Understanding and Improving the Care of Older Adults Living with Dementia Across Four Canadian Provinces during the COVID-19 Pandemic: A Mixed-Methods Study to Inform Policy and Practices

Améliorer les soins aux personnes âgées atteintes de la maladie d'Alzheimer et d'autres troubles neurocognitifs majeurs dans quatre provinces du Canada pendant la pandémie de COVID-19 : une étude mixte pour informer les politiques et les pratiques

Isabelle Vedel, Geneviève Arsenault-Lapierre, Howard Bergman, Susan Bronskill, Yves Couturier, Claire Godard-Sebillotte, Mary Henein, Julie Kosteniuk, Vladimir Khanassov, Carrie McAiney, Debra Morgan, Nadia O'Brien, Megan O'Connell, Laura Rojas-Rozo, Dallas Seitz, Saskia Sivananthan, Eric Smith, Nadia Sourial, Machelle Wilchesky and COVID-ROSA Research Team
Understanding and Improving the Care of Older Adults Living with Dementia Across Four Canadian Provinces during the COVID-19 Pandemic: A Mixed-Methods Study to Inform Policy and Practices

Améliorer les soins aux personnes âgées atteintes de la maladie d’Alzheimer et d’autres troubles neurocognitifs majeurs dans quatre provinces du Canada pendant la pandémie de COVID-19 : une étude mixte pour informer les politiques et les pratiques

Isabelle Vedel, MD, PhD (Associate Professor, MSc Graduate Program Director), Geneviève Arsenault-Lapierre, PhD (Senior Research Associate), Howard Bergman, MD, FCFP, FRCP, FCAHS (Professor, Assistant Dean), Susan Bronskill, PhD (Senior Core Scientist Program Lead), Yves Couturier, PhD (Professor, Scientific Director), Claire Godard-Sebillotte, MD, PhD (Geriatrician), Mary Henein, MSc (Research Assistant), Julie Kosteniuk, PhD (Professional Research Associate), Vladimir Khanassov, MD, PhD (Clinician, Assistant Professor), Carrie McAiney, PhD (Associate Professor, Research Chair in Dementia), Debra Morgan, PhD, RN (Professor and Chair, Fellow), Nadia O’Brien, PhD (Postdoctoral Fellow), Megan O’Connell, PhD (Professor), Laura Rojas-Rozo, MSc, MD (Research Assistant), Dallas Seitz, MD, PhD, FRCP, FAHA (Associate Professor, President), Saskia Sivananthan, PhD (Chief Research and Knowledge Transfer and Exchange Officer), Eric Smith, MD, MPH, FRCP, FAHA (Professor), Nadia Sourial, PhD (Assistant Research Professor), Machelle Wilchesky, PhD (Assistant Professor, Director of Research) and the COVID-ROSA Research Team
a. Department of Family Medicine, McGill University, 5858 Côte-des-Neiges Road, 3rd Floor Montreal, Quebec H3S 1Z1 Quebec, Canada
b. Lady Davis Institute for Medical Research at the Mortimer B. Davis Jewish General Hospital, 3755 Chemin de la Côte-Sainte-Catherine, Montréal, QC H3T 1E2
c. Department of International Affairs, Faculty of Medicine, McGill University, 5858 Côte-des-Neiges Road, 3rd Floor Montreal, Quebec H3S 1Z1 Quebec, Canada
d. ICES Central, G1 06, 2075 Bayview Avenue, Toronto, Ontario M4N 3M5
e. Département de travail social, Université de Sherbrooke, 2500 Boul. de l’Université, Sherbrooke, J1K 2R1
f. Réseau 1 Québec, Université de Sherbrooke, Campus de Longueuil, 150 Place Charles-Le Moyne, Longueuil (Québec) J4K 0A8
g. Canadian centre for Health and Safety in Agriculture (CCHSA), University of Saskatchewan, 104 Clinic Place, P.O. Box 23, Saskatoon, SK, S7N 2Z4
h. School of Public Health and Health Systems, University of Waterloo, 200 University Avenue West, Waterloo, ON, Canada N2L 3G1
i. Canadian Academy of Health Sciences/Académie canadienne des sciences de la santé, 70 Georges St 3rd Floor, Ottawa, ON, K1N 5V9
j. Centre de recherche du Centre hospitalier de l’Université de Montréal (CRCHUM), 900 Saint Denis St, Montréal, Québec, H2X 0A9
k. Department of Psychology, University of Saskatchewan, 9 Campus Drive, 154 Arts Saskatoon SK S7N 5A5, Canada
l. Cumming School of Medicine, University of Calgary, 2500 University Drive NW, Calgary Alberta T2N 1N4, Canada
m. Canadian Academy of Geriatric Psychiatry, 55 St Clair Ave W, Toronto, ON M4V 2Y7
n. Alzheimer Society of Canada, 20 Eglinton Avenue West, 16th Floor. Toronto, Ontario M4R 1K8
o. Département de médecine de famille et de médecine d’urgence, Université de Montréal, Centre de recherche du Centre hospitalier de l’Université de Montréal (CHUM), 850 rue St-Denis, Montréal, QC, H2X 0A9 Canada
p. Donald Berman Maimonides Geriatric Centre, 5795, Avenue Caldwell, Montreal, H4W 1W3, Canada
**Abstract**

**Introduction**: Les implications de la pandémie COVID-19 sont extrêmement éloignées pour les personnes vivant avec une démence (PLWD) en communauté et en soins de longue durée (LTC), étant parmi les plus vulnérables. Les PLWD sont à risque grave de COVID-19 et d'une désorganisation des soins et de santé due à la pandémie. **Objectifs**: 1) Mesurer l'impact de la pandémie sur l'utilisation des services de santé et des services sociaux, la mortalité, l'infection à la COVID-19 à l'aide d'une matrice, et conduire un dialogue délibératif avec des décideurs, gestionnaires, personnes avec un TNM, proches aidants et cliniciens. **Méthodes**: Un projet permettra de comprendre l'impact de la pandémie sur les personnes avec TNM et proches aidants canadiens et de souligner les domaines à améliorer.

