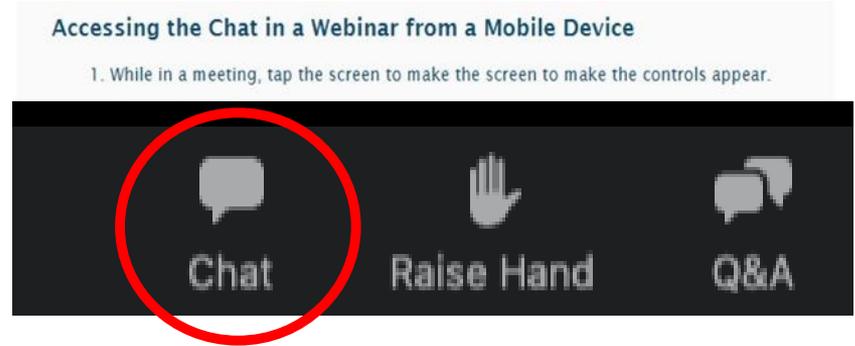


# **Population Segmentation for Population Health Management in Ontario Health Teams**

HSPN Monthly OHT Webinar  
January 25, 2022

# Welcome & thank you for joining us!

Please let us know who you are by introducing yourself (name & OHT or other org)



set response to all (panelists and) attendees  
in the chat box

# Land acknowledgement

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit.

Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

# Poll

## First time ?

Poll ended | 1 question | 182 of 226 (80%) participated

1. Have you joined us for an HSPN webinar previously ? (Single Choice)

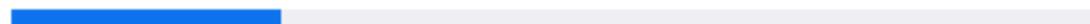
\*

182/182 (100%) answered

Yes (136/182) 75%



No, this is my first event (46/182) 25%



# Today's event

## Segmentation for Population Health Management

### Presenters



Walter Wodchis  
Co-Lead  
OHT Evaluation  
HSPN



Christina Clarke  
RISE Population  
Health Coach

# Agenda

1. Approach to Population Health Management (PHM)
2. Segmenting OHT attributable populations
3. Looking at cQIP measures by population segment
4. Examples to connect segmentation to care model co-design and quality improvement

# What we're trying to do

## Improving Value Means Increasing Population Health and Equity



### COMMENTARY

*Walter P. Wodchis, PhD*

Professor, Institute of Health Policy, Management and Evaluation  
Toronto, ON  
Research Chair in Implementation and Evaluation Science  
Institute for Better Health, Trillium Health Partners  
Mississauga, ON

*Robert J. Reid, MD, MPH, PhD*

Chief Scientist  
Institute for Better Health  
Trillium Health Partners  
Mississauga, ON



### ABSTRACT

*The purpose of this commentary is to outline a vision for the future of value-based healthcare in provinces across Canada and offer a few suggestions for the requirements to make substantial gains in value, based on learnings from past initiatives. We declare as our premise that improving value in healthcare means to improve population health. The goal of improving population health means to improve both average quality of life and life expectancy and to reduce inequalities in these health outcomes. That is, to "shift and squeeze" the population health distribution, as Dr. Patricia Martens phrased it in the Emmett Hall lecture at the Canadian Health Services and Policy Research conference in 2014.*

### Background

What does improved value and improved population health look like? Let us make the comparisons with other healthcare systems,

starting with the Organisation for Economic Co-operation and Development (OECD) as a benchmark for what has been achieved at this time on this planet.

## How to Approach Population Health Management



**An iterative process!**



**Throughout each component:**

- ✓ Apply an **EQUITY LENS**
- ✓ Leverage QI processes and complete **TESTS OF CHANGE**
- ✓ **ADAPT** based on learnings and as population changes



### HIGH LEVEL OVERVIEW OF EACH COMPONENT

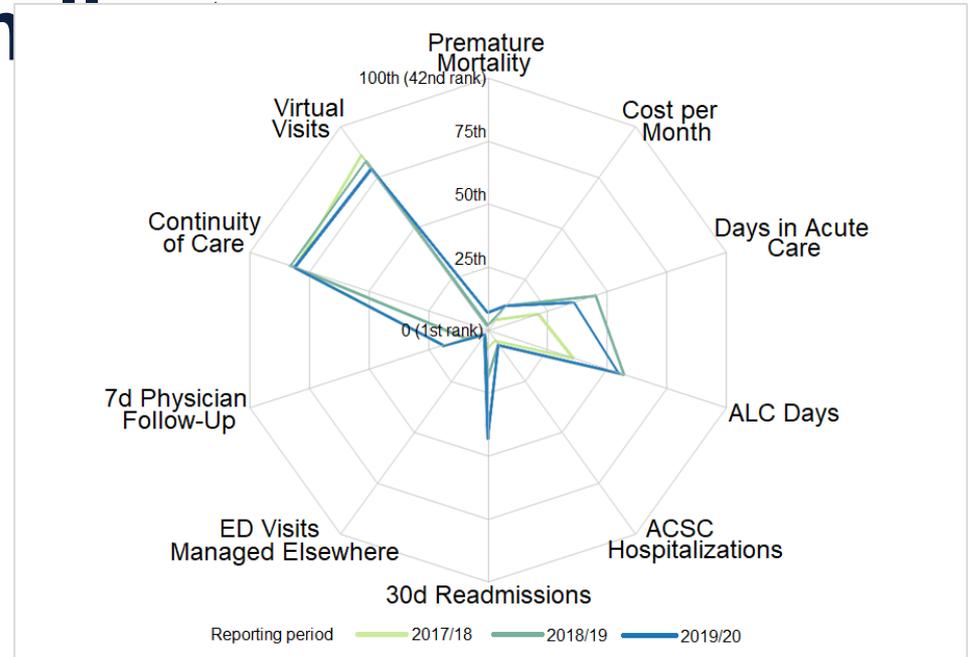
- **Population identification (start here)**
  - This will need to be done on an on-going basis as your population changes and can include two levels of identification:
    - 1) Understanding your attributed population (MoH data)
    - 2) Identifying a priority population with which to start/to prioritize next (HSPN reports)
- **Segmentation for needs, risks & barriers**
  - Segmenting your attributed population into priority populations
  - Segmenting your priority populations
- **Co-designing person-centred care models & service mix**
- **Implementation & reach**
- **Monitor & evaluate**
  - Using a quadruple aim approach

# HSPN used “Spider Diagrams” to report on overall OHT Attributable Population

## Indicator Reports

“Try to be SMALL”

... on target is better



# Opportunities for Improvement HSPN and cQIP Indicators

## Overall OHT Indicators (Hospital-based)

- Days in acute inpatient care
- **ALC days**
- ACSC hospitalizations
- ED visits best managed elsewhere

## Mental Health & Addictions Care

- Outpatient visits within 7d of MHA hospital discharge
- **ED as first point of contact for MHA**
- Frequent (4+) ED visits for MHA
- Repeat ED visits within 30d for MHA
- Rate of ED visits for deliberate self-harm

## Cancer Screening

- **Mammography**
- **Pap Screening**
- **Colorectal**

# Poll

## Using OHT cQIP data

Poll ended | 1 question | 109 of 279 (39%) participated

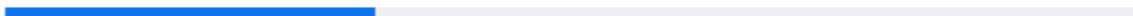
1. How have you used your cQIP data shared through Ontario Health Platform ? (check all that apply) (Multiple Choice) \*

109/109 (100%) answered

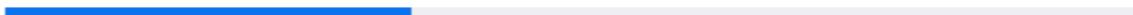
We have not yet reviewed our cQIP data in OHT mee... (28/109) 26%



Our project management office/backbone team have... (36/109) 33%



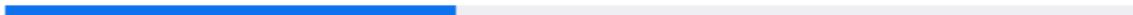
Our performance committee has discussed our data (39/109) 36%



Our leadership group has discussed our data (26/109) 24%



We are starting to develop plans for the cQIP (44/109) 40%



We have drafted plans to improve on cQIP indicators (7/109) 6%



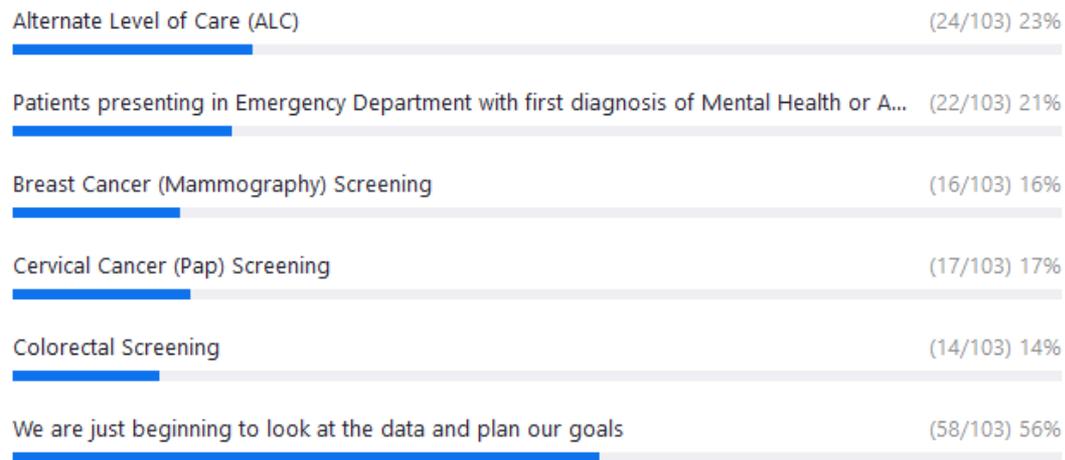
# Poll

## Which indicators have you advanced furthest for collaborative

Poll ended | 1 question | 103 of 285 (36%) participated

1. Which indicators have you advanced furthest for collaborative Quality Improvement Plans? (check all that apply) (Multiple Choice) \*

103/103 (100%) answered



For any of the cQIP measures, have you thought about different sub-populations that you want to focus on for improvement? What are your ideas?

