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Linking immunity to interventions to mitigate COVID-19 infections and promote wellness in congregate living settings in Canada: the Wellness Hub

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Tier 1 Canada Research Chair

On behalf of the Wellness Hub Team

Land Acknowledgement

- We acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit and The Dish with One Spoon treaty amongst the Anishinaabe, Mississaugas of the Credit and Haudenosaunee
- As a white settler, I acknowledge my commitment to continuing to work with and listen to First Nations, Inuit and Métis communities in the spirit of reconciliation and partnership, to care for the people who live on this land, and the land, and to be an ally and learner on the path towards Reconciliation.

Competing Interests

I have various academic interests and received peer reviewed funding from CIHR, Health Canada, WHO, PHAC amongst other funding agencies

Rationale

- The COVID-19 pandemic resulted in a national tragedy in long-term care in Canada
- It turned a harsh light on ageism and the dire situation in long-term care (LTCH) and retirement homes (RH)
 - which was foreshadowed in more than 100 reports over the 50 years prior to this pandemic
 - Facets 2020;5:651-91.

Rationale

- By December 2021, LTCH residents accounted for 3% of all COVID-19 cases in Canada and 43% of related deaths,
 - the highest proportion of COVID-19 deaths in LTCHs worldwide
- >14,000 LTCH residents and staff died from COVID-19 through three pandemic waves between March 2020 and August 2021
 - <https://www.cihi.ca/en/covid-19-resources/impact-of-covid-19-on-canadas-health-care-systems/long-term-care#ref6>

Objectives

- Wellness Hub was designed using an **integrated knowledge translation (IKT) approach** to address the **needs** identified by LTCH/RH partners:
 - ✓ To estimate prevalence of SARS-CoV-2 infection and identify risk factors associated with infection in LTCH/RH
 - ✓ To understand both natural and vaccine-associated COVID-19 immunity
 - ✓ To support LTCH/RHs with
 - ✓ 1) implementing and adhering to IPAC (infection prevention and control) best practices,
 - ✓ 2) promoting COVID-19 vaccine confidence and uptake, and
 - ✓ 3) encouraging staff wellness
- Fahim, Mishra, Chan, Baral, McGeer, Gommerman, Gingras, Delatolla, Oswald, Gilbride, Straus

Methods

Objective	Study Design
Site-Level Study	<p>Overall program evaluation guided by the RE-AIM framework and used iteratively to tailor the implementation strategies.</p> <p>Controlled interrupted time series (CITS) study design used to measure program effectiveness/impact.</p> <ul style="list-style-type: none"> Used to estimate the impact of the Wellness Hub Support Program on metrics of interest by comparing LTCH/RHs in the Facilitated Access arm to those in the Self-Directed Access arm before and after the implementation period.



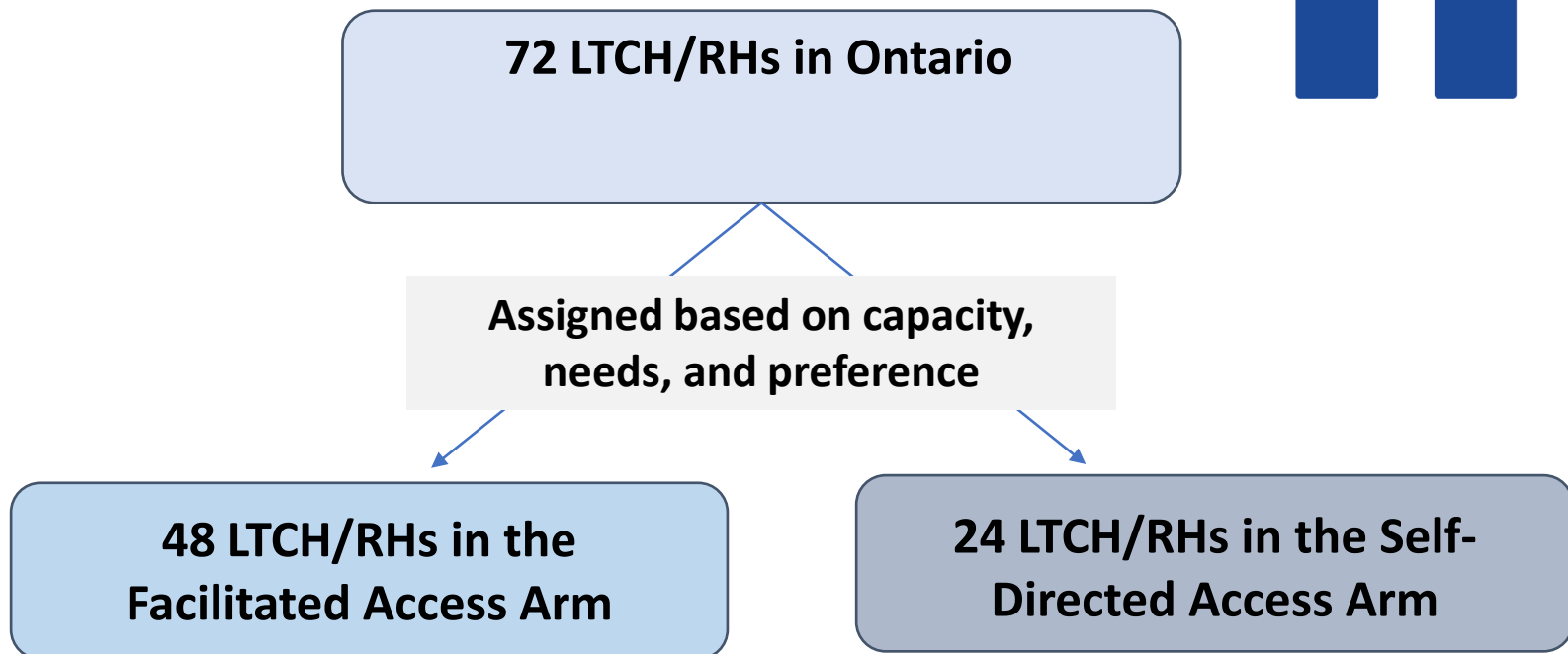
Impact?



Metrics of interest:

- PCR-confirmed COVID-19 infections among residents and staff
- Re-infection of staff and residents
- Hospitalizations among residents
- Change in population-specific seroprevalence
- Wellness Hub implementation outcomes (Embedded process evaluation)

Site-Level Engagement



- Same **Wellness Hub Implementation Support Program** being delivered to 15 shelters, **tailored to their unique context**. No individual-level research activities being conducted with this population.

