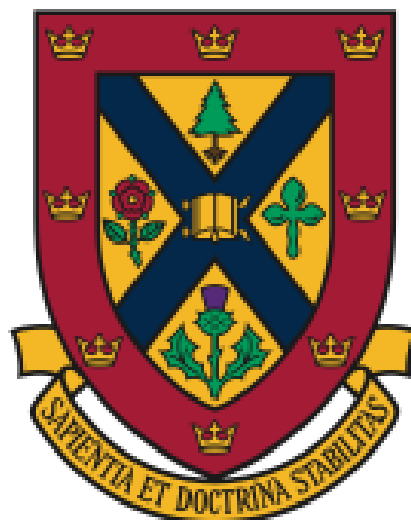


Leveraging electronic medical record data to develop patient interventions: a pilot study

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1. Background

- Segmentation techniques are applied in marketing but not fully explored in health care
- New approaches might help tailor interventions more specifically to patient needs
- Using positive deviance (a form of collective intelligence), people with similar behavioral characteristics may be able to learn from, problem solve with, and motivate each other
- Problem: Many patients still don't have good control over their Type 2 Diabetes (T2D) despite good Diabetes Education, Treatment and Follow-up
- Can positive deviance and data-driven segmentation help patients with poor diabetes control learn from those 'like them' who are successfully managing their disease?