Respond in the chat

# Prior HSPN White Papers on Population Health Management

Approaches to Population Health Management  
Informing Ontario's Health System Transformation

Shawna Cronin  
Lauren Tessier  
Kadesha A. James  
Walter P. Woodchis

Population Health Management Series: Part 1  
February 2021

HSPN Health System Performance Network

A Review of Population Segmentation Tools for Population Health Management: Applicability for Ontario Health Teams

Mudathira Kadu  
Xiaomeng Ma  
Lief Paggian  
Layna C. Ronella  
Walter P. Woodchis

Population Health Management Series: Part 2  
February 2021

HSPN Health System Performance Network

Real World Applications of Population Segmentation in Population Health Management

Daniela L. Veier  
Walter P. Woodchis

Population Health Management Series: Part 3  
February 2021

HSPN Health System Performance Network

## February 2021 HSPN Webinar

Today's event  
**Population Health Management**

Host  
Dr. Walter Woodchis  
Principal Investigator  
HSPN

Presenters

Lauren Tessier  
PhD Student  
HSPN

Mudathira Kadu  
PhD Student  
HSPN

Dr. Daniala Weir  
Post-Doctoral Fellow  
HSPN /  
Trillium Health Partners

Dr. Rob Reid  
Chief Scientist  
Trillium Health Partners  
RISE

Mike Hindmarsh  
Head PHM Coach  
CCMA  
RISE

HSPN 5

[hspn.ca/evaluation/oht/webinars/](https://hspn.ca/evaluation/oht/webinars/)

<https://hspn.ca/evaluation/oht/related/white-papers-on-population-health-management-and-population-segmentation/>

# Key Recommendations

- Ontario is rich with linked population clinical administrative and claims data.
- OHTs should consider both data-driven risk stratification approach and clinical/heuristic population segmentation approach to assess the relative merits of each and the potential for transition to a needs-based approach to care.
- Ensure segmentation can support the next stage in Population Health Management
  - Co-Designing Person-centred care models and service mix

# Think about your opportunities for improvement

Now let's take it down a level.

- Move from entire OHT attributable populations to sub-populations. Use population-segmentation to identify patient populations with (crudely) similar health and social care needs.
- Today, we use the British Columbia Health System Matrix as our example for how to undertake and use population segmentation (you could use other approaches e.g. CIHI).

# Population Segmentation



September 2021 HSPN Webinar

**Today's event**  
**Segmenting Your Population**

**Host**  
Dr. Walter Wodchis  
Principal Investigator  
HSPN

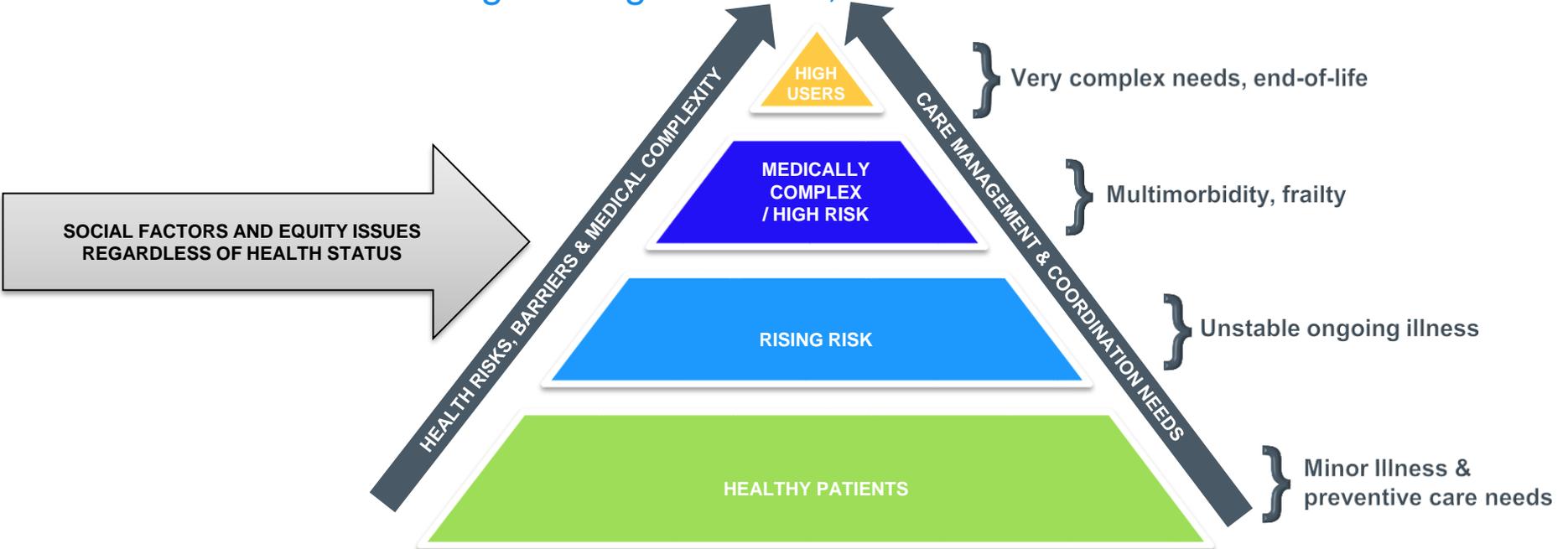
**Presenters**

 Debra Chen CHI	 Samantha Maqus BC MOH	 Rob Reid RISE Lead	 Christina Southey RISE Coach	 Alex Smith London-Middlesex OHT	 Curtis Handford Downtown East OHT
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HSPN  6

[hspn.ca/evaluation/oht/webinars/](https://hspn.ca/evaluation/oht/webinars/)

## Segmenting for needs, risks and barriers



Source: Adapted from Kaiser Permanente



**OHT Long Term Goal: Integrating Care for Full Attributed Population**

# Population Segmentation Using the British Columbia Health System Matrix

- Clinically driven
- Focused on predicting care service needs
- Based on the Bridges to Health Model

Using Population Segmentation to Provide  
Better Health Care for All: The “Bridges  
to Health” Model

JOANNE LYNN, BARRY M. STRAUBE,  
KAREN M. BELL, STEPHEN F. JENCKS,  
and ROBERT T. KAMBIC

*Centers for Medicare and Medicaid Services, U.S. Department of Health  
and Human Services*

The model discussed in this article divides the population into eight groups: people in good health, in maternal/infant situations, with an acute illness, with stable chronic conditions, with a serious but stable disability, with failing health near death, with advanced organ system failure, and with long-term frailty. Each group has its own definitions of optimal health and its own priorities among services. Interpreting these population-focused priorities in the context of the Institute of Medicine's six goals for quality yields a framework that could shape planning for resources, care arrangements, and service delivery, thus ensuring that each person's health needs can be met effectively and efficiently. Since this framework would guide each population segment across the institute's "Quality Chasm," it is called the "Bridges to Health" model.

**Keywords:** Health care reform, community health planning, health services needs and demand, person-focused health.

**C**R*ROSSING THE QUALITY CHASM* (IOM 2001A) ENVISIONED AN approach to health that focuses on the individual person or patient and met six specific aims for care: it must be safe, effective, efficient, patient centered (i.e., meets the patient's desires and preferences within the care delivery environment), timely, and equitable.

*Address correspondence to:* Joanne Lynn, Office of Clinical Standards and Quality, CMS, 7500 Security Blvd., Baltimore, MD 21244-1850 (email: Joanne.lynn@cms.hhs.gov).