**Résumé**

**Introduction**: La pandémie de COVID-19 a eu de graves conséquences pour les personnes qui présentent des vulnérabilités, particulièrement celles avec un trouble neurocognitif majeur (TNM). Ces dernières risquent à la fois d’avoir une infection grave et de voir leur accès aux soins de santé et services sociaux compromis. **Objectifs**: Décrire le protocole de notre étude qui vise à : 1) Mesurer l’impact de la pandémie sur l’utilisation des services de santé et des services sociaux, la mortalité, l’infection à la COVID-19 des personnes avec un TNM, lorsque possible, à la fois dans la communauté et dans les établissements de soins de longue durée, comparativement à avant la pandémie, 2) Comprendre les besoins perçus et les comportements relatifs à l’utilisation des services de santé des personnes avec un TNM et des proches aidants, et les expériences des personnes avec un TNM, proches aidants et médecins avec les services de santé et sociaux, et 3) Générer et diffuser des recommandations fondées sur des données probantes portant sur des stratégies efficaces pour faire face à la pandémie actuelle et se préparer aux vagues subséquentes. **Méthodes**: Une étude à méthodes mixtes convergentes avec approche participative réalisée dans 4 provinces canadiennes. Objectif 1 : nous ferons une étude de cohorte observationnelle rétrospective dans laquelle nous mesurerons la mortalité (toutes causes ; liées à COVID-19), l'utilisation des services de santé, et les taux d'infection dans des banques de données administratives. Objectif 2 : nous ferons une étude de cas multiple explicative, dans laquelle nous conduirons des entretiens semi-structurés et des questionnaires auprès des personnes avec TNM, proches aidants et des cliniciens. Objectif 3 : nous intégrerons les résultats des 2 premiers objectifs à l’aide d’une méta-matrice et conduirons un dialogue délibératif avec des décideurs, gestionnaires, personnes avec TNM, proches aidants et, cliniciens. **Impact et conclusion**: Ce projet permettra de comprendre l'impact de la pandémie sur les personnes avec TNM et proches aidants canadiens et de souligner les domaines à améliorer.
INTRODUCTION

In Canada, and the world more broadly, there is an urgent need to effectively mitigate the rapid spread of COVID-19 and minimize its direct and indirect impacts on persons living with dementia (PLWD) and care partners (Mok et al., 2020). This is essential for those residing in long-term care (LTC) and also community settings. There are more than 564,000 Canadians living with dementia (Alzheimer Society of Canada, 2016). PLWD are particularly vulnerable to both the direct effects of the SARS-CoV-2 infection and to the consequences of containment strategies, including physical distancing and disruptions to access to the healthcare system, especially for non-COVID-19 care (hereafter labelled as “the effect of the pandemic”).

First, PLWD are at a higher risk of SARS-CoV-2 infection since they may not be able to comply with the safeguard procedures and public health recommendations (Wang et al., 2020). They also are at a higher risk of severe COVID-19 disease complications and death as they often are more advanced in age and have multiple comorbidities (Center for Disease Control [CDC], 2020; Hacker Teper et al., 2019; Mondor et al., 2017; Sanità, 2020). A recent Canadian provincial report found that those with a dementia diagnosis were over-represented in SARS-CoV-2 cases and deaths (Institut national d’excellence en santé et en services sociaux, 2020). If scarcity of intensive care resources were to develop, they are at risk of being triaged away from life-saving healthcare (Smith et al., 2020).

These complications are exacerbated for PLWD in LTC, where the pandemic revealed existing inadequate organization of care (Bergman, 2020; Bolt et al., 2021; Brown et al., 2020; CDC, 2020; Kaasalainen, 2020; McGilton et al., 2020; Sanità, 2020). Almost 80% of all deaths in Canada have occurred in long-term care and seniors’ homes (Walsh & Semeniuk, 2020), where around 70% of residents have dementia (Canadian Institute for Health Information, 2020b).

Second, PLWD, who require coordinated support from several health and social services (Borson & Chodosh, 2014; Canadian Academy of Health Science, 2019; Hacker Teper et al., 2019), are experiencing unprecedented disruptions of their care. Access to health and social services has been limited due to the impossibility of face-to-face contact or due to catastrophic professional and volunteer shortages such as home care, day programs, LTC facilities, and community resources. Phone or virtual visits are being used by health care providers for ongoing care (Boivin et al., 2020), but these methods can pose special challenges to PLWD who frequently have hearing, visual, and functional impairments.

Third, specific infection measures implemented by different levels of health authorities and general public appeals to practice physical distancing prevent family and friends from visiting PLWD and disrupt daily routines (e.g., walks, outings), which puts them at risk of isolation (Cudjoe & Kotwal, 2020), neuropsychiatric symptoms of dementia (Boutoleau-Bretonnière et al., 2020; Canevelli et al., 2020), and mental health issues (Boutoleau-Bretonnière et al.). These factors may contribute to putting PLWD, especially in LTC, at increased risk of being prescribed antipsychotics and benzodiazepines, medications that are associated with potentially severe adverse events (Schwarz et al., 2012).