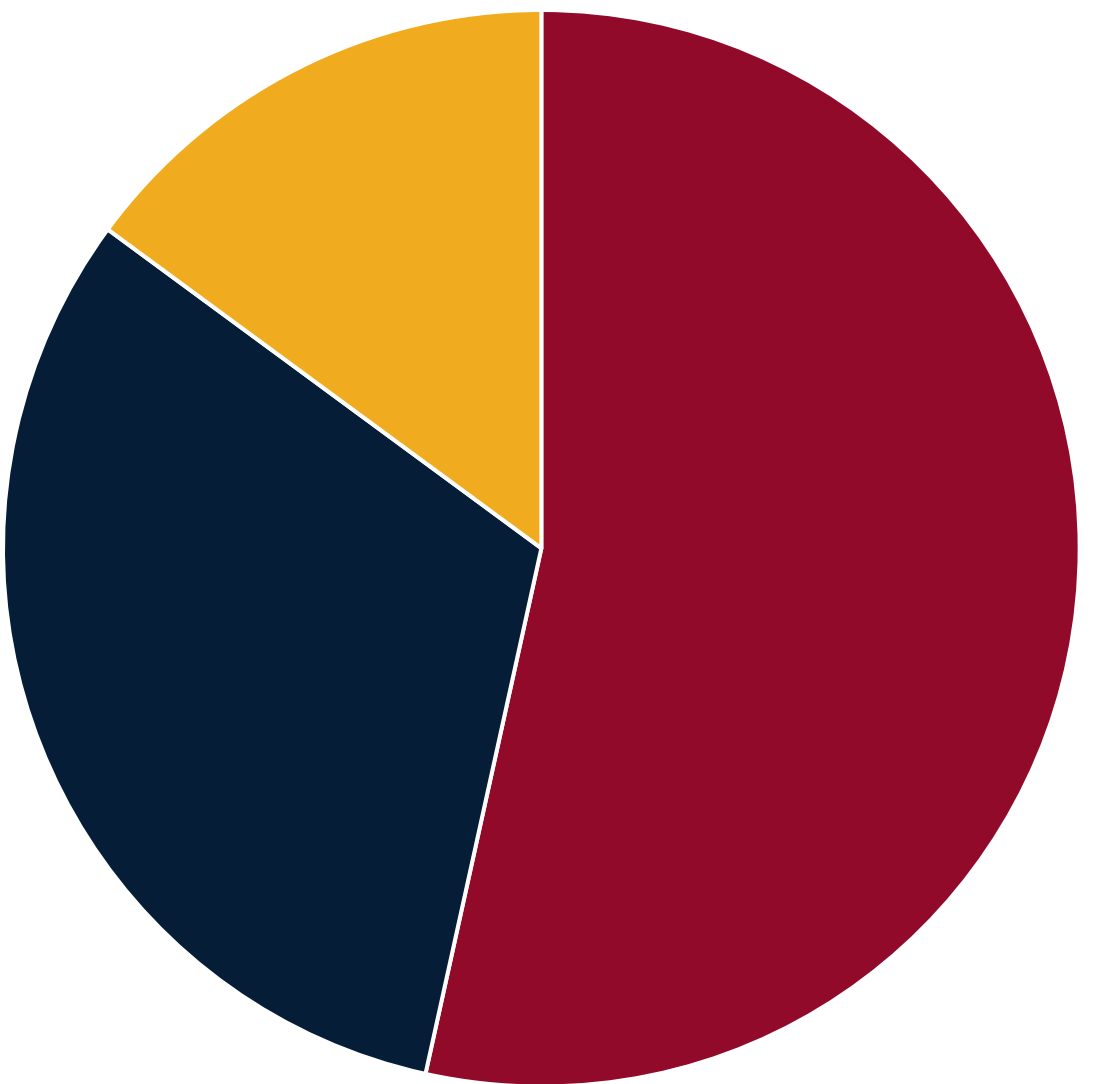