Wellness Hub Site-Level Support Program

Wellness Hub is composed of **3 main branches**:



- Focus on supporting **staff** in creating healthy environments with infection prevention and control (IPAC)

- Focus on promoting **staff** vaccine confidence and vaccine uptake

- Focus on promoting **staff** wellness

IPAC+ Resources

- **IPAC+ Resource Repository** iteratively updated
- **IPAC+ Self-Assessment** iteratively updated based on PHO checklist changes
- Summary of **new directives** for LTCHs and RHs provided in **weekly newsletter**

Weekly Wellness Hub Newsletter



Wellness Hub: Weekly Directives Update

Week of April 11, 2022

This section provides a centralized source of updated directives specific to long-term care homes and retirement homes in Ontario and to share resources that you could consider leveraging to support with implementing new directives in your setting.

Source	Summary	Link
Date		
Long-Term Care and Retirement Home Policies		
<i>If a directive is specifically aimed towards long-term care homes, retirement homes are encouraged to also follow the directive as long as it is appropriate for their setting.</i>		
MOHLTC February 4, 2022 Tag: reopening	Ontario easing temporary visiting restrictions at LTCHs <ul style="list-style-type: none"> Effective February 7, the maximum number of designated caregivers per resident is increasing from 2 to 4 and will continue to be subject to a limit of 2 per resident at one time. In addition, residents who have had at least 3 doses of a COVID-19 vaccine will be able to resume social day trips. Effective February 21, general visitors 5 years and older who have had at least 2 doses of a COVID-19 vaccine will be able 	Website



About Services Resources News + Events Webinars

IPAC+ Resource Library

A resource library to support the implementation of infection prevention and control (IPAC) practices in long-term care facilities (LTCFs) and retirement homes (RHs).

IPAC+ is an initiative led by the Knowledge Translation Program at St. Michael's Hospital, Unity Health Toronto and the Regional Geriatric Program of Toronto (RGPT). LTCF and RH stakeholders can refer to this library to assess IPAC preparedness and implementation of evidence-based IPAC practices in their settings.

For more information on IPAC+ please email keelia.quinndelaunay@unityhealth.on.ca

To receive a tailored list of resources for your long term care home or retirement home, please fill out the [Interactive Infection Prevention and Control Checklist](#)

Search & Filter by IPAC Domain

Type one or more keywords

Auditing

Entrance and screening

Human Resources

Hand Hygiene

Universal Masking

Physical Distancing

Planning and Outbreak Management

Surveillance and Outbreak Management

Postmortem Care

Declaring the Outbreak Over

Environmental Cleaning

IPAC+ Self-Assessment for Long-Term Care Homes (LTCHs) and Retirement Homes (RHs)

Interactive Infection Prevention and Control Checklist for Long Term Care and Retirement Homes

What is this tool? This tool is an interactive version of the Public Health Ontario COVID-19: Infection Prevention and Control Checklist for Long-Term Care and Retirement Homes checklist ([see here](#)).

Who was this tool developed by? The creation of this tool is part of an initiative led by the Knowledge Translation Program at St. Michael's Hospital, Unity Health Toronto, in partnership with over 20 additional institutions.

Who is this tool for? Key stakeholders in long term care and retirement homes (e.g., leadership, management, and/or frontline workers) are encouraged to complete the interactive checklist.

How will this tool help me and/or my long term care and/or retirement home setting? This interactive checklist will allow you to do a comprehensive self-assessment of your current infection prevention and control (IPAC) practices, and will auto-generate a report summarizing your current practices. The report will direct you to tailored tools and resources that can be leveraged to address these gaps in order to decrease the spread of infectious diseases such as COVID-19 between residents and staff.

Who else will use the results of this interactive checklist? Please note only the team at the Knowledge Translation Program as well as the LTC Hub: IPAC+ research study team and investigators (if you are participating in this study) will have access to your identifiable self-assessment data. Our wider net of project partners will only have access to anonymous group data. If you are participating in the LTC Hub: IPAC+ study, your responses may be used to monitor your setting's IPAC strengths and gaps to assess the impact of the program and tailor supports accordingly. Again, any results that are published will be published anonymously as group data.

How long will this take me? The checklist will take approximately 20-30 minutes to complete. If you are interrupted, you can pick up where you left off at a later time as long as you open the self-assessment on the same device and browser.

What if I have questions? If you have any questions about the self-assessment, please contact the Research Coordinator at keelia.quinndelaunay@unityhealth.on.ca.

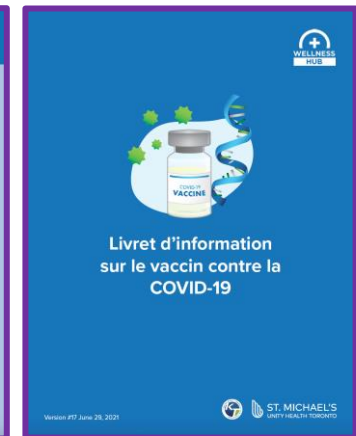
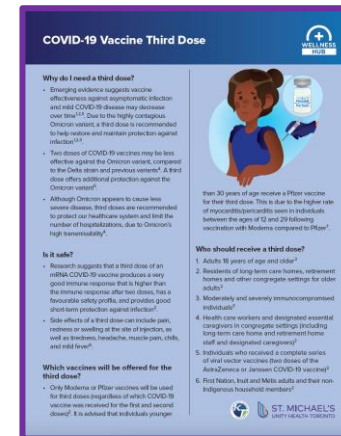
<https://www.rgptoronto.ca/resources/ipac/>

<https://ipac.knowledgetranslation.ca/>

Vaccine+ Resources

1. Wellness Hub's Vaccine+ Information Booklet discussing research, directive updates, and common myths regarding the COVID-19 vaccines available here: <https://wellness-hub.ca/res/wellness-hub-vaccine-information-booklet/>

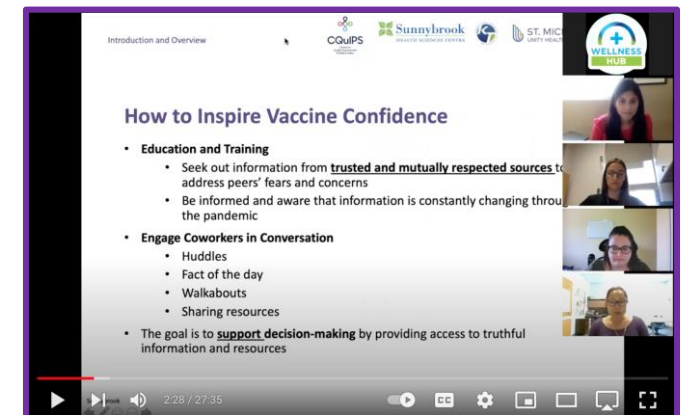
- The booklet is also available in French here: <https://wellness-hub.ca/res/wellness-hub-vaccine-information-booklet-french>
- Supplemental one-pagers iteratively created based on specific vaccine-related subtopics of interest