Fourth, care partners may be experiencing increased challenges, especially in the community, as formal care services are disrupted for their loved ones and themselves (Roach et al., 2020). Optimal dementia care relies on caring for the dyad: the PLWD and care partners (Borson & Chodosh, 2014). Lack of adequate support for care partners, who may now need to provide additional support to a PLWD, could put both within this dyad at risk.

Fifth, PLWD may not seek necessary care because they or their care partners fear of COVID-19 infection, which may result in acute or chronic conditions being sub-optimally managed, leading to increased need for health care services and risk of all-cause mortality.

Considering these daunting challenges, we leveraged our existing infrastructure, methods, and network, to ensure a timely response to these significant challenges. This project utilizes tools and methods already developed by the Alzheimer Society of Canada (ASC), the College of Family Physicians Canada (CFPC) as well as the Canadian...
Consortium on Neurodegeneration in Aging (CCNA). The CCNA is a research network that includes more than 320 clinicians, including nurses and physicians, and researchers throughout Canada who aim to accelerate progress in research on dementia. Together, following a participatory approach that will engage PLWD, their care partners, and healthcare decision-makers and clinicians, we will measure and describe the consequences of the pandemic for PLWD living in the community and LTC on mortality, use of health care services and experiences of PLWD, care partners, and primary care physicians. We will follow this with a deliberative dialogue to co-develop evidence-based and actionable recommendations for clinicians, including nurses, physicians, and other healthcare workers, and decision-makers to tackle the current wave of the pandemic and prepare for subsequent waves.

1. **Research Objectives**

1.1. To measure the impact of the pandemic on health and social services use, mortality, and where possible, COVID-19 infection rate of PLWD both in the community and in LTC facilities compared to before the pandemic.

1.2. To understand PLWDs’ and care partners’ perceived needs, behaviours related to health service use and the experiences of PLWD, care partners, and physicians with health and social services.

1.3. To generate and disseminate evidence-based and actionable recommendations on effective strategies to address the current wave of the pandemic and prepare for subsequent waves.

**Methods**

This study is framed according to the Andersen healthcare utilization model (Andersen et al., 2013) (herein referred to as the Andersen model), which links outcomes (i.e., mortality, use of health services) to predisposing and enabling factors (i.e., need, access to services, experiences, behaviours related to health service use, sex, gender, socioeconomic status (SES), rurality). We will use a convergent mixed-method design where qualitative and quantitative studies will complement each other to examine the pandemic’s impact on health service use by PLWD and care partners in Canada (O’Cathain et al., 2010; Pluye & Hong, 2014). This design is particularly suited to study complex phenomena such as dementia care, where multiple organizations are involved in responding to complex patient and care partner’s needs (Vedel et al., 2019). A retrospective observational cohort quantitative study design using administrative databases (objective 1) and a qualitative study using questionnaires and interviews (objective 2) will be conducted in parallel (Figure 1). Following these two objectives, we will integrate the quantitative and qualitative results by conducting a deliberative dialogue workshop to develop and disseminate evidence-based recommendations (objective 3). This study will be conducted in four provinces (Quebec, Ontario, Alberta, Saskatchewan). Together, these four provinces represent more than three quarters of the Canadian population (Government of Canada, 2020; Government of Canada, 2018).

We have adopted a participatory research approach (Alzheimer Society of Canada, 2015; Bush et al., 2017; Jagosh et al., 2012) to create long-lasting system changes (Bush et al.; Jagosh et al.), where stakeholders contribute to all the key research processes, including setting objectives, interpretation and validation of findings, and recommendation development. Our participatory approach aims to engage PLWD and care partners, as well as health organization managers and decision-makers. We followed the SPIRIT checklist (SPIRIT Group, 2013) for writing this protocol and made sure that no relevant items were missed.

2.1. **Objective 1.** We will use a retrospective observational cohort study to estimate the impact of the pandemic across provinces and by setting of care in PLWD. We will compare health services use, mortality, and where possible, COVID-19 infection in a fixed cohort of PLWD at the start of the pandemic (March 1st through December 31, 2020) (exposed group) to those in PLWD during the same calendar periods in the preceding year (unexposed group) (See Figure 2). This design will enable an accurate estimation of the impact of the pandemic on PLWD, accounting for seasonality and expected natural decline of the population.
Figure 1

Overall study objectives and design

Objective 1:
Measure the impact of the pandemic on health and social services use, infection rate and mortality of PLWD both in the community and in long-term care facilities.

Quasi-experimental study using administrative databases

Objective 2:
Understand PLWDs' and caregivers' perceived needs, behaviors and experiences of health and social services.

Explanatory qualitative multiple case study

Survey
Interviews

Objective 3:
Generate and disseminate evidence-based and actionable recommendations on effective strategies to tackle the current wave of the pandemic and prepare for future waves.

Integration of qualitative and quantitative results
Deliberative Workshops
Dissemination Canada
Objective 1 retrospective cohort study design

T0 (March 1st)  December 31st

Weekly measurements until the end of the follow-up.