The Milbank Quarterly, Vol. 85, No. 2, 2007 (pp. 185–208)  
No claim to original U.S. government works.  
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# BC's Population Segmentation: 14 Health Status Groups

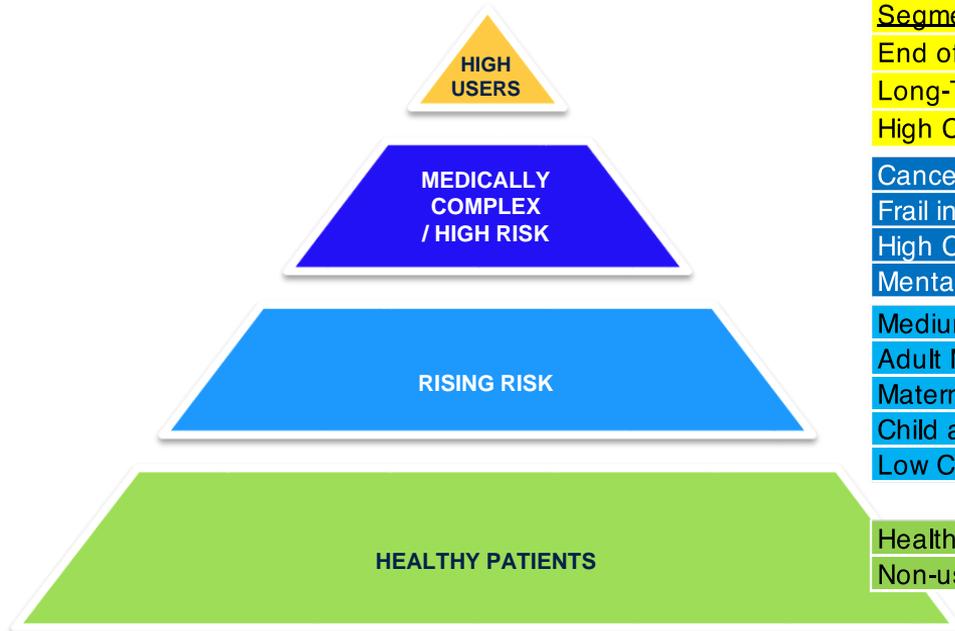
Broad Category	Population Segment representing 'highest' need for care in year	
<b>Towards the End of Life</b>	<b>End of Life</b>	In a palliative care or end of life program
	<b>Frail in Residential Care</b>	Living in Licenced residential care
	<b>Frail with High Complex Chronic Conditions</b>	High chronic conditions with supports for activities of daily living
	<b>Frail living in the community</b>	With supports for activities of daily living, without high chronic conditions
<b>Living with Illness and Chronic Conditions</b>	<b>High Complex Chronic Conditions, not Frail</b>	High chronic conditions, without supports for activities of daily living
	<b>Cancer</b>	Population with cancer diagnosis and treatment
	<b>Severe Mental Illness and Substance Use</b>	Hospitalized for MH or SU in 5 year period
	<b>Medium Complex Chronic Conditions</b>	Specific Medium Chronic Conditions or comorbidities
	<b>Low Complex Chronic Conditions</b>	Specific Low Chronic Conditions
<b>Getting Better</b>	<b>Children and Youth Major Conditions</b>	Significant time-limited health needs, without chronic conditions. Includes Newborns with health conditions
	<b>Adults Major Conditions</b>	health conditions
<b>Staying Healthy</b>	<b>Healthy</b>	Healthy, low users, with minor episodic health care needs
	<b>Maternity and Healthy Newborns</b>	Maternity, Obstetrics and newborns
	<b>Non-users</b>	People who used no health care in year



Health System Matrix 6.1, BC Ministry of Health 2015

BRITISH COLUMBIA

## Ontario: Cost, Mortality and Population Sizes of Population Groups/Segments Using BC Health System Matrix



Segment	\$ PMPM	Premature Mortality	% Pop
End of Life	\$ 5,318	22,664	0.6%
Long-Term Care	\$ 4,290	10,040	0.6%
High Chronic with Frailty	\$ 2,661	6,518	1.0%
Cancer	\$ 1,661	3,073	0.7%
Frail in Community (Home Care)	\$ 1,314	2,695	0.7%
High Chronic Conditions	\$ 909	1,374	4.0%
Mental Health & Substance Abuse	\$ 725	967	1.1%
Medium Chronic Conditions	\$ 441	542	8.2%
Adult Major Age 18+ yrs	\$ 308	243	2.8%
Maternity & Healthy Newborn	\$ 228	28	2.1%
Child and Youth Major <18 yrs	\$ 190	200	27.0%
Low Chronic Conditions	\$ 187	41	0.9%
Healthy (low user)	\$ 65	52	39.1%
Non-user	\$ 31	61	11.2%

Source: Adapted from Kaiser Permanente

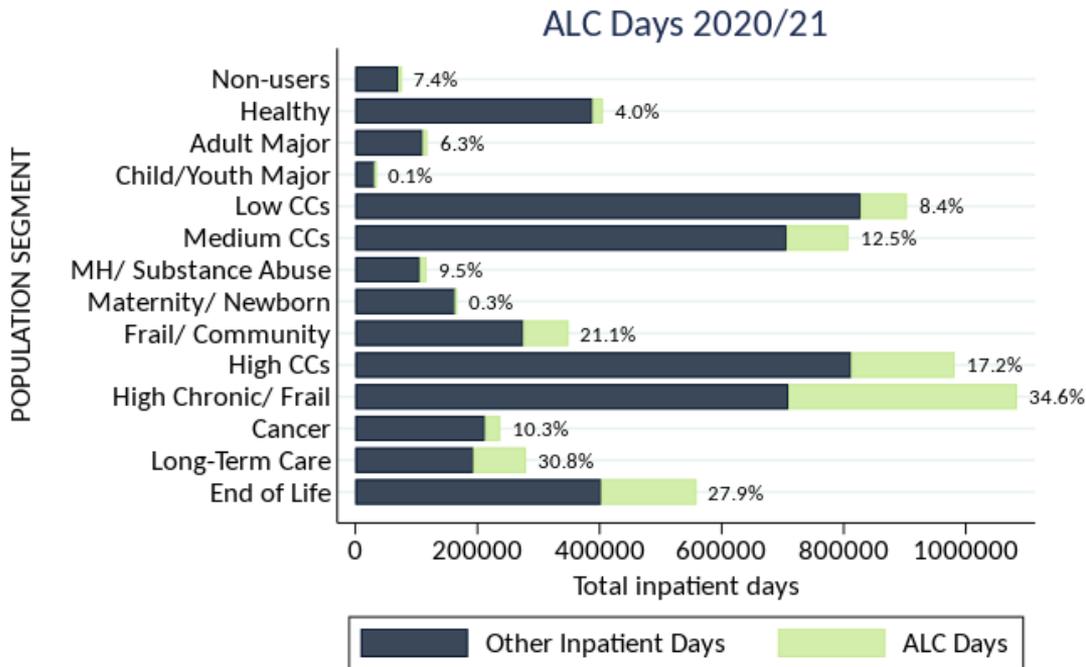
All data for 2020/21 based on 2019 Attributed Population  
 \$PMPM = Provincial attributed government cost per member per month  
 Premature mortality per 100,000 population

# Think about your opportunities for improvement

The next slides focus on OHT measures for cQIP indicators:

- We report on 5 cQIP indicators (ALC, MH first, 3x cancer screening)
- HSPN will send reports to OHTs on cQIP indicators reported according to BC Health System Matrix groups and CIHI Pop Grouper. Today we review results based on BC HSM.
- Different indicators are prominent in different groups identifying the need for both in-reach (amongst known contacts of health

# 2020/21 ALC Days Rate (per 100 acute days) in acute hospitals across all Ontario OHTs by BC Matrix Segment

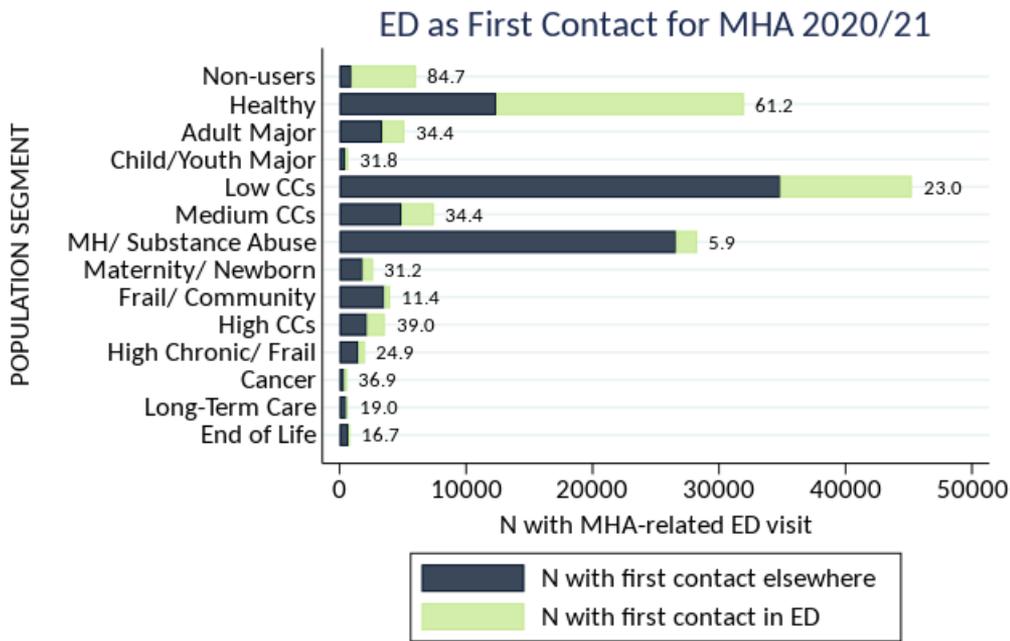


Notes:  
 \*Proportion of inpatient days designated as ALC is shown at end of bar.  
 \*Data are suppressed for segments with small counts.  
 \*Overall ALC days in OHTAM=18.0%.

cQIP ALC indicator is reported showing the total number of patient days in the bars:

- blue bars represent number of non-ALC days (x-axis/horizontal scale);
- green indicate number of ALC days;
- percentage to the right is the proportion of acute inpatient days that are ALC

# Rate of mental-health related ED visits in 2020/21 (per 100 population) where the ED was the first point of contact with a health provider across all Ontario OHTs by BC Matrix Segment