2. Workshop to train people in LTCHs and RHs to be Champions for COVID-19 vaccination

3. Vaccine Town Hall Live Q&A sessions about COVID-19 vaccination ongoing (6 held to date)

4. Interviews with frontline staff ongoing to co-create CARE+ and Vaccine+ supports based on their perspectives and feedback



CARE+ Resources

Wellness Hub's CARE+ Resource Package Launched and Disseminated

- Accessible resource package to support LTCH/RH staff (both leadership and frontline staff) with their mental health and wellness
- Prioritized resources from **Canadian mental health organizations and experts** that are available for **free** (or low-cost/barrier to entry), **evidence-based** and accessible in different languages
- Interviews with frontline staff ongoing to co-create CARE+ and Vaccine+ supports based on their perspectives and feedback

Topic Focuses:

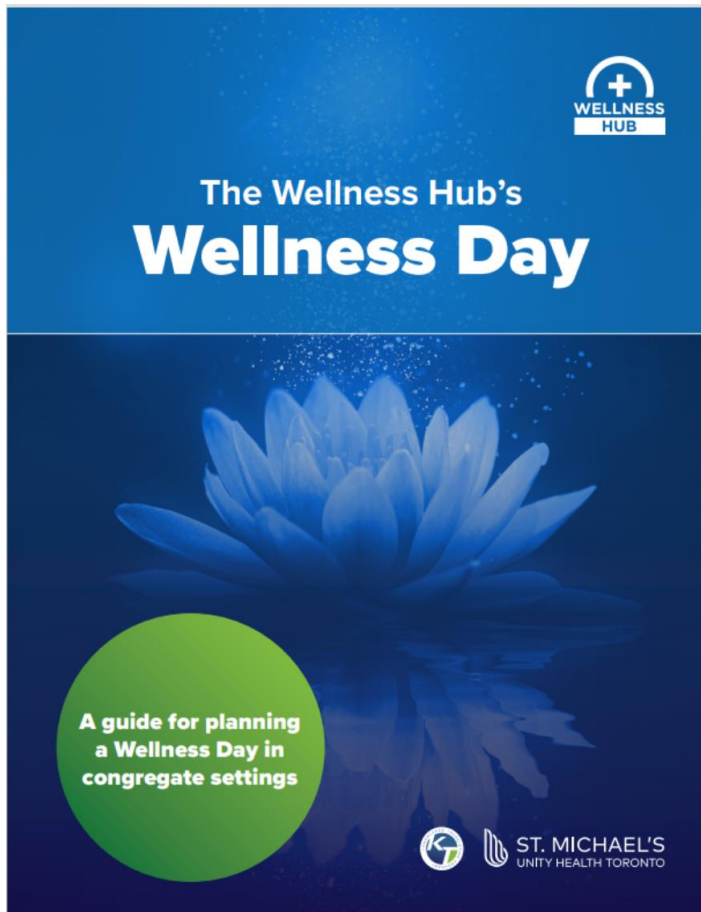
- Mindfulness
- Burnout
- PTSD, Anxiety, Depression as Secondary Illnesses of Burnout
- Grief and Bereavement

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What we did – CARE+ Resources

Wellness Day Guide

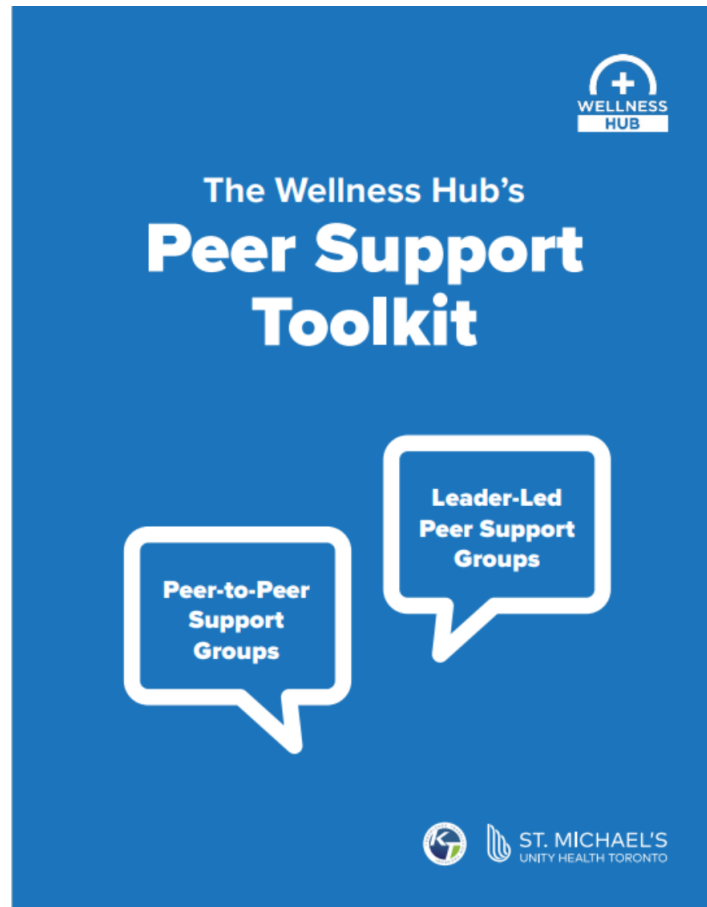


Goal:

- Promote staff well-being through onsite and virtual facilitation
- Provide access to evidence-based mental health resources tailored to the needs and settings of a particular site.

What we did – CARE+ Resources

Peer Support Kit



Goal:

- Encourages staff and leadership to plan peer and/or leadership-led discussions that facilitate group wellness discussions.
- Peer support session(s) give participants the opportunity to connect, share health education resources, and provide emotional and social support in the workplace

Intervention Homes

- In addition to the IPAC+, CARE+ and Vaccine+ resources, they received
 - Facilitated resource and support access
 - Monthly Community of Practice meetings
 - 1:1 facilitator access to request tailored supports
 - Wastewater surveillance in a subset

Methods

Objective	Study Design
Individual-Level Immune Study	Serial cross-sectional with nested cohort study. <ul style="list-style-type: none">Used to better understand the prevalence of COVID-19 infection within the LTCH/RH populations of interest, and explore what factors are associated with the spread and prevention of spread of infection in congregate settings.