Cohort selection

Exposure measurement period: pandemic vs. no pandemic
Outcome measurement period: health service use and mortality
Measurement of confounders/predictors

Persons 65+ with a diagnosis of dementia in cohort

Fixed Cohort Design

Population: Persons aged 65+ with a prevalent diagnosis of dementia on March 1, 2020 (T0) and on the same day in 2019 (T0) as a historical control

Exposure: Presence of Pandemic

Outcome: Health services use and mortality measured weekly from March 1st to December 31st of pandemic year (2020) and historical control (2019)

Confounders/Predictors: Measured from T0 to 2 years prior

Stratification variables: Measured from T0 to T0-5 years
2.1.1. Data sources. We will analyze linked, population-based health administrative databases from the provinces of Quebec, Ontario, Alberta and Saskatchewan. These provinces offer a mix of urban and rural settings, as well as make up an estimated 76% of the Canadian population (Government of Canada, 2020; Government of Canada, 2018). Canada has a public, universal health system and, as such, these data account for the majority of services provided including emergency department (ED) visits, hospitalizations, physician visits, dispensed prescriptions (over/under age 65 years depending on the province), home care services, long-term care admission and mortality (Canadian Institute for Health Information, 2020a). The administrative health data is accessible approximately 3-8 months, depending on the database and the province, following service delivery. Some data sources are common to the provinces (Canadian Institute for Health Information, 2020a). We will request the databases through ICES (ON), Institut de la statistique du Québec (QC), Health Quality Council (SK), and Alberta Health Services (AB). All data within these administrative databases are anonymized and personal identifying information is removed. Data is only accessible by those approved and by the appropriate governing bodies where each database is held.

2.1.2. Population. Within each province, persons aged 65+ years, with a history of dementia on the first day of the exposed period (March 1, 2020) or unexposed period (March 1, 2019) will be eligible for inclusion in the cohorts. We will identify PLWD using a validated algorithm that was developed in Ontario at ICES and adopted by the Canadian Public Health Agency (Jaakkimainen et al., 2016). The research team already has experience with applying this algorithm in QC and ON.

2.1.3. Outcomes. As per the Andersen model, the main outcomes will be health services use and mortality. We will measure these outcomes from March 1st through December 31st of each year. We will select measures based on a framework of indicators our team previously developed and already operationalized in two provinces (Quebec and Ontario) (Sourial et al., 2021; Sourial et al., 2020) (see definitions in Table 1). Several of the chosen outcomes are based on the feasibility of comparability between provinces. We will measure the outcomes throughout the follow-up period weekly beginning on the first day of each cohort selection period. In addition to the outcomes in Table 1, we will, where possible, measure COVID-19 infection rate, measure health service use and mortality due to COVID-19.

2.1.4. Covariates. As per the Andersen model, we will consider predisposing and enabling factors as covariates. We will consider the following potential confounders or predictors of the outcome in modelling the outcomes: age, sex, socioeconomic status, a proxy of rurality, region, available indicators of immigration status, comorbidity, stage or severity of disease, and time since diagnosis, the presence or absence of COVID-19, available neighbourhood contextual variables related to marginalization according to the 2016 Census, and attachment to an interdisciplinary primary care team (where possible).

2.1.5. Analysis. We will perform analyses in each province and stratify by whether an individual lived in LTC or the community, determined by a variable or an algorithm available in each province. We will also perform descriptive summary of the weekly events using Kaplan-Meier analysis for time to first event outcomes (e.g., LTC, mortality), and summarizing rates for other outcomes (e.g., visits to ED, hospital, ambulatory care). For each indicator, the denominator will be the persons still at risk at the beginning of each week (i.e., individuals alive, eligible for health care insurance coverage, and 65 years old or older at the beginning of each weekly follow-up). To allow a comparison of the impact of the pandemic throughout its different periods, we will aggregate and analyze the weekly data in three periods:
- Period 1: March – May (first wave)
- Period 2: June – September (plateau)
- Period 3: October – December (second wave)
We will apply the same periods to the exposed (i.e., pandemic) and unexposed (i.e., historical control) cohorts to examine the impact of the pandemic across these periods. We will compare the rates between provinces. To pool the provinces’ rates, we plan to do a meta-analysis to analyze the overall trends of some comparable outcomes (Table 1).
Table 1

**Operational definition for study indicators**

| Indicator | Definition |
|-----------|------------|
| Total visits to primary care physicians<sup>a</sup> | Rate of visits to a primary care physician (in-person office or home, phone, or telemedicine) during the week among persons with dementia. |
| Total visits to specialists | Rate of visits to a specialist (in-person office or home, phone, or telemedicine) during the week among persons with dementia. |
| Visits to the emergency department | Rate of emergency department visits during the week among persons with dementia. |
| Potentially avoidable visits to the emergency department (ED)<sup>b</sup> | Rate of potentially avoidable emergency department visits during the week among persons with dementia. |
| Hospitalizations | Rate of hospitalizations (non-elective) during the week among persons with dementia. |
| Intensive Care Unit (ICU) Hospitalizations | Rate of ICU hospitalizations during the week among persons with dementia. |
| Ambulatory care sensitive conditions (ACSC) hospitalization – General Population<sup>b</sup> | Rate of hospitalizations during the week with a most responsible diagnosis of asthma, cardiac heart failure, Chronic Obstructive Pulmonary Disease (COPD), diabetes, hypertension, angina, seizures among persons with dementia. |
| ACSC hospitalization – Older Population<sup>b</sup> | Rate of hospitalizations during the week with a most responsible diagnosis of asthma, cardiac heart failure, COPD, diabetes, hypertension, hypotension, dehydration, pneumonia, urinary tract infection, constipation, skin ulcers, weight loss, nutritional deficiency, adult failure to thrive, seizures. |
| Alternate Level of Care (ALC) hospitalization<sup>b</sup> | Rate of hospitalizations during the week with ALC status among persons with dementia. |
| Readmissions to the hospital within 30 days following hospital discharge | Rate of hospital readmissions (non-elective) within 30 days of hospital discharge during the week among persons with dementia. |
| Prescribed benzodiazepines | Proportion of persons with dementia with at least one prescribed benzodiazepine during the week. |
| Prescribed antipsychotics | Proportion of persons with dementia with at least one prescribed antipsychotic during the week. |
| Use of home care<sup>b</sup> | Rate of home care visits during the week (nurse or physician) among persons with dementia. |
| Admission to long-term care | Proportion of persons with dementia admitted to long-term care during the week. |
| Palliative Care<sup>b</sup> | Rate of palliative care during the week among persons with dementia. |
| Mortality | Total number of persons deceased during the week among those persons with a diagnosis of dementia on the 1<sup>st</sup> of the week. |

<sup>a</sup> Primary care visits include office, home, phone or virtual visits by a family physician or general practitioner. Maximum of one visit per patient per physician per day.