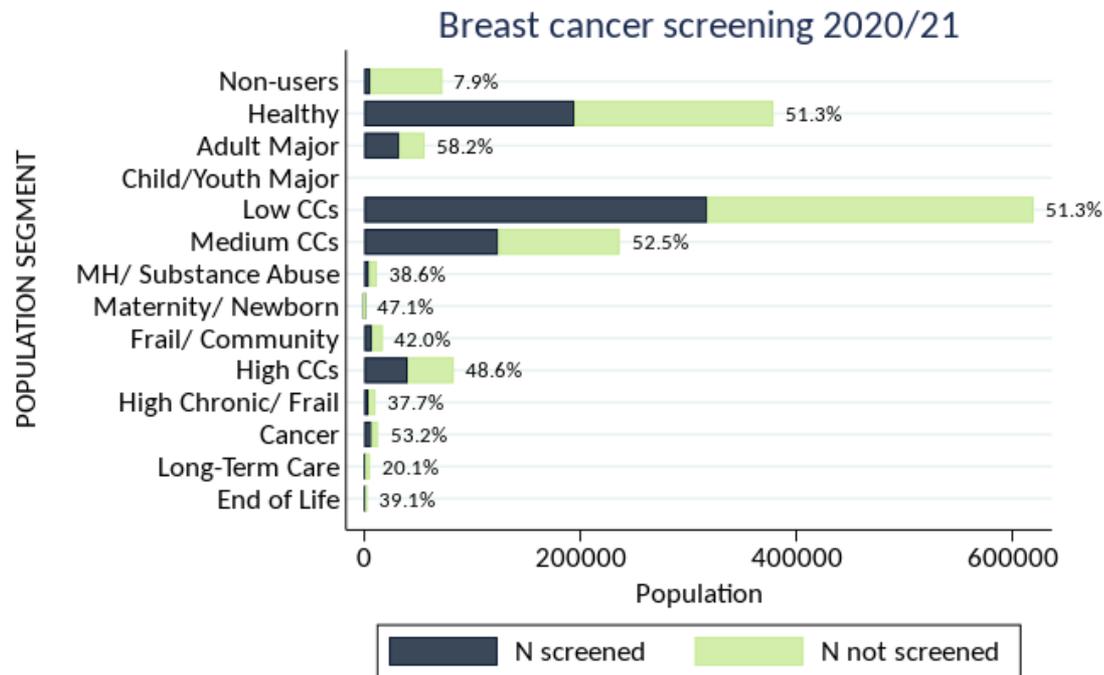


Notes:  
 \*Rate of segment with ED as first point of contact for MHA is shown at end of bar.  
 \*Data are suppressed for segments with small counts.  
 \*Overall rate per 100 in OHTAM=32.3.

cQIP MHA indicator is reported showing the total number of individuals with MHA-related ED visits in the bars:

- blue bar represents number of individuals where the MHA-related ED visit was not the first point of contact for MHA (x-axis);
- green indicates number where the MHA-ED visit was the first point of contact;
- percentage to the right is rate of MHA-related ED visits where the ED was the first point of contact

# Number of women (52-69 yrs of age) across all Ontario OHTs not up-to-date with a screening Mammogram as at March 31, 2021 by BC Matrix Segment

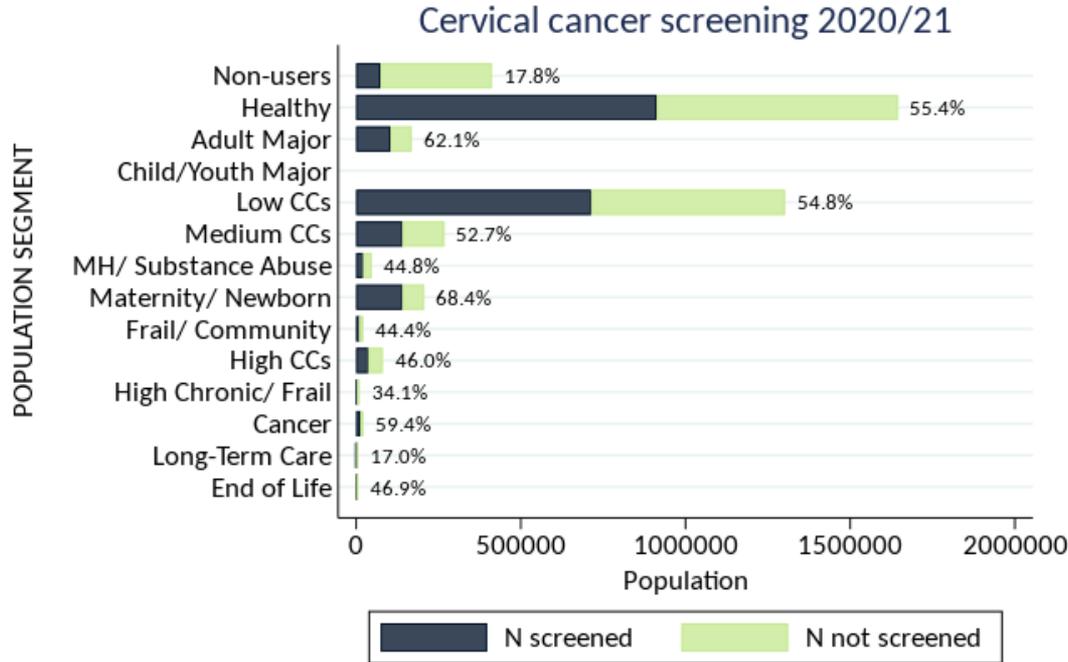


Notes:  
 \*Proportion of segment screened is shown at end of bar.  
 \*Data are suppressed for segments with small counts.  
 \*Overall proportion screened in OHTAM=49.1%.

cQIP cancer screening indicators are reported showing the total number of individuals in the bars:

- blue bar represents number of individuals screened (x-axis);
- green indicates the number not screened;
- percentage to the right is the breast cancer screening rate

# Number of women (23-69 yrs of age) across all Ontario OHTs not up-to-date with a screening Pap Smear as at March 31, 2021 by BC Matrix Segment

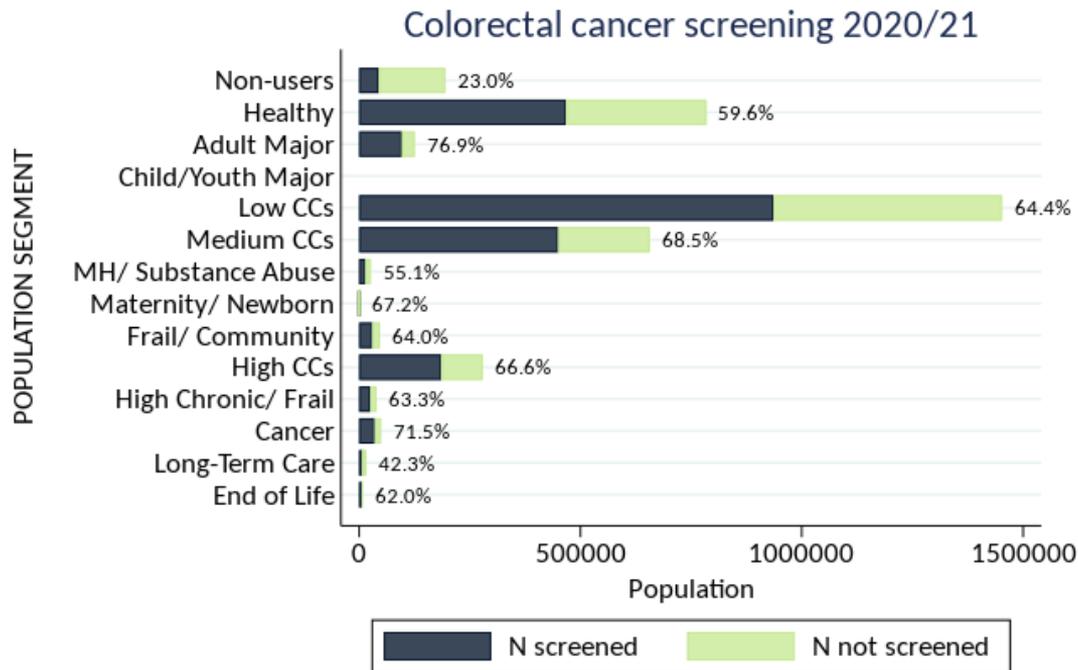


Notes:  
 \*Proportion of segment screened is shown at end of bar.  
 \*Data are suppressed for segments with small counts.  
 \*Overall proportion screened in OHTAM=51.8%.

cQIP cancer screening indicators are reported showing the total number of individuals in the bars:

- blue represent number of individuals screened;
- green indicate number not screened;
- percentage to the right is cervical cancer screening rate

# Number of adults 52-74 yrs of age across all Ontario OHTs not up-to-date with a Colorectal Cancer screening as at March 31, 2021 by BC Matrix Segment



Notes:  
 \*Proportion of segment screened is shown at end of bar.  
 \*Data are suppressed for segments with small counts.  
 \*Overall proportion screened in OHTAM=62.4%.

cQIP cancer screening indicators are reported showing the total number of individuals in the bars:

- blue bars represent number of individuals screened (x-axis);
- green indicate number not screened;
- percentage to the right is cervical cancer screening rate