- Serial cross-sectional study allows for the population-level assessment of relevant **exposures** (e.g., factors that may be related to the prevention and/or spread of COVID-19 infection) and **outcomes** (i.e., COVID-19 infection), as well as exploration of their potential associations



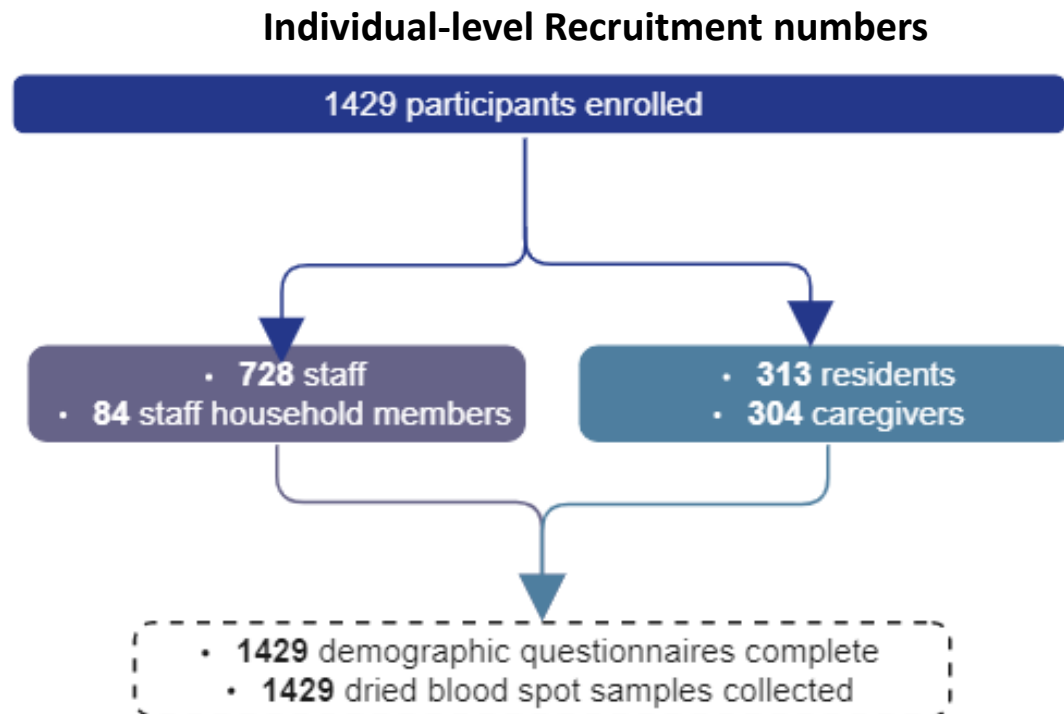
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Results

Results

	Intervention Homes (n=48)	Control Homes (n=24)
Home Ownership		
For profit	62.5% (30)	58.3% (14)
Not for Profit	37.5% (18)	41.6% (10)
HVAC System	89.5% (43)	87.5% (21)
Shared four-bed rooms	72.9% (35)	45.8% (11)

Results – Individual Level

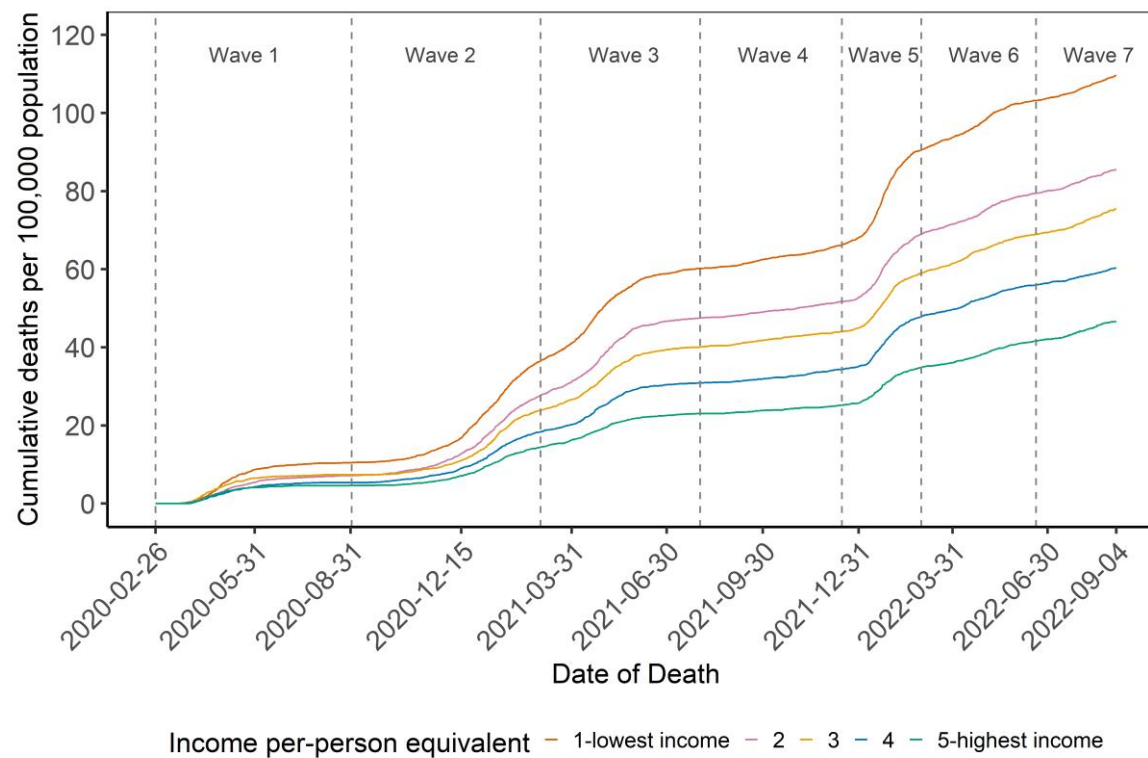


- **99 individuals** have completed their follow-up (9M) demographic **questionnaire**
- **95 individuals** have completed their follow-up (9M) sample dried blood spot sample **collection**

