Improving health systems for vulnerable populations from a primary care perspective

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Land Acknowledgements

The Department of Family Medicine, McMaster University, recognizes and acknowledges that it is located on the traditional territories of the Haudenosaunee and Anishnaabeg nations. This territory, covered by the Upper Canada Treaties, is within the lands protected by the Dish With One Spoon Wampum agreement and is directly adjacent to the Haldimand Treaty territory.

The City of Phoenix is located within the homeland of the O'Odham and Piipaash peoples and their ancestors, who have inhabited this landscape from time immemorial to present day.
Disclosures
VIP Research Team Acknowledgements

Dr. Ricardo Angeles, MD, PhD
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Setting the Scene
The Epidemiology
The Effects on Healthcare System
The Implications
Who, Where, How?
Health System Impacts
Bringing It All Together
1: Setting the Scene

Physician

Personal reflections about clinical experience in primary care in deprived settings in the UK/Canada
Council Housing in the United Kingdom
The World’s End Estate
What does it mean to be ‘vulnerable’?

Human/Social
- Group of people
- Graduation cap
- Gender symbols

Economic
- Currency symbol
- Home with broken window
- Fork and knife

Physical
- Person falling
- Heart rate
- Elderly person with cane

Environmental
- Home with lock
- Building with location pin
- Train
Vulnerable Populations

There are many vulnerable populations:
- Chronic conditions
- Homeless
- Mental illness
- Low-income
- Ethnic minorities
- Seniors
- ... 

Vulnerable populations are further impacted by disparities in social determinants of health and social factors:
- Poverty
- Housing
- Gender
- Education
- Racism
- Social isolation and lack of care

Vulnerable populations may be found in the following places:
- Social housing
- Food banks
- Long term care
- Community Centres
- Homeless shelters
The VIP Research Lab

The Vulnerable Individuals in Primary Care (VIP) Research Lab develops and evaluates innovative programmes to address **chronic diseases among vulnerable populations**

**VISION**
To improve health by facilitating equitable access and linkage to primary care for vulnerable populations in Canada and internationally, including Low and Middle Income Countries (LMICs) and High Income Countries (HICs).

**MISSION**
We are committed to producing robust evidence for novel primary care and community-based interventions that improve primary care access and linkage for vulnerable populations and that reduce inappropriate health care utilization. We will continue to partner collaboratively with patient groups, stakeholders, and primary care providers to develop programs specific to unmet health needs of vulnerable populations. We aim to integrate research into mainstream health practice and the broader health system.
A New Approach
2: The Epidemiology

Epidemiologist

A Vulnerable Population: Evidence from low-income seniors in social housing in Canada
Changing Population Demographics

The Older Population Within Canada Has Grown and is Expected to Grow

Cost of Healthcare

![Cost of Healthcare Chart]

Canadian Institute for Health Information 2022
Sources of Data from VIP Research Lab

Multiple data sources from social housing residents and other vulnerable populations:

- CP@clinic Program Database
- CP@home Program Database
- Health Awareness of Behaviour Tool: Survey
- Ambulance Call: Records
- Health Administrative Data: Two Separate ICES Cohorts
- Focus Groups and Interviews: Transcripts
Type of Data

Domains / questions from existing validated questionnaires:

- Demographics
- Modifiable risk factors
- Non-modifiable risk factors
- Physical measures
- Social determinants of health
- Quality of life
- Health literacy and source of health information

Domains/variables from administrative or ambulance data:

- Diagnosis
- Health status
- Health care utilization
Scope of the Data

3 regions implementing home visits

Residents 50 years and older, between 2014 and 2022
# Older Adults in Social Housing in Ontario: An example of a vulnerable population