# Implications

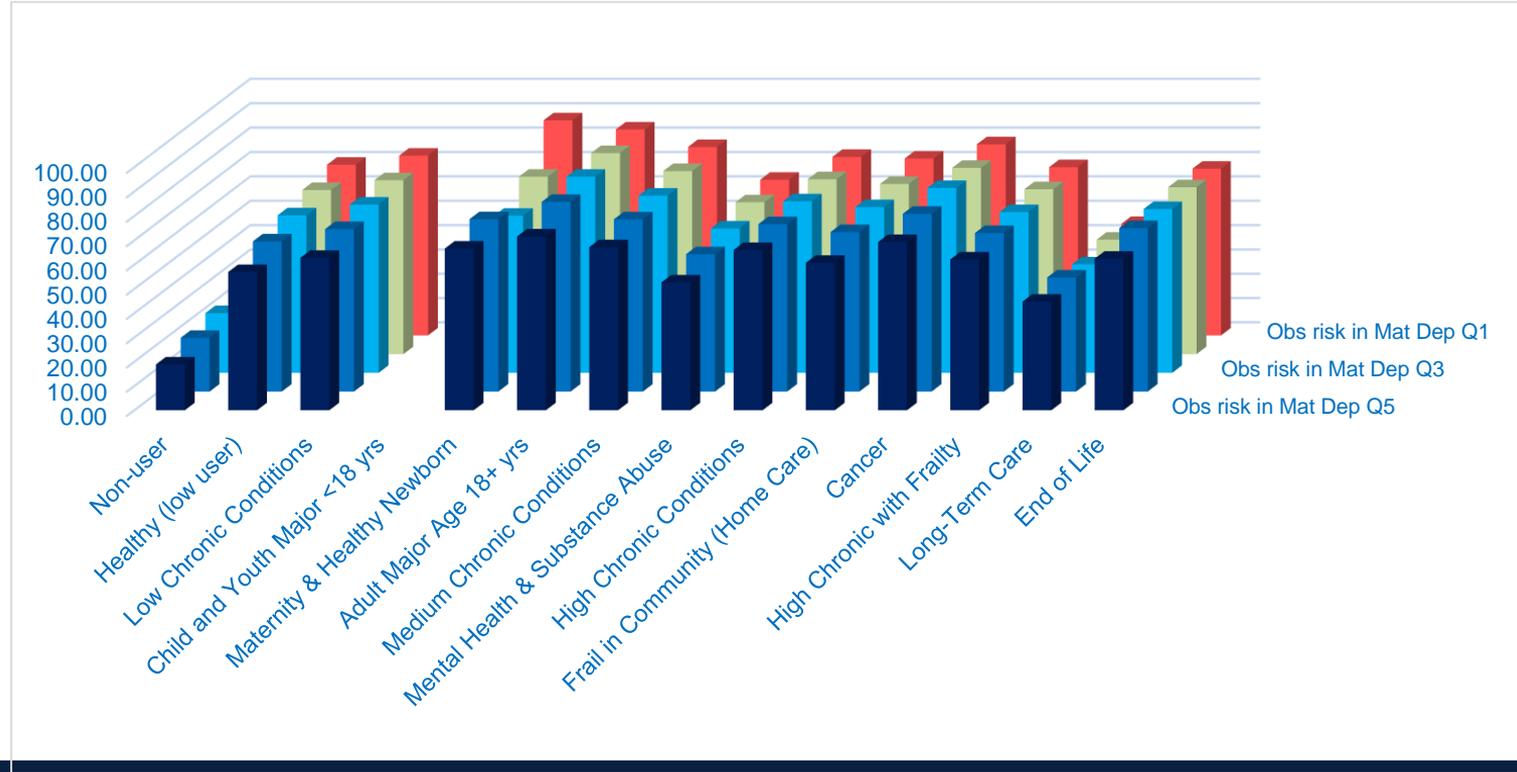
- ALC strategies must consider multiple populations including frail seniors in the community, those in Long Term Care and those who have palliative care needs at the end of life.
- Strategies to identify individuals with Mental Health and Addictions must consider those who tend to use relatively little health care services but also some who have Major Acute encounters in the health care system.
- Cancer screening strategies must pay particular attention to those with little to no contact with the health care system.

# Sub-population segmentation: Think about equity

The next slide shows how OHT cQIP measures of cancer screening are related to Material Deprivation across population segments:

- In most population segments we see a notable gradient where those who live in the most deprived neighbourhoods have the lowest level of cancer screening and the screening rates go up as neighborhood deprivation decreases.  
E.g. for Low Chronic Conditions Colorectal screening rates increase from 63% to 74%
- We use the Deprivation Score from the Ontario Marginalization Index

# Percent of adults 52-74 yrs of age across all Ontario OHTs not up-to-date with a Colorectal Cancer screening as at March 31, 2021 by BC Matrix Segment and Material Deprivation Quintile

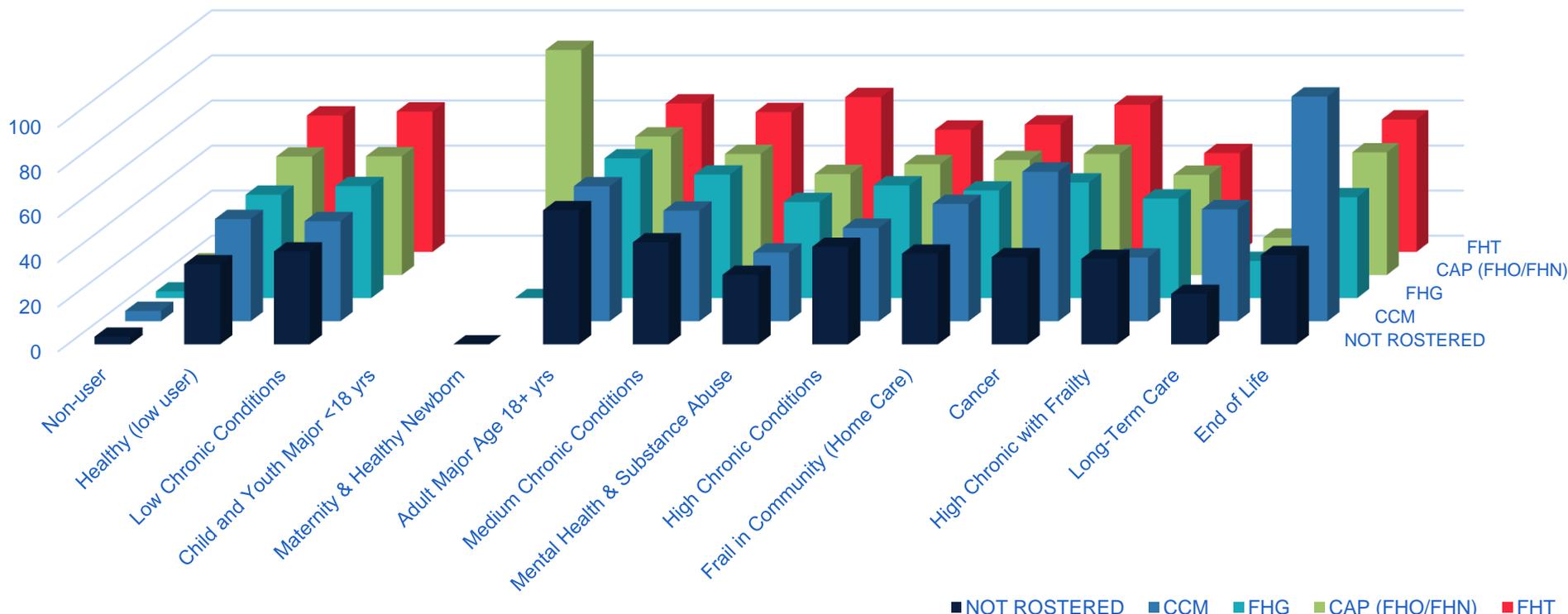


# Sub-population: Think about primary care models

The next slides focus on your how OHT cQIP measures of cancer screening are related to (payment) models of primary care.

- In most population segments we see a notable gradient where those who are attached to Family Health Teams (FHTs) have higher rates of cancer screening than those in other capitation models which are higher than in blended payment or non-enrolled patients.
- E.g. for Mental Health/Substance Abuse segment, Breast cancer screening with Mammogram decreases from 69% in FHT to 31% among those rostered with Comprehensive Care

# Percent of women (52-69 yrs of age) who are up-to-date with a screening Mammogram as at March 31, 2021 by BC Matrix Segment and Physician Enrolment Model



■ NOT ROSTERED ■ CCM ■ FHG ■ CAP (FHO/FHN) ■ FHT



CCM – Comprehensive Care Model  
 FHG – Family Health Group  
 CAP (FHO/FHN) – Family Health Organization/Family Health Network  
 FHT – Family Health Team

# Implications

- Both in-reach and out-reach strategies must consider the barriers to access experienced by individuals living in geographies with high levels of deprivation.
- Strategies to reach patients in primary care practices that do not have rostered patients or are primarily Fee for Service with Comprehensive Care Model rostering are important. These practices have lower rates of screening and effective interventions have greater opportunity to increase overall OHT screening rates.

Share your thinking and questions about segmentation and how it applies to cQIP indicators. What are your ideas to address the cQIP indicators ?