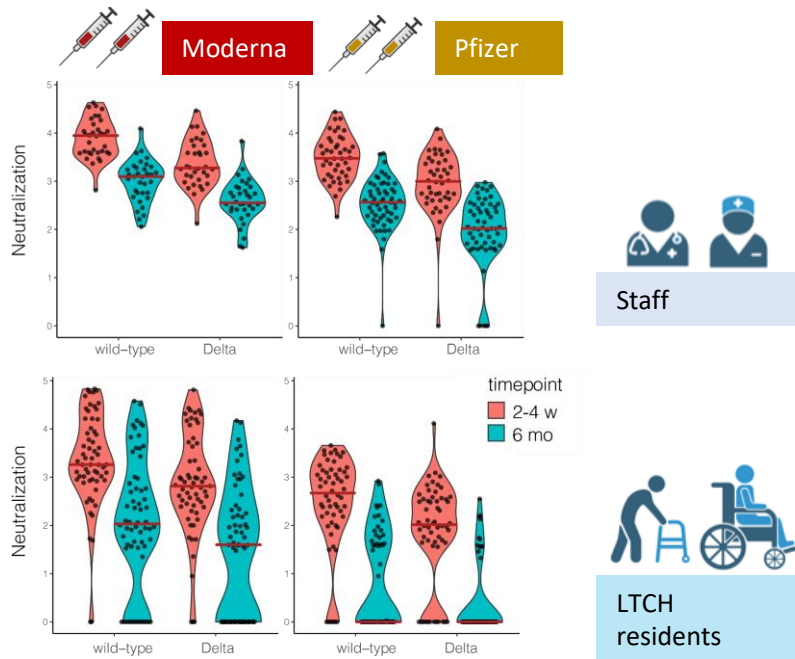
Results

- We conducted a retrospective, observational study using surveillance data on laboratory-confirmed COVID-19 cases (Jan 23 to Dec 13, 2020; prior to vaccine).
- Hardest-hit neighborhoods (comprising 20% of the population) accounted for:
 - 53.87% (44,937/83,419) of community cases
 - 48.59% (2356/4849) of staff cases
 - 42.34% (1669/3942) of other HCW cases.
- Congregate setting staff cases were more likely than community cases to be
 - concentrated in lower-income neighborhoods (Gini 0.24, 95% CI 0.15-0.38 vs 0.14, 95% CI 0.08-0.21)
 - with a higher household density (Gini 0.23, 95% CI 0.17-0.29 vs 0.17, 95% CI 0.12-0.22) and
 - with a greater proportion working in other essential services (Gini 0.29, 95% CI 0.21-0.40 vs 0.22, 95% CI 0.17-0.28).
 - Ma et al. JMIR Public Health Surveill 2022;8(10):e34927

Mishra et al (Open Forum Inf Dis 2022;Dec 23 19(1): ofac690)



Results – Factors affecting neutralization

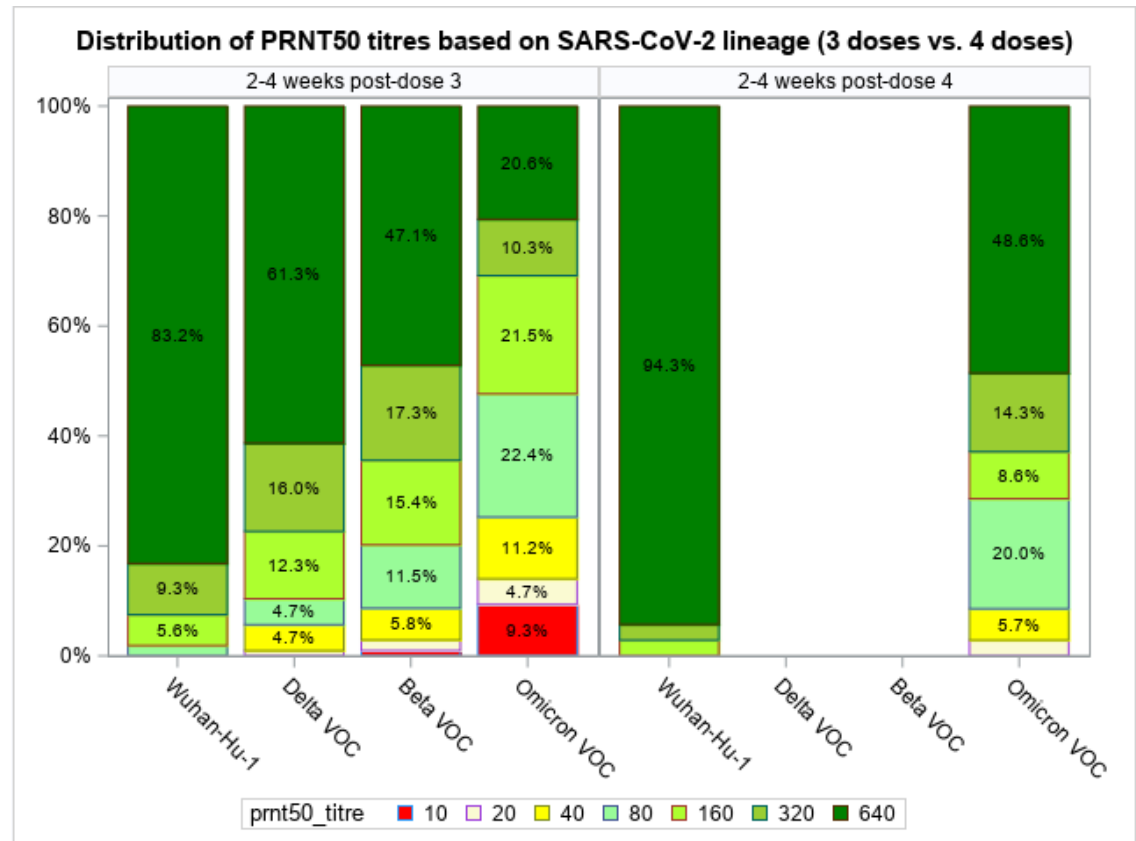


- **Vaccine:**
 - ▶ Moderna > Pfizer (~3.6 fold)
- **Population:**
 - ▶ Staff > resident (~6.3 fold)
- **Virus variant:**
 - ▶ Wild-type > Delta (~2.9 fold)
- **Time post dose 2:**
 - ▶ 2-4 weeks > 6 months (~7.3 fold)
- **Cumulative drop in neutralization**
 - ▶ **480 fold** (from top left to bottom right)

Gingras et al. Mucosal Immunol
2022.15:799-808.