<table>
<thead>
<tr>
<th>N = 4,433 individuals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>74 years</td>
</tr>
<tr>
<td>Female</td>
<td>68%</td>
</tr>
<tr>
<td>White</td>
<td>81%</td>
</tr>
<tr>
<td>Lives alone (widowed/divorced/single)</td>
<td>82%</td>
</tr>
<tr>
<td>Education (no high school diploma)</td>
<td>44%</td>
</tr>
</tbody>
</table>
# Modifiable Risk Factors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>All Residents n=3544</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Smoker</td>
<td>19%</td>
</tr>
<tr>
<td>High Alcohol Consumption</td>
<td>6%</td>
</tr>
<tr>
<td>&lt;1 serving of fruits/vegetables daily</td>
<td>40%</td>
</tr>
<tr>
<td>&lt;30 minutes of physical activity daily</td>
<td>46%</td>
</tr>
<tr>
<td>Adds salt to food</td>
<td>30%</td>
</tr>
<tr>
<td>Fatty food consumption at least once per week</td>
<td>50%</td>
</tr>
</tbody>
</table>

CP@clinic Program. CP@clinic Database, November 2022.
# Cardiovascular (CV) Risk Factors

<table>
<thead>
<tr>
<th></th>
<th>Our Research Data</th>
<th>StatsCan Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-reported</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>67%</td>
<td></td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td><strong>Anthropometric Measures (in 60-79 yrs old only)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>38%</td>
<td></td>
</tr>
</tbody>
</table>

CP@clinic Program. CP@clinic Database, November 2022.
Hypertension (HTN)

3370 residents had their blood pressure measured

1819 (48%) had high 1st session BP (>140 systolic or >90 diastolic)

1204 (66%) self-reported being diagnosed with HTN

481 (26%) had not been diagnosed with HTN

48% had moderate/extreme anxiety or depression

20% had poor/fair ability to handle day-to-day stress

CP@clinic Program. CP@clinic Database, November 2022.
# Diabetes Risk Status (not diagnosed)

<table>
<thead>
<tr>
<th>Risk Status</th>
<th>All (n=2622)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>5%</td>
</tr>
<tr>
<td>Moderate Risk</td>
<td>37%</td>
</tr>
<tr>
<td>High Risk</td>
<td>58%</td>
</tr>
</tbody>
</table>

CP@clinic Program. CP@clinic Database, November 2022.
### Type 2 Diabetes Mellitus

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Self-reported T2DM n=1213</th>
</tr>
</thead>
<tbody>
<tr>
<td>High BP measured according to HTN Canada guidelines</td>
<td>47%</td>
</tr>
<tr>
<td>&lt;30 minutes of physical activity daily</td>
<td>50%</td>
</tr>
<tr>
<td>&lt;1 serving of fruits/vegetables daily</td>
<td>41%</td>
</tr>
<tr>
<td>Overweight/obese</td>
<td>29% / 49%</td>
</tr>
<tr>
<td>Self-reported health status (poor/fair)</td>
<td>41%</td>
</tr>
</tbody>
</table>

CP@clinic Program. CP@clinic Database, November 2022.
### Conditions Indirectly Impacting CV Health

<table>
<thead>
<tr>
<th>Quality of Life (QoL) sub-domains</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems or unable to perform daily self-care</td>
<td>20%</td>
</tr>
<tr>
<td>Limited mobility</td>
<td>53%</td>
</tr>
<tr>
<td>Difficulty performing usual activities</td>
<td>36%</td>
</tr>
<tr>
<td>Pain/discomfort</td>
<td>74%</td>
</tr>
<tr>
<td>Extremely/moderately anxious or depressed</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Self-Reported Health Status: Poor / Fair**

| All respondents                                                      | 33% |

CP@clinic Program. CP@clinic Database, November 2022.
Food Insecurity

People living in social housing face double food insecurity rates compared to older adults in the general public.

People who did report being food secure were still more likely to report poor dietary habits than the general public.