Respond in the chat

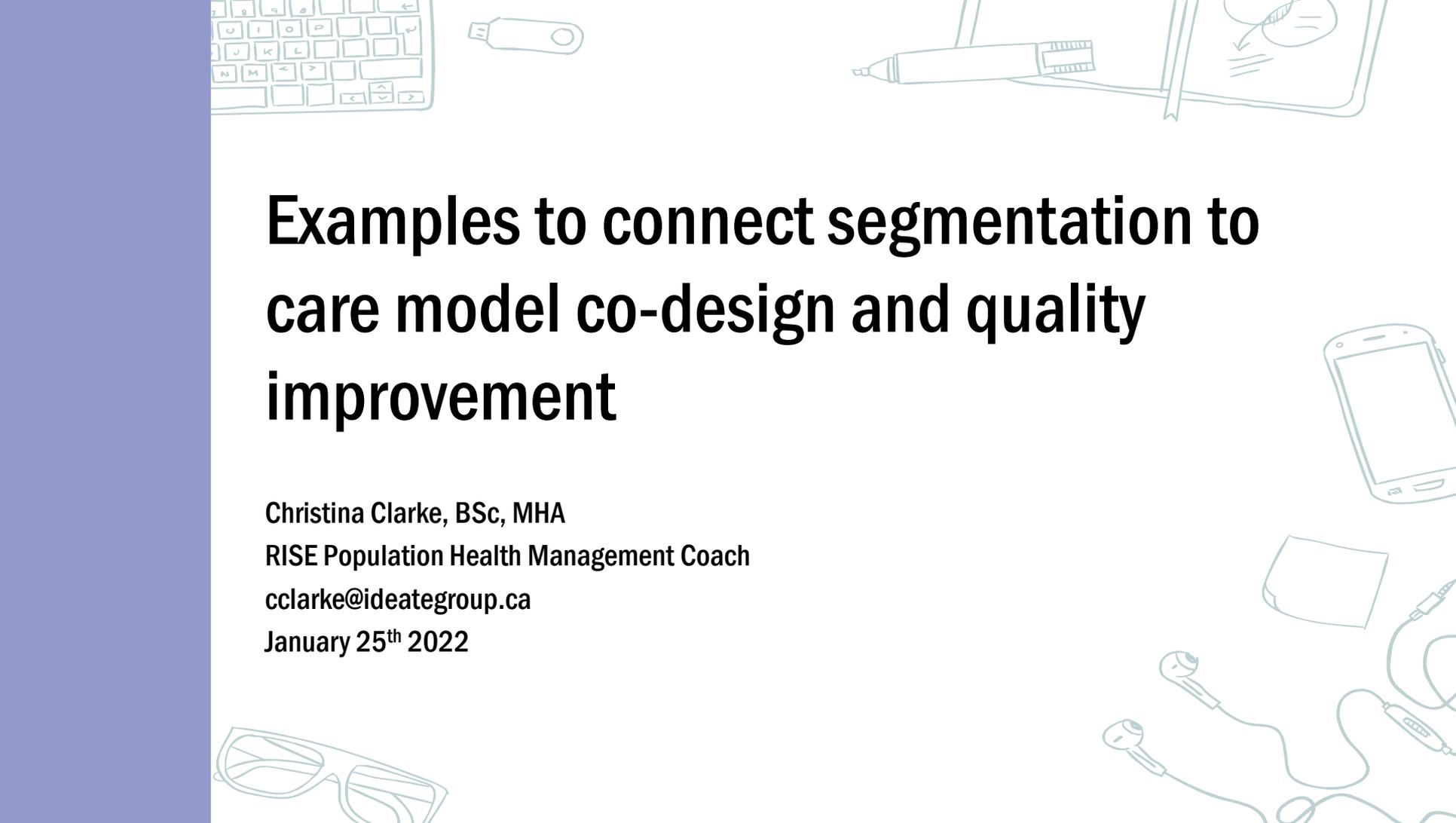
# Think about your opportunities for improvement

- Use examples from Ontario Health - Quality 'change ideas' to identify improvement opportunities for Alternate Level of Care (ALC), Mental Health and Addictions/Substance Abuse (MHA), Cancer screening.

Resources available through Ontario Health's OHT cQIP Community of Practice for 'change ideas'

# Summary

- Population segmentation into different ‘types’ of health care needs offers more refined information on which individuals require additional intervention to improve on cQIP (and other) indicators.
- Sub-population segmentation starts to drive more specifically at the different challenges faced by patients including socio-economic challenges and the advantages of attachment to interprofessional teams.



# Examples to connect segmentation to care model co-design and quality improvement

Christina Clarke, BSc, MHA

RISE Population Health Management Coach

[cclarke@ideategroup.ca](mailto:cclarke@ideategroup.ca)

January 25<sup>th</sup> 2022



# Segmentation for population health management

- A process of understanding why the health of groups is not optimal
- Involves using data and knowledge to understand how systems, processes, medical care, and patient factors influence an outcome



## The process of segmentation helps us...

- Challenges assumptions and act on data and knowledge
- Support planning to better match finite resources to needs
- Identify improvement opportunities
- Understand and account for variation in populations (e.g., who is not accounted for?)



“We're lost, but we're making good time.” — Yogi Berra



# Principles for segmentation

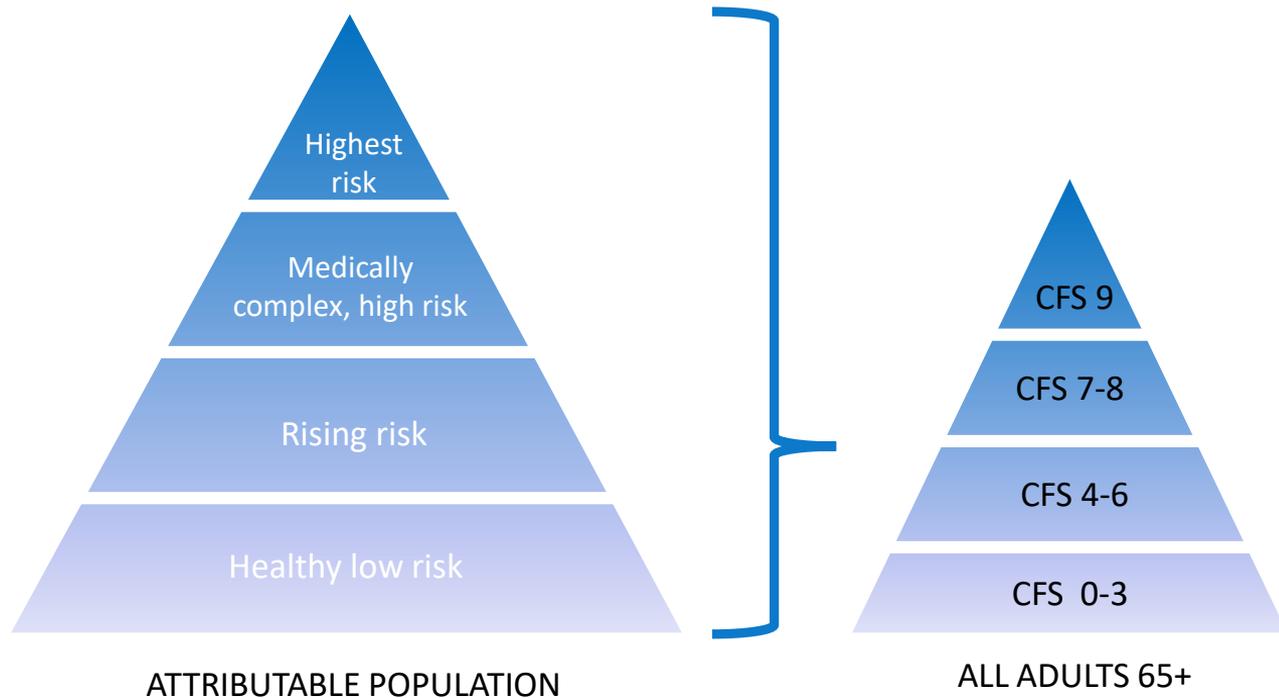
- Prioritize learning (about your population)
- Look for leverage points
- Start small, learn and grow
- Don't let perfect be the enemy of good enough
- Steal and share – repeat
- Segmentation is a process, not an outcome or end-point

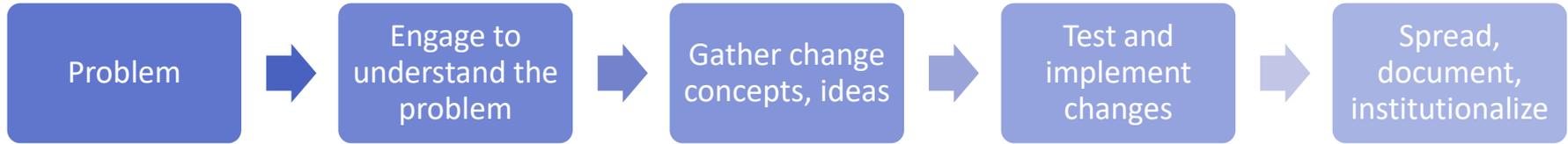
# There's no single right way to do population segmentation

- Consider scope (whole population, sub-population)
- Consider what data you have available now?
- Segment based on what you already know
- Low tech (excel, care team review) or high tech (e.g., CIHI pop health grouper, Johns Hopkins ACG system, etc.)?