Results: Levels of neutralizing antibodies against delta, beta, and Omicron VOCs are significantly lower compared to those against ancestral SARS-CoV-2

A fourth dose of mRNA vaccine results in substantially increased PRNT50 titers against Omicron in LTC residents*



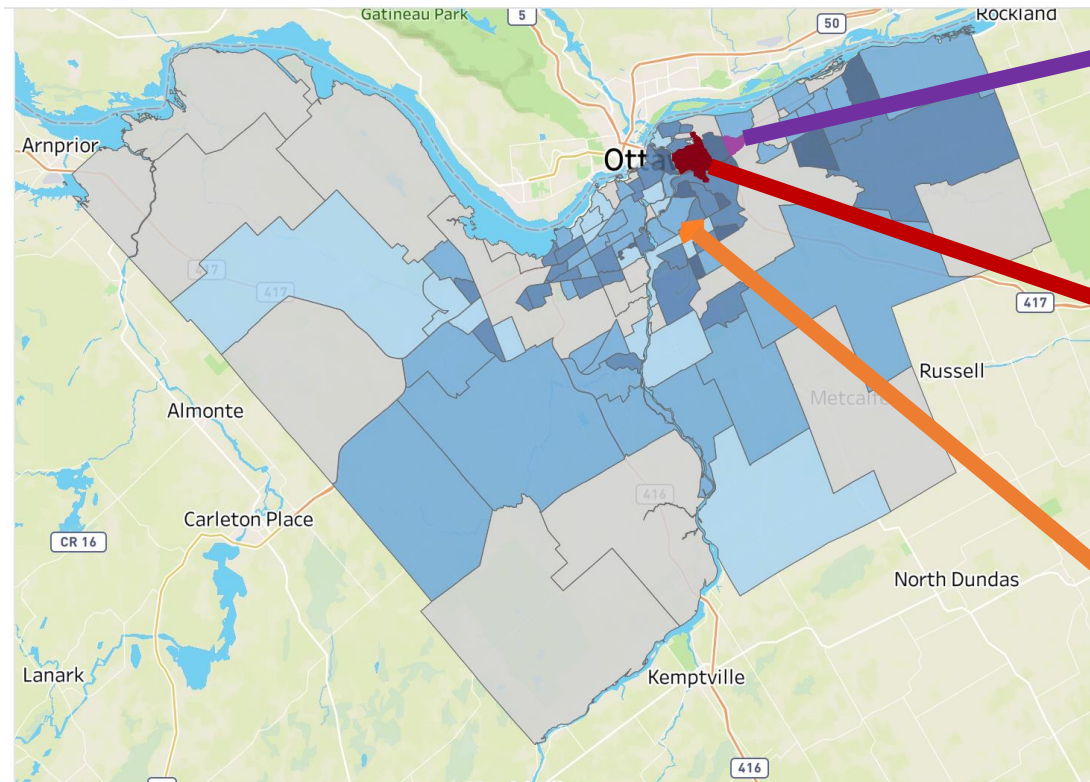
- Residents with any prior or current COVID-19 infection excluded; all negative PRNT50 responses given a common value of 10
- Banerjee et al. Med (N Y). 2022 Jun 10;3(6):422-432.e3.

Wastewater surveillance of COVID-19,

Testing of sewage for the presence of COVID-19

- Sampling done in 3 high-risk communities in **Ottawa** where LTCH staff live.
- Sampling at 6 sites in **Toronto** (2 LTCHs, 3 communities, 3 shelters).
 - Toronto Public Health website is updated with Waste Water
 - results: <https://www.toronto.ca/home/covid-19/covid-19-pandemic-data/covid-19-wastewater-surveillance/>.
- Sampling in the **Hamilton** region.

SAMPLING LOCATIONS – OTTAWA'S NEIGHBOURHOODS



Ledbury-Heron Gate-Ridgemoor Sewershed

Population	13,090
Households	5,210
Mean age of residents	30.8
Double dose of vaccination (%)	47.7

Jasmine Park-Beacon Hill Sewershed

Population	17,496
Households	3,210
Mean age of residents	43.2
Double dose of vaccination (%)	80.4

Overbrook-McArthur Sewershed

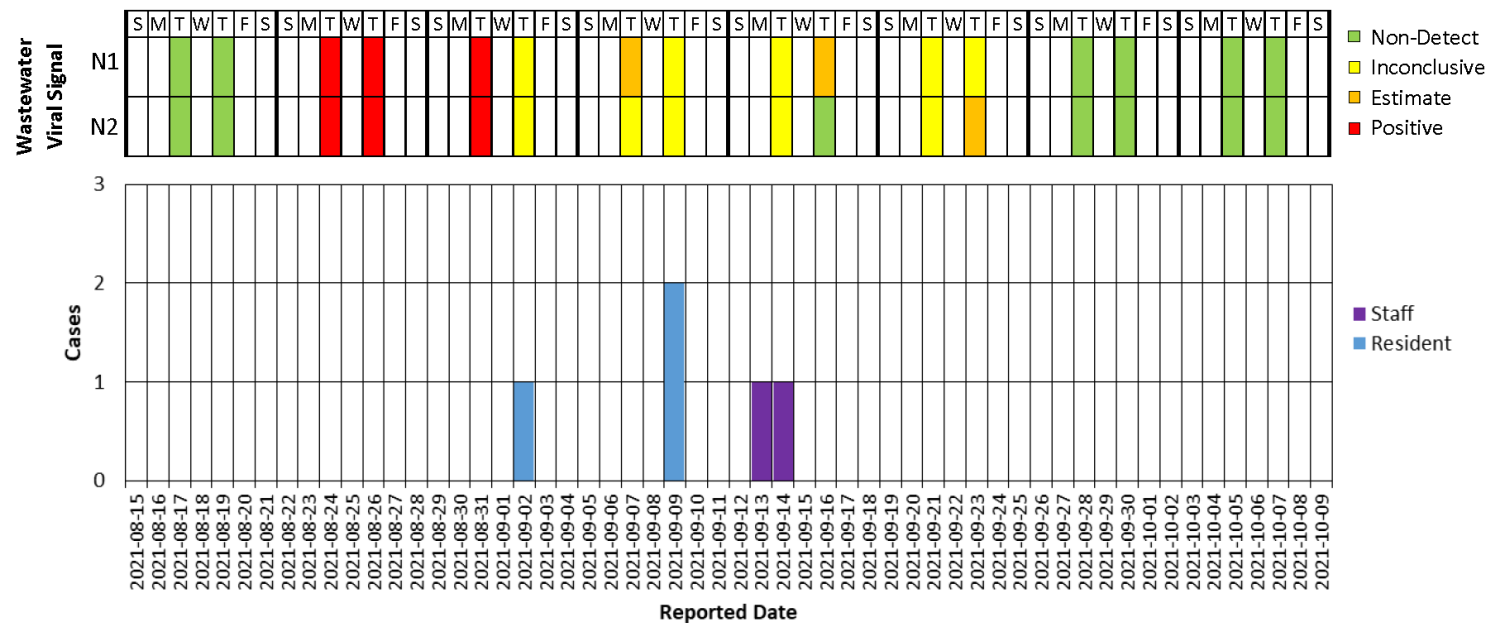
Population	19,961
Households	2,325
Mean age of residents	39.0
Double dose of vaccination (%)	77.9