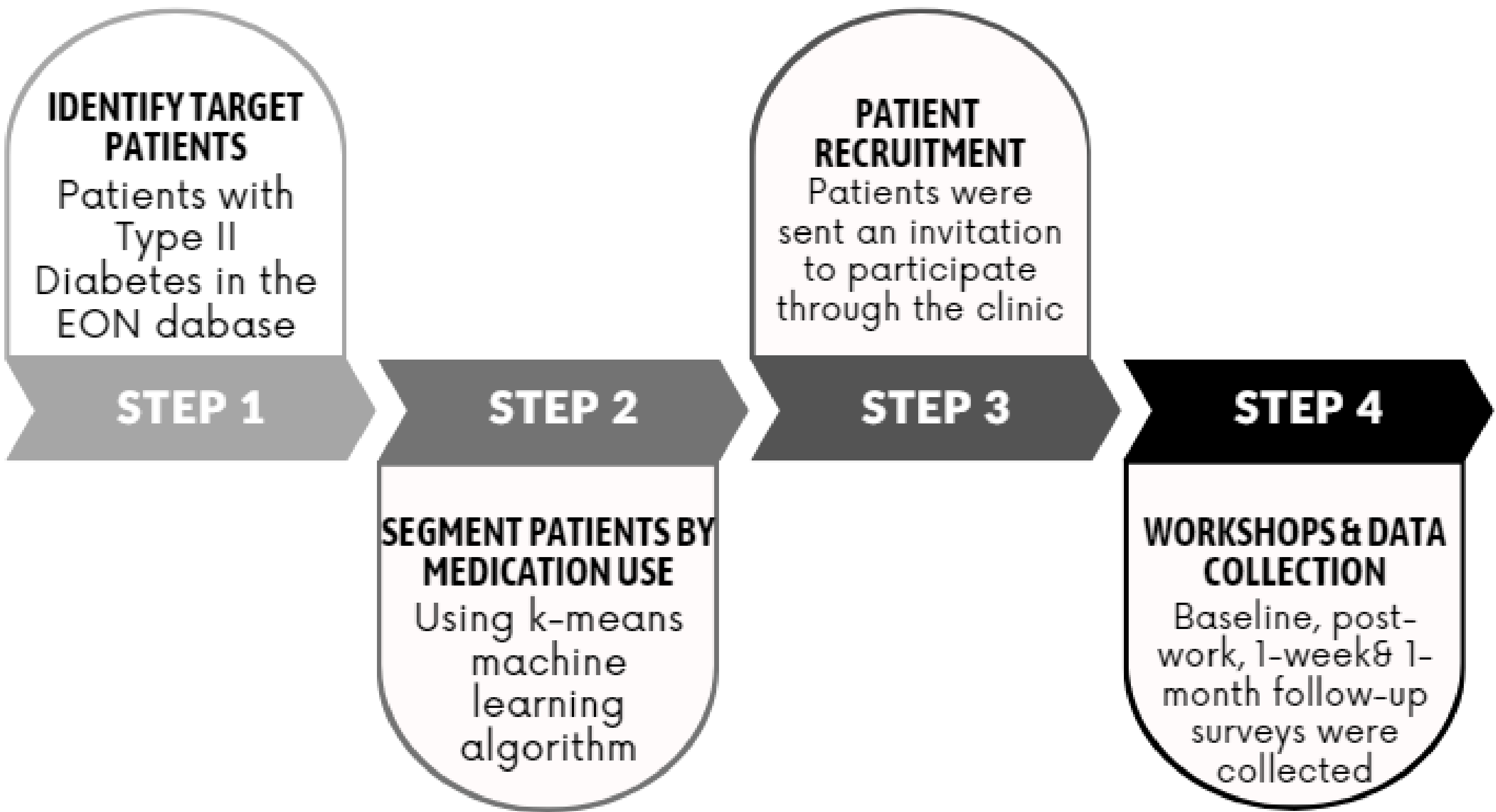
2. Aims