# Example 1:

Focusing on  
the frail older  
adult  
population  
(65+)





Frailty not identified or managed before crisis occurs

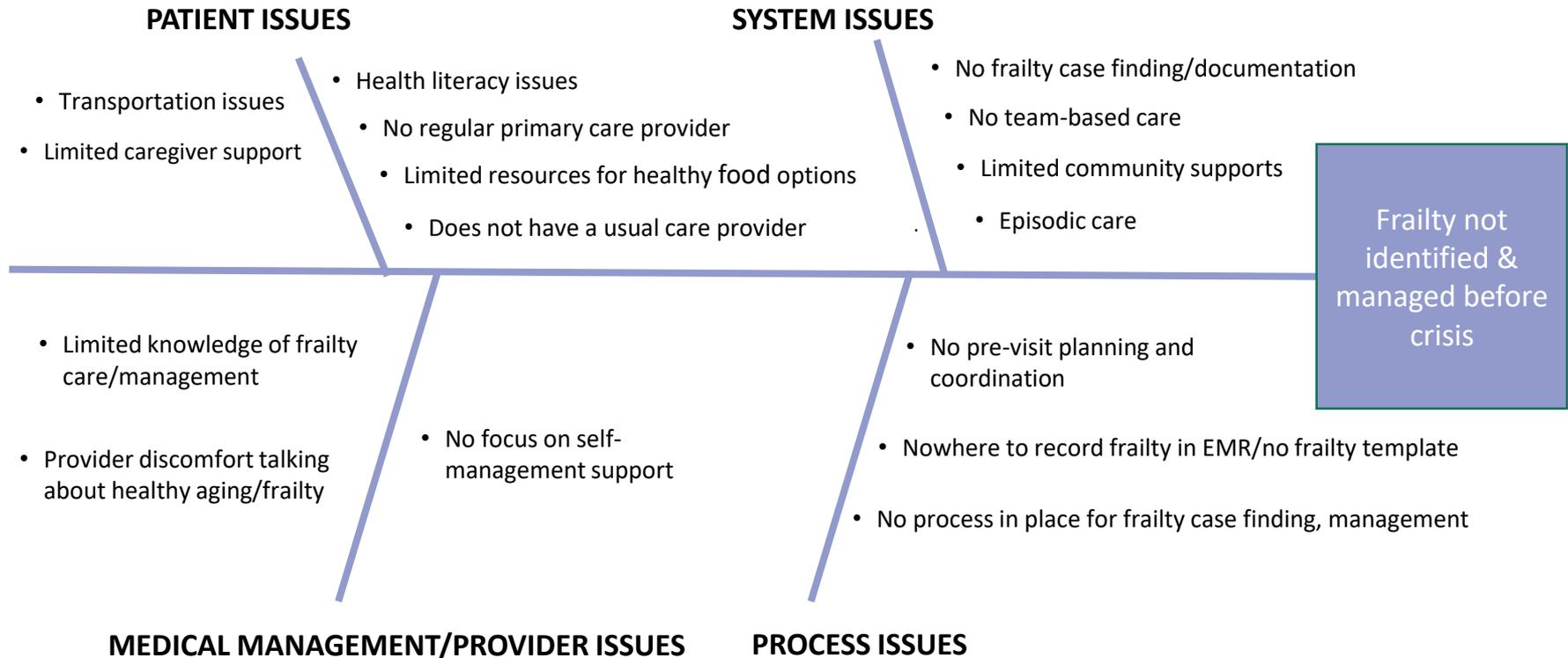
Validate with data/observation  
Fishbone diagram  
Process Mapping  
Pareto analysis  
Others

Best-practice  
Patient ideas  
Problem analysis  
Ontario Health - Quality  
'change ideas

PDSAs  
Scale up PDSAs  
Implement

The diagram shows three small circles, each containing the letters P, A, D, and S arranged in a circle, representing PDSA cycles. The circles are arranged in a diagonal line from bottom-left to top-right, with the top-right circle being the largest.

# Fishbone diagram (root cause analysis)

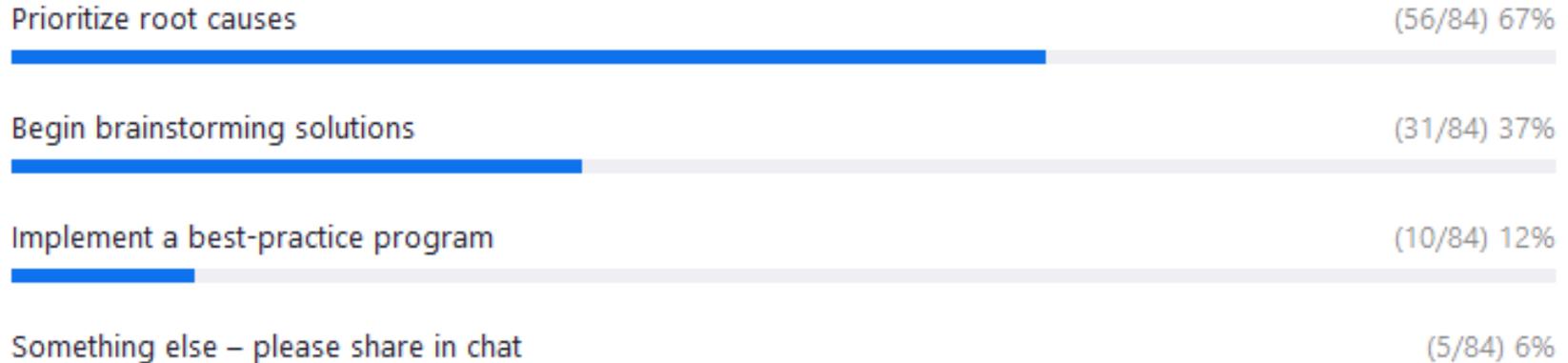


# What are your next steps?

Poll ended | 1 question | 84 of 230 (36%) participated

1. What are your next steps? (Multiple Choice) \*

84/84 (100%) answered

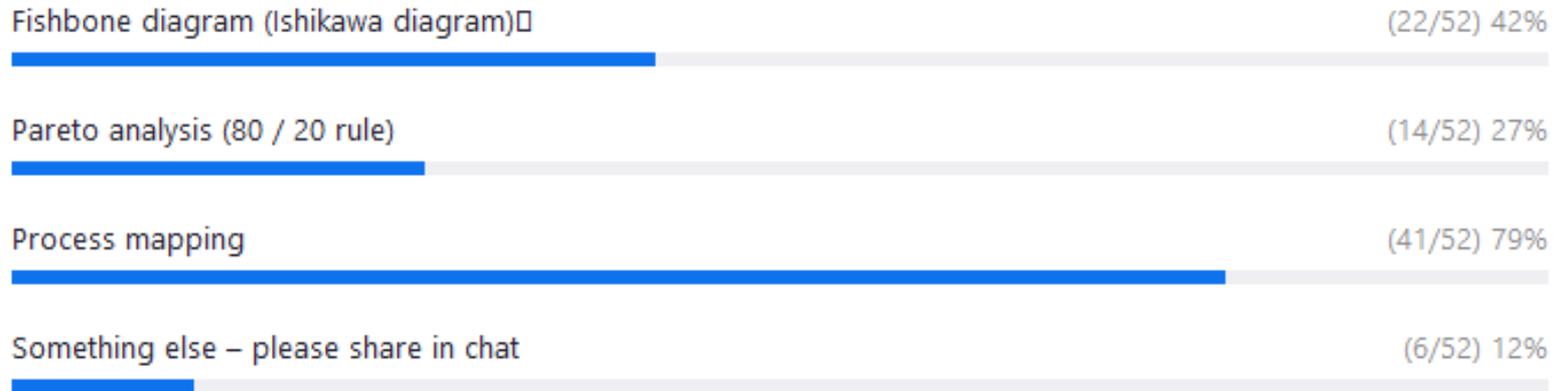


# What tools or processes are you using for your segmentation work

Poll ended | 1 question | 52 of 223 (23%) participated

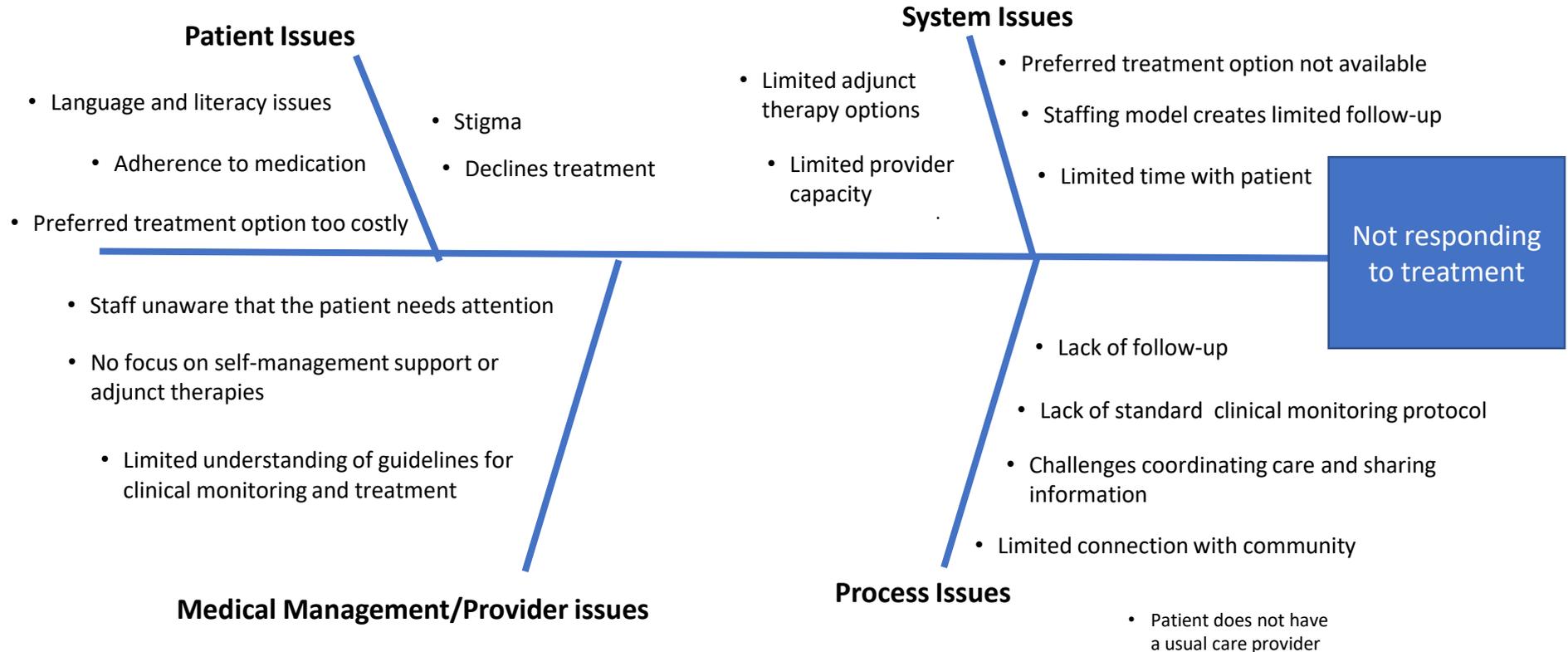
1. What tools or processes are you using for your segmentation work? (Multiple Choice) \*