<sup>b</sup> These indicators will be measured within each province and will not be comparable across provinces.
If the exposed and unexposed cohorts are not comparable at baseline, we will use propensity score-based inverse-probability weighting to increase the comparability of the exposed and unexposed (Austin, 2011) cohort and strengthen the causal interpretation of the results (Desai & Franklin, 2019; Hérnan & Robins, 2020). We will use the aforementioned covariates in the propensity score model. Comparability of the exposed and unexposed group in the weighted sample on measured confounders and predictors will be verified using descriptive (e.g., standardized mean differences) and graphical assessments. We will model the outcomes in the exposed and unexposed periods using generalized estimating equations to account for correlation across time periods in each group. Results will be presented as incident risk ratios, incident risk differences and numbers needed to treat to prevent one event. We will derive variance estimates using bootstrap methods (Austin, 2016) and perform a correction for multiple testing using the Bonferroni method. Finally, we will conduct a sensitivity analysis comparing the outcomes from the historical control (2019) and the preceding year (2018) to evaluate any differences that are not attributable to the pandemic.

2.2. Objective 2. We will conduct an explanatory qualitative multiple case study (Yin, 2009), where one case will be one province. We will combine data from two sources: survey (questionnaires) and semi-structured interviews.

2.2.1. Survey. We will use three questionnaires developed by the ASC and the CFPC in collaboration with patient and care partners: one for PLWD, one for care partners of PLWD, and one for family physicians. These questionnaires were pilot tested, and their face validity verified by the ASC and the CFPC for their respective questionnaires. These questionnaires assess the following domains: access to a family physician, experience with care and support received (e.g., experience with virtual visits) (30 closed and open-ended questions and five sociodemographic questions). The ASC and CFPC first distributed this survey in October 2020 nationally to PLWD and care partners, and to all Canadian family physicians. We expect 900 completed questionnaires (600 from PLWD and care partners, 300 from family physicians), with a targeted demographic approach to ensure representation of women, as well as Black, Indigenous, and Persons of Colour according to Statistics Canada data. The surveys were translated into five languages (English, French, Hindi, Simplified Chinese and Traditional Chinese) to facilitate this approach. We will conduct a descriptive analysis of the closed-ended questions and qualitative thematic analysis of the open-ended questions. We will then explore the associations between experiences of health and social services and gender, SES, rurality, and ethnicity. While the questions do not directly relate to the COVID-19 pandemic, participants are invited to share experiences that related to the pandemic in the instructions of the questionnaires.

2.2.2. Semi-structured interviews. As per the predisposing and enabling factors in the Andersen model, semi-structured interviews will explore care needs (e.g., unmet needs), behaviours related to health service use (e.g., how persons decide to go to ED or not) and experiences related to health and social service use by PLWD and care partners during the pandemic. In a pilot study with 20 care partners in Alberta, we identified the following themes: loss of personal support from family and friends, decreased access to healthcare (particularly day programs and home care services), and decline in mental and cognitive health of PLWD (Roach et al., 2020). We will interview a purposive sample of PLWD and care partners, including PLWD and care partners whose lived experiences speak to the diversity of the population (gender, rurality, sexual orientation, ethnicity, SES). An interview guide will be developed in close collaboration between persons with lived experience (persons living with dementia and care partners) and our team’s qualitative research experts. We will recruit participants through local Alzheimer’s Societies for people living in the community via email, newsletter and social media. We will recruit approximately 10 PLWD with the option to have their care partners present, we will conduct 10 interviews with care partners in each of the four participating provinces and conduct 1 hr semi-structured interviews with these 80 PLWD and care partners. We will also compensate the participants...
of the interviews with a $20 CAD gift card. We will develop an interview guide and test it in the field. We will conduct these interviews remotely by trained members of the research team in the language preferred by the interviewee (English or French) using the technology preferred by each PWLD and care partners (phone, Facetime, Skype, Zoom, etc.) (Janghorban et al., 2014; Wilkerson et al., 2014). The research team will contact all participants by phone or teleconference system to discuss the consent form. During this conversation, participants will have the opportunity to ask questions about the consent form and decide to participate or not in the research project, and if so, when they wish to participate. We will assess the PLWD’s capacity to consent using an existing detailed script. For documentation purposes, the research team will record this process to document the agreement to participate on the study. Recording will be done upon the participants’ agreement. We will then transcribe the interviews verbatim and entered it into NVivo12. One researcher from each province (four researchers total) will independently code a sample of the interview transcripts to develop a coding framework that they will then apply to the broader qualitative data set. In keeping with the iterative nature of qualitative data analysis, we may continually revise and modify the coding framework over the course of data analysis to account for emergent themes, as well as insights from researchers and collaborators. We will analyze the data using conventional qualitative content hybrid analysis using the Andersen model (Andersen et al., 2013) as a starting point and remaining open to new themes (Denzin & Lincoln, 2005). We will use several strategies to enhance rigour: sharing of non-identifiable sample of interview transcripts and summaries with our collaborators to obtain feedback, an audit trail of analytical decisions will be kept using ‘memoing’ in NVivo12, and reflexivity to account for personal biases.