- Develop and validate machine learning algorithms to segment patients with T2D into meaningful clusters;
- Develop and assess a virtual peer-to-peer workshop intervention for patients with type 2 diabetes (T2D) by segmenting participants based on medication use.

3. Data

- Access to primary care electronic medical record (EMR) data repositories provides an opportunity to implement personalized primary health care solutions
- The Eastern Ontario Network (EON) database includes data from over 200,000 patients across Eastern Ontario
- For this study, data from one EON clinic was utilized to identify patients with T2D (n=825) aged 40 and older

4. Approach



■ Control ■ Medication ■ Lifestyle

Figure 1: Segmented patient groups

5. Patient Segmentation

Two extreme clusters identified using k-means machine learning clustering based on recent medication history:

- "Medication" segment = patients who tend to take several medications (N=32%)
- "Lifestyle" segment = patients who do not take diabetes drugs (N=15%)
- "Control" Remaining clusters = intermediate behaviors

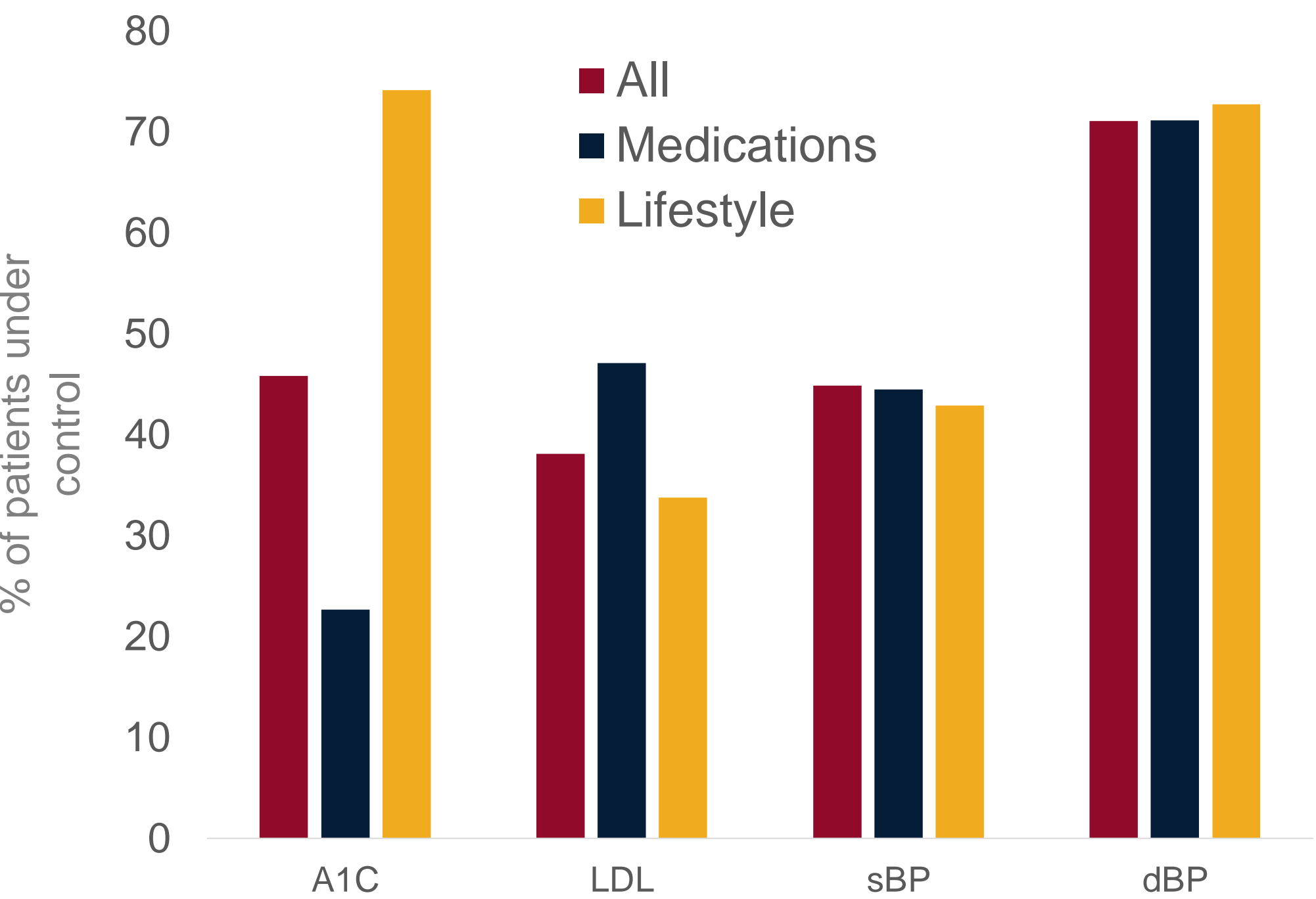


Figure 2: % Patients with good Control of biomarkers by segment

6. Peer-to-Peer Virtual Workshops

Moderated virtual peer-to-peer workshops were held with patients with good and bad control from within and across segments (lifestyle, medication, and mixed (from all clusters))

Six workshops with 3-6 participants (total n=22) included: sharing experiences, challenges and practical advice related to T2D, discussion and problem solving related to sharing T2D-related collective intelligence

