs.
  - 2 – Reduce ED visits by informing the patient about where they can access alternative supports.
  - 6 – Educate the patient to better manage their condition to help prevent further cognitive decline.



- What benefits emerge if the CP was to bring Ivy along to the Molly's next visit?



*"I enjoyed how friendly she was. She was very sweet and very polite. ... I have a sick family member who is battling leukemia, and he looked forward to receiving the pictures from the visit. She isn't just helping us in the community, she is also reaching people in Hamilton."*

*"Much more talkative than any other visit I have ever seen him. Ivy appeared to brighten up his mood and engagement for the visit." CP observation*



# Moving Forward – Next Steps

- **Short Term – Clean Data Stream**
  - Developing ‘value’ formulas for each activity.
    - Working toward quantifying value – total cost of provision.
  - Modifying the documentation process to more accurately record ‘value’ and changing the mindset on documentation as a competence in an effort to improve data quality.
  - Formal evaluation of CP documentation as a competence.
- **Long Term - Queen’s Community Health Data Lake**
  - Position Northumberland Paramedic Services to be a leader in the Queen’s Community Care Data Lake project.

# Relevant References

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