2.2.3. Case Study Analysis. We will analyze the results from the survey and the interviews together using an explanatory qualitative multiple case study (Yin, 2009), where one case will be one province. The utilization of the case study method is appropriate when the phenomenon of interest is embedded in its context (here, each province) and is multifactorial (Yin). We will conduct a within-case analysis followed by a cross-case analysis.

2.3. Objective 3. In order to generate and disseminate evidence-based and actionable recommendations on effective strategies to address the current wave of the pandemic and prepare for subsequent waves, we will first integrate the quantitative and qualitative results from objective 1 and 2, respectively grounded in the Andersen model (Andersen et al., 2013). To do so, we will build a meta-matrix as described in Miles and Huberman (1994). This will allow us to juxtapose outcomes and predisposing and enabling factors. It will help identify what factors we can act on to improve the outcomes. We will develop a series of infographics and data visualizations to clearly communicate these integrated results (Graham et al., 2006).

Then, we will conduct a virtual deliberative dialogue workshop, an appropriate method for bringing together multiple stakeholders to develop evidence-based recommendations for practice and policy (Boyko et al., 2012; Burchardt, 2014; Lavis et al., 2014; O’Brien et al., 2020). A deliberative dialogue is intended for diverse stakeholders to assess evidence. We will generate recommendations based on the lived and professional expertise of stakeholders (O’Brien et al.). Deliberative dialogue workshops are professionally moderated to encourage convergent and divergent views, and do not aim to establish a group consensus. Deliberations have been conducted successfully on diverse health issues including pediatric cancer care (Longo et al., 2021), primary care for women living with HIV (O’Brien et al.), medical assistance in dying (Boivin et al., 2019) and breast cancer screening (Abelson et al., 2018).

We will conduct the deliberative dialogue with 15 stakeholders from each of the participating provinces, for a total of 60 participants. The participating stakeholders will represent family and specialist physicians, nurses, social workers, managers, and PLWD and care partners. They will each be compensated with a $20 CAD gift card. This workshop will be conducted in collaboration with the Canadian Foundation for Healthcare Improvement (CFHI), and the ASC. It will consist of
four steps: i) considering the evidence (see above infographics and data visualization), ii) deliberating together and separately within each province (using breakout rooms in Zoom), iii) sharing strategies and priorities across Canada, and iv) generating recommendations related to care of PLWD and care partners during a pandemic.

We will draw upon international resources to guide the facilitation of an online deliberation (Lupton, 2020; Tippin M et al., 2020; University College London, 2020). We will discuss tailored evidence-based recommendations for specific subpopulations (women, LGBTQ2+, low SES, racialized persons) and people living in rural regions, as their needs may differ (Cooper et al., 2015, 2017; Cooper et al., 2010; Cooper, 2018; Fredriksen Goldsen et al., 2019; Sivananthan et al., 2015; Sourial et al., 2020) from the majority and urban populations.

3. Participatory Research Approach. Our participatory approach is a community-based participatory approach, engaging PLWD and care partners; and an organizational participatory approach, engaging health organization managers and decision-makers.

3.1. Engagement of persons living with dementia and care partners. Increasing efforts are being put forward in research related to dementia to engage PLWD in a meaningful way (Bethell et al., 2018), which we adopted with the intentions to increase the credibility and legitimacy of our shared research project by benefiting from their unique lived experience, inform decision-making and identify gaps in healthcare services (Alzheimer Society of Canada, 2015). To this end, 16 PLWD and care partners were recruited through advertisements from the ASC, Federation of Quebec Alzheimer Societies, and the Engagement of People with Lived Experience of Dementia program from the CCNA. This group of 16 PLWD and care partners will provide insights to prioritize research questions from objective 1 and 2. They will also contribute to interpreting the results of objective 1 and 2. Finally, these 16 PLWD and care partners will enrich and actively participate in the deliberative dialogue of objective 3.

A distinct advisory group of PLWD and care partners previously reviewed and provided input on the surveys developed by the ASC.

3.2. Decision-makers and managers involvement. In addition, we are collaborating with various stakeholders representing decision-makers and managers from the ASC, Alzheimer’s Societies, the Public Health Agency of Canada, Healthcare Excellence Canada (formerly known as the Canadian Foundation for Health Improvement), the CFPC, the Canadian Geriatrics Society, and Dementia Advocacy Canada to minimize the direct and indirect impacts of the current wave of the COVID-19 pandemic and prepare for subsequent waves. The decision-makers and managers have been involved in the research protocol development, tools development and distribution. They will be involved in the interpretation of objectives 1 and 2, as well as the deliberative dialogues of objective 3.

4. Knowledge transfer strategy. This research has the fundamental goal of producing evidence that will address current gaps on the impact of COVID-19 and facilitate the improvement of the design of effective and efficient care systems, service delivery mechanisms and public health policies to better support PLWD and care partners. Throughout this project, we will leverage our infrastructure, networks, and partners’ existing communication platforms (website, Twitter accounts, ASC’s newsletter, and CFPC and CFHI listservs) to continuously disseminate results as soon as they are available to ensure that this evidence may rapidly inform the response to the pandemic.