7. Patient Outcomes

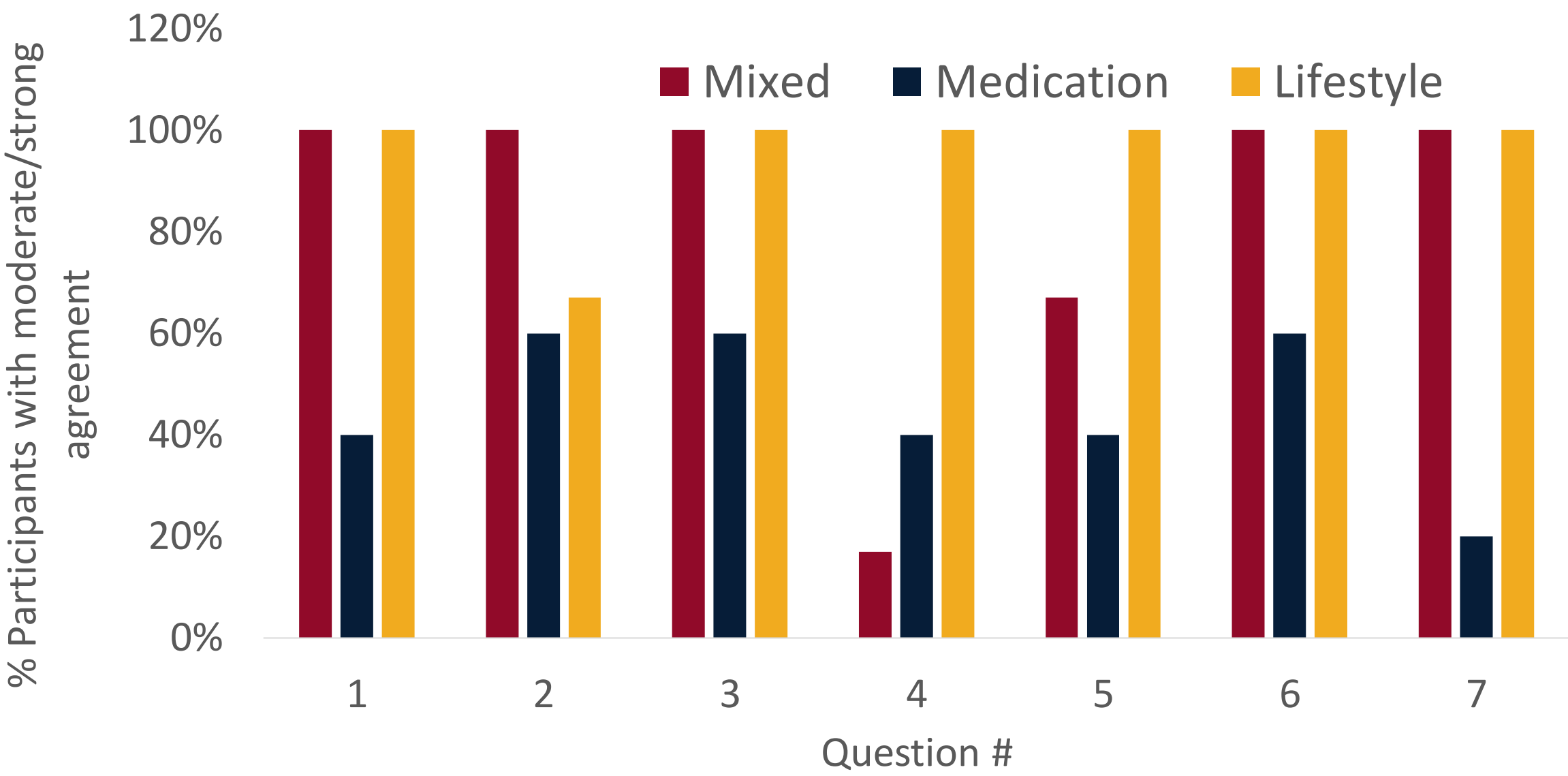


Figure 3: Patient reported outcomes post workshop participation

Learning and motivation:

Lifestyle and mixed group workshops had better overall experience (Q1), better learning (Q2-Q3), higher motivation to set a goal and act in the future (Q4-Q6) compared to the medication group. Only 20% of medication group participants would recommend the workshop, compared to 100% of lifestyle and mixed group participants.

8. Summary

- Pilot data indicates patients in the lifestyle + mixed workshop participants reported improved overall experience, better learning, and higher motivation
- Data analysis is ongoing, including qualitative analysis of workshop discussions
- Patients in the Medication and Lifestyle segments may have different preferences, needs, and characteristics (e.g., HbA1c control)
- This pilot project provides evidence to support the development and implementation of a data driven intervention for patients with T2D
- Segmentation of patients by behavior may help identify strategies that can help patients improve control of disease

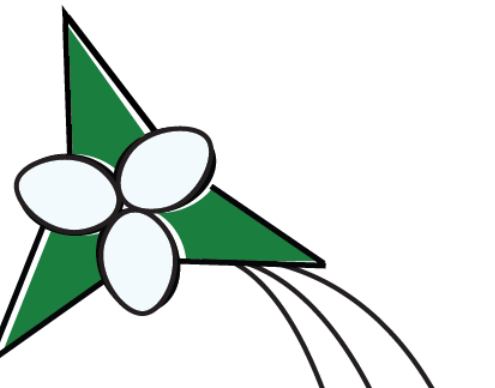
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EON: EASTERN ONTARIO NETWORK

The Eastern Ontario Network (EON), Queen's University's practice-based research network (PBRN), is a network of over 150 primary care providers in practice at 14 clinics in Eastern Ontario.

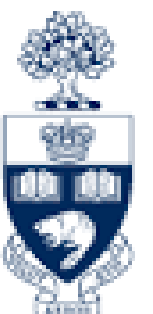
EON's goal is to leverage electronic medical record (EMR) data to transform primary care through cutting-edge research that impacts patient care and management.



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