Social Isolation or Loneliness

1 in 5 low-income older adults living in social housing experience social isolation or loneliness

4 to 5x more likely to be hospitalized than those who are not socially isolated, previous research has indicated

Agarwal G. et al. CMAJ Open. 2021; 9(3).
Health Literacy

In a subset in whom NVS-UK was administered (n=229)

82.1% below adequate

Sources of Health Information

Older adults prefer to get info from health professionals:

- Doctor or Nurse: 79.0%
- Educational Brochure/Pamphlet: 28.8%
- Pharmacist: 22.8%
- Family Member: 17.6%
- Media (print ads, TV, etc): 11.9%
- Internet: 11.7%
- Walk-in Clinic: 11.2%

Sadri, P...Agarwal, G. Manuscript prepared for submission, 2022.
Consequences of chronic ill health have health system impacts
Seeking Emergency Healthcare after a Fall

Older adults in social housing are almost TWICE as likely to have an incidence of falls compared to the general older adult population.

People in Social Housing are More Likely to Go to Long-Term-Care Facilities

Rate of transfer to LTC

Classified as ‘frail’

2019 LTC Waitlist = 34,834 Older Adults

We hypothesize:
- 16,380 social housing older adults could qualify for LTC**
- If 50% are on the LTC Waitlist:

23% of the LTC Waitlist is social housing older adults

Vulnerable Populations are Frequent Callers of 911

In people with ≥5 EMS calls within 12 months:

- **Loneliness**
  - 37 - 49%
  - More common than regional/Canadian rates

- **Poverty and food insecurity**
  - 43% and 14%
  - Higher rates than average Ontario citizens

- **Lower quality of life**
  - Mobility issues 78%
  - Difficulty with self-care 55%
  - Difficulty with usual activities 78%
  - Experience pain/discomfort 87%
  - Anxiety/depression 67%

Rising Levels of 911 Calls

Emergency Medical Services (EMS) calls to 911 increase 5% annually in Canada and the US

Older adults = **38 - 48%** of EMS calls

Frequent callers = **13.8%** of ED visits

Demand greater in **older adults** (85%+)

Cost of 911 Call for EMS

1 EMS CALL


Estimated ambulance call cost averages $1,626* and may range anywhere between $499 and $2,254.40
Novel Interventions

Appropriate for vulnerable populations
Developing New Interventions

Need to think outside of the box

New and novel partnerships

Setting up for success

Community involvement

Accounting for access

Health system opportunities
Changing Lifestyle - It’s Not Just Education….

Factors that increase confidence to...

- **quit smoking**
  - Intent to quit smoking
  - Ability to handle personal crises
  - Having less frequent problems with usual activities
  - Smoking fewer cigarettes daily

- **reduce alcohol intake**
  - Older age

- **eat more fruits & vegetables**
  - Intent to eat more fruits & vegetables
  - Knowledge
  - Younger age

- **improve physical activity**
  - Intent to increase physical activity
  - Already being active
  - Knowledge

- **reduce stress**
  - Ability to handle personal crises

Reconnecting To Primary Care
5: Who, Where, How?

Upstream prevention

Sustainable strategies
Community Paramedic
Strategy 1: Who: Task Shifting

- Paramedics
- Paramedic Students
- Lawyers
- Lay Health Workers
- Health Volunteers
The **CP@clinic Program**

**Evidence-based program focused on**

- Chronic disease prevention
- Chronic disease management
- Health promotion

We work in partnership with Paramedic Services and provide the following:

- Accredited CP@clinic paramedic training
- Evidence-based health risk assessments
- Algorithms and secure database
Legal Health Clinic

Intake Screening

Medical-Legal partnership

Legal problems can be harmful to your health

Provided with resources or educated about an area of law sufficient to either solve or help their legal problems

Recommended to system navigators

Referred to lawyers

Scheduled for another appointment

Going to Where People Are
Strategy 2: Where?

Where do we need to deliver the care / how can people access it?

Where the people are!

- In social housing buildings
- At home
- At community centres
- At temples/places of worship
In the home: the CP@home Program

- Vulnerable and frail older adults
- Individuals who:
  - Have multiple chronic conditions
  - Have limited mobility
  - Are on the LTC waitlist
  - Are receiving remote patient monitoring
  - Are referred by paramedics (including frequent callers)
  - Are referred by hospital discharge planners (e.g. at risk for readmission)

In the community: at a Sikh Gurdwara

- Riverdale neighbourhood, Canada’s third largest immigrant settlement
- Predominantly South Asian population
- Individuals who were at risk of chronic health conditions
- Volunteers provided translation in Punjabi, Hindi and Urdu
- Feasible approach for adapting the program for a Sikh South Asian population

Strategy 3: Social Determinants of Health

What really influences health?