IMPACT AND CONCLUSION

The pandemic continues to be a challenge as global cases continue to rise (John Hopkins University, 2020). PLWD are increasingly vulnerable to the effects of the pandemic (Brown et al., 2020; Holder & Reddy, 2020). The pandemic has revealed existing gaps in care, for example, the lack of resources available to LTC and uncoordinated access to care. As frontline physicians, nurses and other healthcare professionals, managers, and policymakers continue to be overburdened by the additional stress of COVID-19 on the healthcare system, understanding the impact on and the experiences...
of service use by PLWD and care partners is crucial to adapt our policies and practices. This knowledge can be used to design approaches that will mitigate disease spread. In addition, the disruption caused by the pandemic will likely reverberate through our healthcare systems in the long-term and in future health emergencies; this study can be used to address these disruptions in care. Our research aim is to contribute to improving the care for PLWD and care partners in a system persistently impacted by COVID-19 by: i) Accelerating the availability of high-quality and real-time evidence to support Canada’s rapid response to the global pandemic to better prevent and manage COVID-19; ii) Improving the implementation of practices and policies and identifying the ones that are more promising to prevent and manage COVID-19 and similar health emergencies at the population levels; iii) Enabling Canadian engagement and coordination in national research and to better enable harmonized data collection, sharing of data, and quasi-experimental studies; iv) Providing evidence to inform clinical and health system management and the public health response within and across jurisdictions in Canada; v) Enhancing provincial and national collaborative efforts, to mitigate the rapid spread of COVID-19, related negative consequences, and prepare for future health emergencies.

**Authors’ contribution:** IV, SB, YC, DM, SS, MW, HB, CM, ES, DS, NS, CGS, MOC, NOB, LRR, JK, VK, MH, GAL all had substantial contributions to the design of the study, drafting of the work and revising it critically, have approved the final draft of the work, and take accountability for its contents.

**Acknowledgments:** The authors recognize the work of the COVID-ROSA Research Team, which in addition to the authors includes our collaborators who consented to be included on this list: Laura Maclagan, Jacqueline Quail, Colleen Maxwell, Andrea Gruneir, Nouha Ben Gaied, Mario Gregario, Lisa Poole, Mary Beth Wighton, Joanne Bracken, Wendy Weidner, Jennifer Major, Manuel Montero Odasso, Ngozi Iroanyah, Serge Gauthier, Sid Feldman, Jean-Baptiste Beuscart, Matthieu Calafiore, Pam Roach, Natalia Smith, Aaron Jones, Ginny Lane, and Juanita Bascu. We would also like to acknowledge the Alzheimer Society of Canada and the Canadian Consortium on Neurodegeneration in Aging for their collaboration.

**Funding:** This project is funded by the Canadian Institute of Health Research (CIHR)(VR5-172692).

---

**Statement of conflict of interest:** The authors declare no conflict of interest.

**Ethics certificate number:** McGill University IRB Study Number A07-E46-20B / 20-07-003.

**Reçu/Received:** 14 Jan 2021 **Publié/Published:** Juin 2021
Abelson, J., Tripp, L., & Sussman, J. (2018). ‘I just want to be able to make a choice’: Results from citizen deliberations about mammography screening in Ontario, Canada. *Health Policy*, 122(12), 1364-1371. https://doi.org/https://doi.org/10.1016/j.healthpol.2018.09.013

Alzheimer Society of Canada. (2015). *Meaningful engagement of people with dementia*. https://alzheimer.ca/en/Home/We-can-help/Resources/meaningful-engagement

Alzheimer Society of Canada. (2016). Report summary Prevalence and monetary costs of dementia in Canada (2016): a report by the Alzheimer Society of Canada [Note de synthèse Prévalence et coûts financiers des maladies cognitives au Canada : un rapport de la Société Alzheimer du Canada (2016)]. *Health promotion and chronic disease prevention in Canada : research, policy and practice*, 36(10), 231-232. https://pubmed.ncbi.nlm.nih.gov/27768560

Andersen, R., Davidson, P., & Baumeister, S. (2013). Improving Access to Care. In G. Kominski (Ed.), *Changing the U.S. Health Care System: Key Issues in Health Services Policy and Management*. Jossey-Bass.

Austin, P. C. (2011). An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. *Multivariate Behavioral Research*, 46(3), 399-424. https://doi.org/10.1080/00273171.2011.568786

Austin, P. C. (2016). Variance estimation when using inverse probability of treatment weighting (IPTW) with survival analysis. *Stat Med*, 35(30), 5642-5655. https://doi.org/10.1002/sim.7084

Bergman, H. (2020). CONSTATS ET PISTES POUR L’AVENIR DE NOTRE SYSTÈME DE SANTÉ. *La Presse*. https://plus.lapresse.ca/screens/1342b5d1-9561-4978-906c-1271de341127_7c__0.html?utm_medium=Twitter&utm_campaign=Microsite+Share&utm_content=Screen

Bethell, J., Comisso, E., Rostad, H. M., Puts, M., Babineau, J., Grinbergs-Saul, A., Wighton, M.B., Hammel, J., Doyle, E., Nadeau, S., & McGilton, K. S. (2018). Patient engagement in research related to dementia: A scoping review. *Dementia*, 17(8), 944–975. https://doi.org/10.1177/1471301218789292

Boivin, A., Gauvin, F. P., Gornon, G., Garcia, A., Rouly, G., Marcoux, I., & Lehoux, P. (2019). Information needs of francophone health care professionals and the public with regard to medical assistance in dying in Quebec: a qualitative study. *CMAJ Open*, 7(2), E190-e196. https://doi.org/10.9778/cmajo.20180155