Wastewater Surveillance for COVID-19 in the City of Toronto

Kimberley Gilbride, Claire Oswald
Toronto Metropolitan University



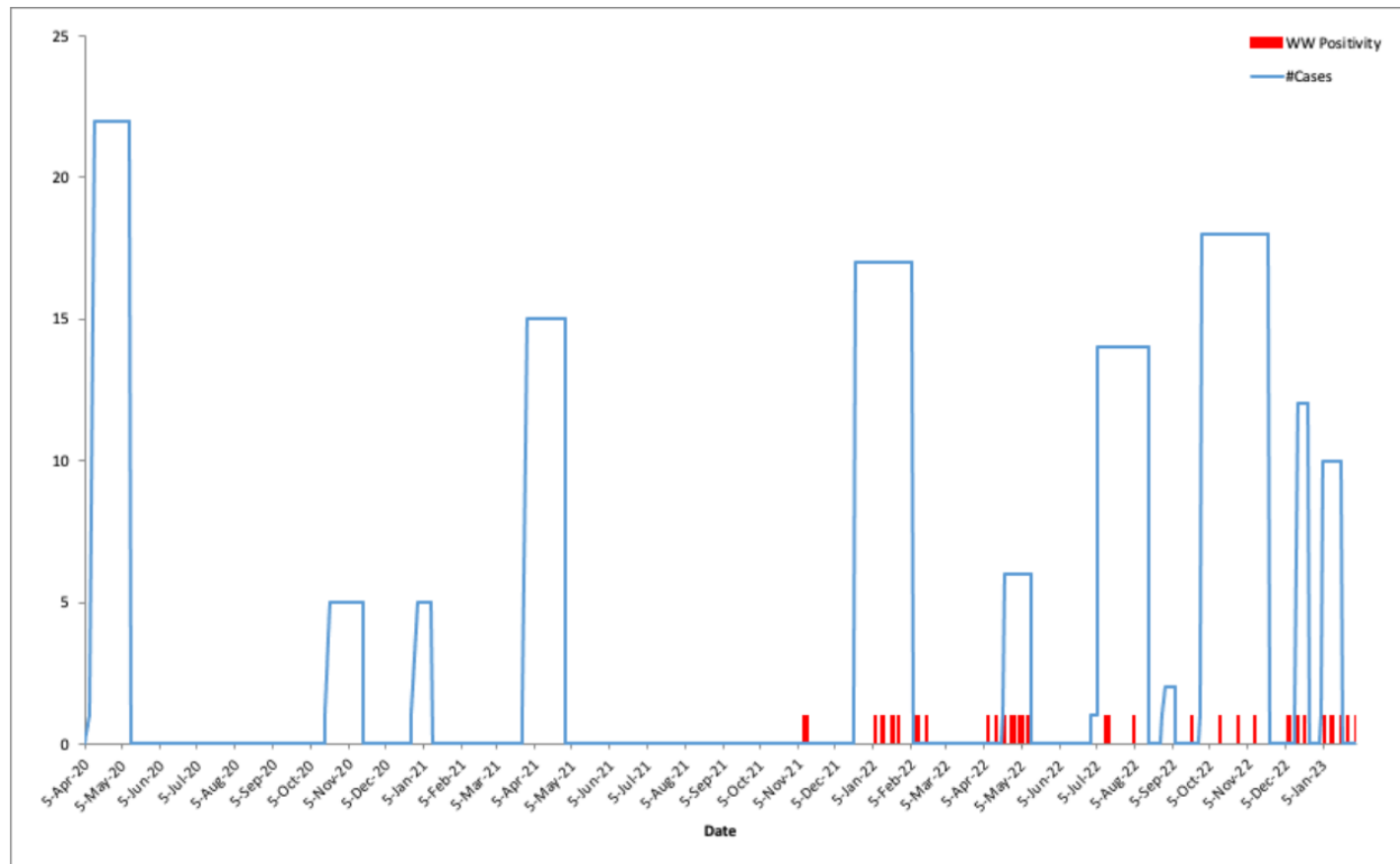
Shelter Outbreak Case Study



Akingbola, S., Fernandes, R., Borden, S., Gilbride, K., Oswald, C., Straus, S., Tehrani, A., Thomas, J., Stuart, R. **Early identification of a COVID-19 outbreak detected by wastewater surveillance at a large homeless shelter in Toronto, ON.** *Canadian Journal of Public Health*. 2022 Sept 26:1-8.