- Housing / eviction
- Access to social support and community services
- Food
- Employment
- Benefit coverage
- Mental health
- Medication
- Disability coverage & WSIB
Legal Health Clinic Results

- 84% had unmet legal needs
- 3.44 legal needs per patient on average
- 58% referred to Legal Aid Ontario or Hamilton Community Legal Clinic

6: Health System Impacts

Evidence-based interventions

Research demonstrates robust results: CP@clinic as an example
Randomized Controlled Trial Design

Pragmatic cluster-RCT
Compare intervention to usual care
In 5 Ontario community sites
For 1 year
Social housing buildings for low-income older adults

INCLUSION CRITERIA

- > 50 residential units
- > 60% of residents aged > 55 years
- One matched building of similar size and demographics
Randomized Controlled Trial
Randomization

794 attendees
715 attended ≥2 times
644 attended ≥3 times

Building participation rates ranged from 10% - 82%

All presented material including the CP@clinic© Program is the sole and exclusive property of the Vulnerable Individuals in Primary Care Research Lab.
Randomized Controlled Trial
Primary Outcome

Change in mean EMS calls in intervention arm compared to control arm after 1-year intervention

Data extracted from EMRs of 5 regional paramedic services

Building-level analysis: Generalized Estimating Equations (GEE) analysis used to compare mean number of EMS calls per 100 apartment units per month

CP@clinic intervention buildings showed 19 - 25% reduced EMS calls across all analyses

Randomized Controlled Trial
Secondary Outcomes

Change in health-related quality-of-life (HRQoL) and chronic disease risk factors among intervention participants

Data extracted from pre/post survey (HABiT) and CP@clinic database

**Individual-level analysis**: Changes in risk factors between groups, while adjusting for building clusters and pairing using GEE

- **Lowered diabetes risk**
- **Sustained decrease in blood pressure**
- **Significant improvement in four Quality of Life domains:**
  - discomfort
  - usual activities
  - self-care
  - pain

Randomized Controlled Trial
Secondary Outcomes

Change in health-care utilization among intervention arm residents compared to control arm, after 1-year of intervention

Data extracted from Ontario administrative health datasets

Individual-level analysis: Changes in health utilization between groups, while adjusting for building clusters and pairing using GEE

Significantly higher odds of antihypertensive medication initiation amongst those eligible for the Ontario Drug Benefit (≥65 yrs OR <65 with disability)

Sensitivity analysis (attendees only)

Higher incidence rate of primary care visits

Lower odds of long-term care transfers

Higher odds of home care services

Agarwal, G et al. Manuscript prepared for submission, 2022.
Randomized Controlled Trial
Cost Effectiveness Outcomes

**Cost-utility analysis** among intervention arm residents compared to control arm, after 1-year of intervention

Actual cost data obtained from paramedic services, health utility scores from pre-post surveys

Program Cost Per QALY is well below the threshold for program adoption in Canada

For every $1 spent on the CP@clinic Program, the Emergency Care System sees $2 in benefits!

Randomized Controlled Trial
Qualitative Outcomes

Perceptions of the CP@clinic program by participants

Data from four focus groups

Thematic analysis: multiple coders analyzed focus group transcripts for common themes

Peace of Mind and Support
Access to Health Resources
Social Participation and Connectedness

Marzanek F…Agarwal G. Manuscript prepared for submission, 2022.
“... to be able to come down, have your blood pressure checked, talk to them, it just made it so much easier and gave you such peace of mind. That is the most important thing that I got out of it was the peace of mind.”

“I think it made you feel better when you’ve been talking to them...if you had any questions they were answered.”

“I was ready to go to the hospital, but no they made it comfortable enough that I didn’t have use that ambulance.”
“They gave us information. If we needed, if we had questions they would help us. They were very helpful.”