52/52 (100%) answered





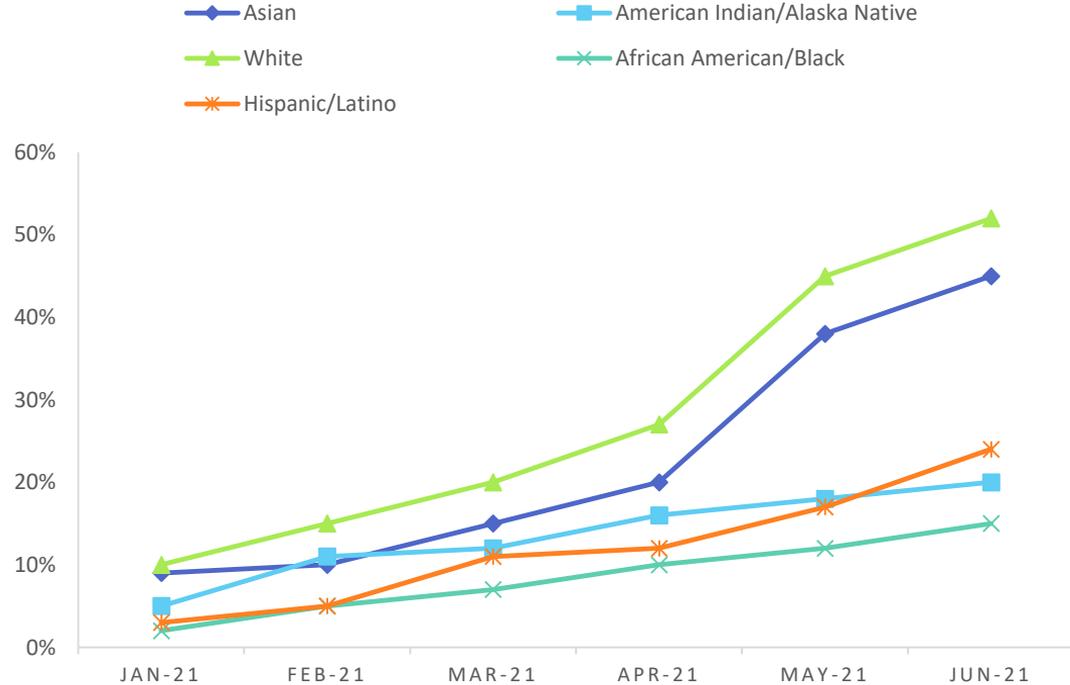
# Moderate depression, not responding to treatment



## Example 2:

Segmentation  
by race to look  
for gaps

### VACCINATION RATES SEGMENTED BY RACE



# Where are you in your segmentation efforts?

Poll ended | 1 question | 62 of 203 (30%) participated

1. Where are you in your segmentation efforts? (Single Choice) \*

62/62 (100%) answered



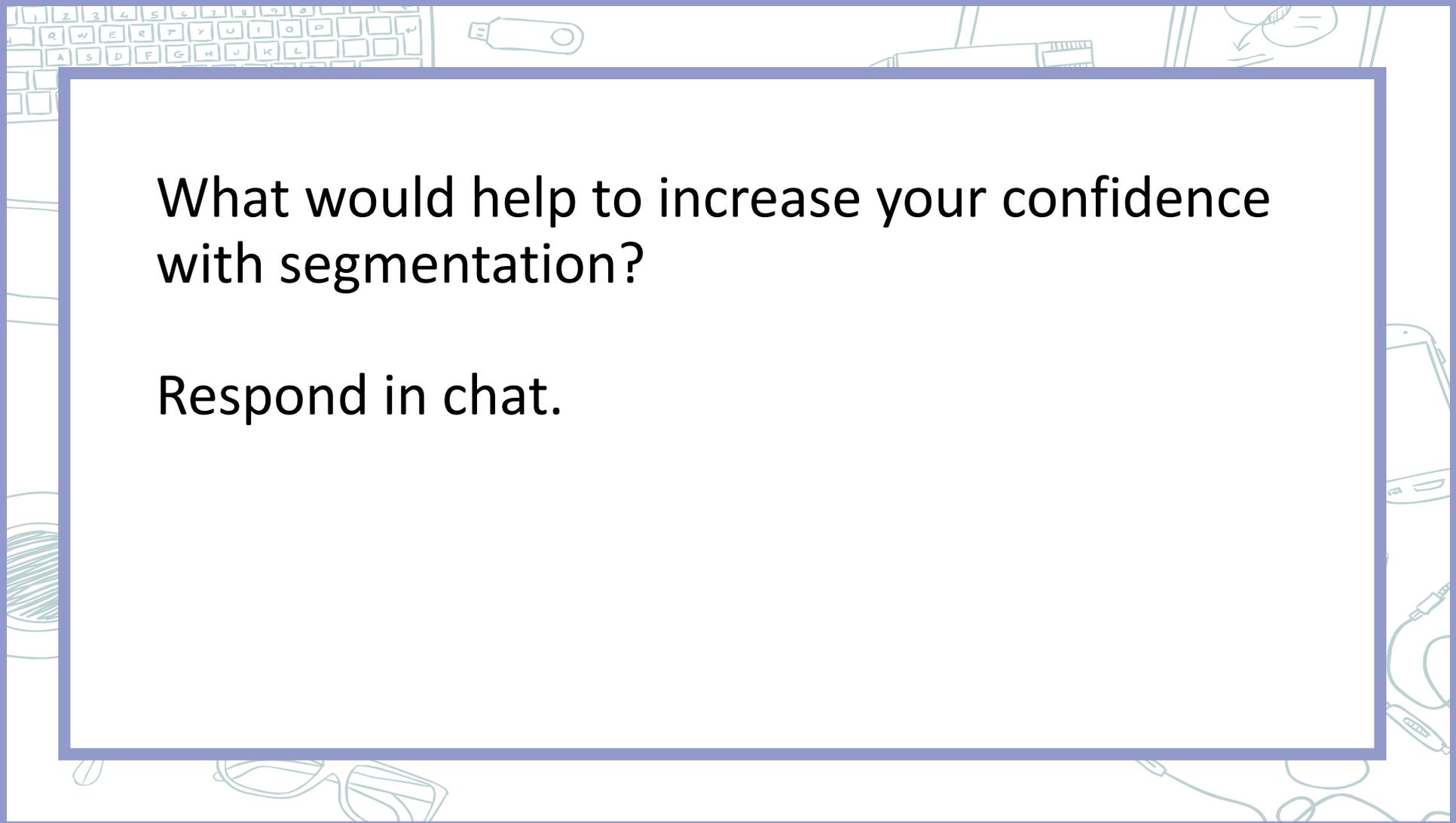
## How confident that you can segment any part of your population

Poll ended | 1 question | 77 of 204 (37%) participated

1. How confident are you that you can segment any part of your attributable population (Single Choice) \*

77/77 (100%) answered



The background features a light blue line-art illustration of a workspace. On the left, a portion of a computer keyboard is visible. At the top center, there is a USB drive. On the right, a laptop is partially shown. The entire scene is framed by a thin blue border.

What would help to increase your confidence with segmentation?

Respond in chat.

# Up Next:

## HSPN Webinar Series

- 4<sup>th</sup> Tuesday of the Month: 12:00 – 1:30pm

### Upcoming Topics:

- Series in Population Health Management
  - Segmentation: Examples in OHTs
  - Understanding chronic disease management (e.g. diabetes)
- Series in Learnings from OHT Development
  - Early learnings from OHTs in Developmental Evaluation
  - Organizing for Ontario Health Teams survey 2.0

# ***Everyone is involved !***

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<https://hspn.ca/evaluation/ontario-health-teams>

## **Thank you!**