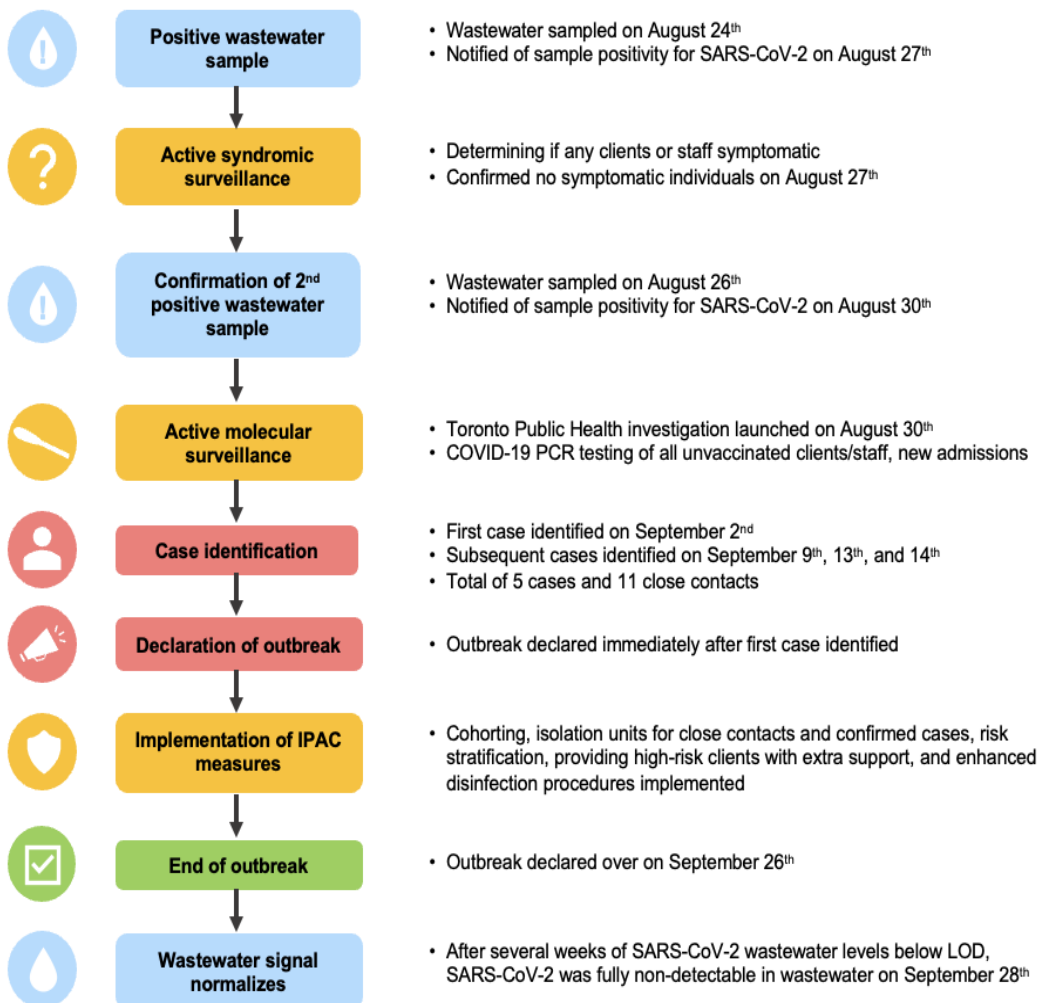
Wastewater Surveillance

- Data for **PHC** - including 2 LTC wings + hospital
- Wastewater facility: **fac1a**
- WW sampling from on **March 25, 2021 - May 5, 2022**



An Approach to COVID-19 Wastewater Surveillance in Shelters

Application in a Toronto Shelter



Results – Support Program

- 56 homes received facilitated access to Healthcare Excellence Canada funds
- 54 homes participated in DBS collection
- >4000 CARE+ packages delivered
- >6000 participated in town halls/seminars
- CoPs co-created and held monthly with > 400 participants
 - Topics included vaccine confidence, IPAC support, dealing with racism in the workplace



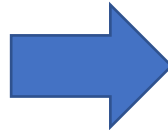
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Next steps

Optimising Wellness – Resource Navigation

CARE+ Project

To co-create accessible resource supports with staff in LTCHs/RHs focused on promoting mental health and wellness both during and beyond the COVID-19



Resource Navigation Project

- To evaluate the impact of resource navigation on LTCH support staff wellness and the secondary outcomes of burnout;
 - knowledge of/access to/use of wellness supports;
 - COVID-19 vaccination
 - COVID-19 hospitalizations
 - deaths due to COVID-19
- Resource navigators will support with implementing and **disseminating CARE+ resources** such as the CARE+ package to LTCH staff

Evaluating the impact of resource navigators to support LTCH staff during COVID-19



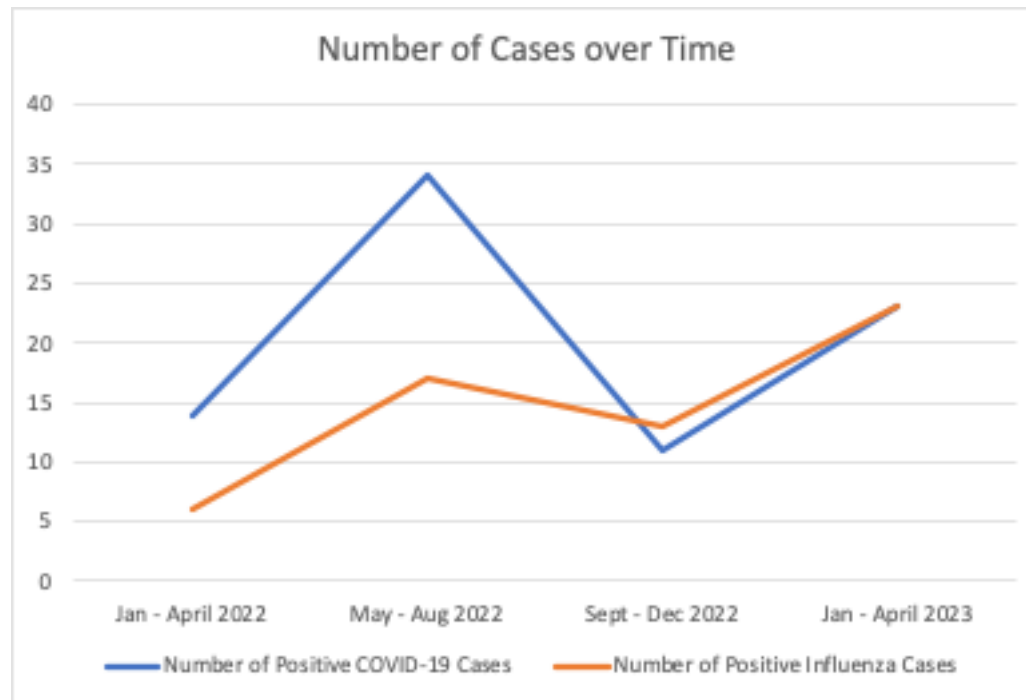
Randomized control trial to implement and evaluate the impact of providing LTCH staff with:

Intervention: 1:1 tailored support from a resource navigator + educational resources, compared to;

Control: Educational resources only

Outcomes: burnout, wellness, retention, quality of life

Integration of Rapid Antigen Testing and Wastewater Surveillance



Conclusions

- Different research disciplines can facilitate tailored implementation approaches to:
 - Link immunity to interventions
 - Mitigate infection risk
 - Promote wellness in high-risk settings

Lessons Learned

- Evolving nature of the pandemic highlighted
 - Importance of engaging knowledge users and tailoring the response to their needs
 - Need for the research team to be nimble, flexible and tailor approaches to immunity research to population needs/context
- Conducting research from basic science through to clinical and implementation research can be done and is fun and rewarding
 - Requires clinical and scientific humility
 - Is a wellness strategy

Thank you to an amazing team!



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**COVID-19 IMMUNITY
TASK FORCE**

Temerty
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