“They found me a doctor I didn’t have one here at all, after 4 years.”

“You were sort of aware of services that were out there but you didn’t know who or where to go.”
Social Participation and Social Connectedness Increased

“A sense of safety, companionship. Nice to sit out in the hall and wait our turns and talk.”

“They (building residents) participated in the sessions and this led them to participate in other things [occurring in the building].”

“We were all out here socializing, waiting [for our turn].”
7: Bringing It All Together

Primary Care Perspective

Improving health systems for vulnerable populations
Benefits of the CP@clinic Program

Reduces Social Isolation
Participants feel more socially connected to each other

Improves Health System Navigation
Participants are provided health information and support

Fills Healthcare Gaps
Providing more time for patients with a healthcare provider

Supports the Primary Care System

Acknowledgements

Study Participants

Government and Community Organizations

Paramedicine
- International Roundtable on Community Paramedicine
- Paramedic Chiefs of Canada
- Ontario Association of Paramedic Chiefs
- Tema Foundation

Community
- Canadian Red Cross
- St Matthew’s House, Hamilton
- Carefirst Seniors & Community Services Association
- City of Hamilton Public Health Services
- Grey Bruce Health Services
- South Bruce Grey Health Centre
- VON Canada, Middlesex-Erigin
- Home and Community Care Support Services Mississauga
- Home and Community Care Support Services Hamilton Niagara Haldimand Brant

International
- Sunraysia Community Health Services, Australia

Technology
- Prehos Inc.
- Interdev Technologies

Paramedic Services
- BC Emergency Health Services
- Brant/Brantford Paramedic Services
- Chatham-Kent EMS
- City of Greater Sudbury Paramedic Services
- Cochrane District EMS
- County of Simcoe Health and Emergency Services
- Essex Windsor EMS
- Frontenac Paramedics
- Grey County Paramedics
- Guelph Wellington Paramedic Service
- Halton Region Paramedic Services
- Hamilton Paramedic Service
- Hastings Quinte Paramedic Services
- Middlesex-London Paramedic Service
- Oxford County Paramedic Services
- Peterborough County-City Paramedics
- Prescott Russell Emergency Services
- Norfolk County Paramedic Services
- Niagara Emergency Medical Services
- Peel Regional Paramedic Services
- York Region Paramedic Services
- Weeneebayko Area Health Authority Paramedic Service
- Beausoleil First Nation Paramedic Service
- Region of Durham Paramedic Services
- Haliburton County Paramedic Services
- Kenora District Services Board – Northwest EMS
- Naotkamegwaning EMS
- County of Renfrew Paramedic Service
- Sault Ste Marie Paramedic Services

Housing
- AdvantAge
- Ontario Non-Profit Housing Association
- City of Greater Sudbury Housing Corporation
- City Housing Hamilton
- Cochrane District Social Services Administration Board Housing Services
- County of Wellington Social Services Department - Housing Services
- County of Simcoe Social Housing Department
- Halton Community Housing Corporation
- London & Middlesex Housing Corporation
- Niagara Regional Housing
- York Housing
- Haldimand Norfolk Housing Corporation

Funders
- Canadian Institutes of Health Research
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- Department of Family Medicine, McMaster University
- International Development Research Council
- GACD - Global Alliance of Chronic Disease
- Ontario Trillium Foundation
- McMaster University
- Canadian Frailty Network
- Family Medicine Associates
- Health Canada
Connect With Us!

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cpatclinic.ca

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@VIPResearchLab
@CPatClinic
@GinaAgarwall

**Emails**
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mcmastercp@gmail.com
Thank you!
Social Housing in Ontario

**What is it?**
Rent-geared-to-income housing based on 30% of a household’s gross monthly income

**Who Provides It?**
- Municipalities
- Private companies
- Non-profit organizations
- Charities (Good Shepherd, March of Dimes Canada)

**How Many Currently?**
237,000 households*
(14% of Ontario households that rent their dwelling)

*2021 Census, Statistics Canada