Boivin, A., Penafiel, M., Rouly, G., Lahaie, V., Codsi, M.-P., Isabel, M., & White-Guay, B. (2020, April 7, 2020). The bmj opinion. *Covid-19—a pivotal moment in community care*. https://blogs.bmj.com/bmj/2020/04/07/covid-19-a-pivotal-moment-in-community-care/

Bolt, S. R., van der Steen, J. T., Mujezinović, I., Janssen, D. J. A., Schols, J. M. G. A., Zwakhalen, S. M. G., Khemai, C., Knapen, E. P. A. G. M., Dijkstra, L., & Meijers, J. M. M. (2021). Practical nursing recommendations for palliative care for people with dementia living in long-term care facilities during the COVID-19 pandemic: A rapid scope review. *International Journal of Nursing Studies*, 113, 103781. https://doi.org/10.1016/j.ijnurstu.2020.103781

Borson, S., & Chodosh, J. (2014). Developing Dementia- Capable Health Care Systems: A 12-Step Program. *Clinics in geriatric medicine*, 30(3), 395-420. https://doi.org/10.1016/j.cger.2014.05.001

Boutouleau-Bretonnière, C., Poucllet-Courtemanche, H., Gillet, A., Bernard, A., Deruet, A. L., Gouraud, I., Mazoue, A., Lamy, E., Rocher, L., Kapogiannis, D., & El Haj, M. (2020). The Effects of Confinement on Neuropsychiatric Symptoms in Alzheimer’s Disease During the COVID-19 Crisis. *Journal of Alzheimer’s Disease*, 76(1), 41-47. https://doi.org/10.3233/JAD-200604

Boyko, J. A., Lavis, J. N., Abelson, J., Dobbins, M., & Carter, N. (2012). Deliberative dialogues as a mechanism for knowledge translation and exchange in health systems decision-making. *Soc Sci Med*, 75(11), 1938-1945. https://doi.org/10.1016/j.socscimed.2012.06.016

Brown, E. E., Kumar, S., Rajji, T. K., Pollock, B. G., & Mulsant, B. H. (2020). Anticipating and Mitigating the Impact of the COVID-19 Pandemic on Alzheimer’s Disease and Related Dementias. *The American Journal of Geriatric Psychiatry*, 28(7), 712-721. https://doi.org/10.1016/j.jagp.2020.04.010

Burchardt, T. (2014). Deliberative research as a tool to make value judgements. *Qualitative Research*, 14(3), 353-370. https://doi.org/10.1177/1468794112469624

Bush, P. L., Pluye, P., Loignon, C., Granikov, V., Wright, M. T., Pelletier, J.-F., Bartlett-Esquiline, G., Macaulay, A. C., Haggerty, J., Parry, S., & Repchinsky, C. (2017). Organizational participatory research: a systematic mixed studies review exposing its extra benefits and the key factors associated with them. *Implementation Science*, 12(1), 119. https://doi.org/10.1186/s13012-017-0648-y

Canadian Academy of Health Science. (2017). *Improving the quality of life and care of persons living with dementia and their caregivers*. https://www.cahs-acss.ca/wp-content/uploads/2019/01/Report.pdf

Canadian Institute for Health Information. (2020a). *Data Holdings*. https://www.cihi.ca/en/access-data-and-reports/make-a-data-request/data-holdings
Canadian Institute for Health Information. (2020b). Dementia in long-term care: Policy changes and educational supports help spur a decrease in inappropriate use of antipsychotics and restraints. https://www.cihi.ca/en/dementia-in-canada/dementia-across-the-health-system/dementia-in-long-term-care

Canevelli, M., Valletta, M., Toccaceli Blasi, M., Remoli, G., Sarti, G., Nuti, F., Sciancalepore, F., Ruberti, E., Cesari, M., & Bruno, G. (2020). Facing Dementia During the COVID-19 Outbreak. Journal of the American Geriatrics Society, 68(8), 1673-1676. https://doi.org/10.1111/jgs.16644

Center for Disease Control (CDC). (2020). Coronavirus Disease 2019 (COVID-19) - People Who Need Extra Precautions: People Who Are at Higher Risk for Severe Illness. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-at-higher-risk.html

Cooper, C., Lodwick, R., Walters, K., Raine, R., Manthorpe, J., Iliffe, S., & Petersen, I. (2015). Observational cohort study: deprivation and access to anti-dementia drugs in the UK. Age and Ageing, 45(1), 148-154. https://doi.org/10.1093/ageing/afv154

Cooper, C., Lodwick, R., Walters, K., Raine, R., Manthorpe, J., Iliffe, S., & Petersen, I. (2017). Inequalities in receipt of mental and physical healthcare in people with dementia in the UK. Age and Ageing, 46(3), 393-400. https://doi.org/10.1093/ageing/afw208

Cooper, C., Tandy, A. R., Balamuruli, T. B., & Livingston, G. (2010). A systematic review and meta-analysis of ethnic differences in use of dementia treatment, care, and research. Am J Geriatr Psychiatry, 18(3), 193-203. https://doi.org/10.1097/JGP.0b013e318181bf9caf

Cooper, R. (2018). Socioeconomic adversity—an important barrier to healthy aging. Bmj, 367, k1288. https://doi.org/10.1136/bmj.k1288

Cudjoie, T. K. M., & Kotwal, A. A. (2020). “Social distancing” amidst a crisis in social isolation and loneliness. Journal of the American Geriatrics Society, 68, E27-E29. https://doi.org/10.1111/jgs.16527

Denzin, N. K., & Lincoln, Y. S. (2005). The Sage handbook of qualitative research. Sage Publications Ltd.

Desai, R. J., & Franklin, J. M. (2019). Alternative approaches for confounding adjustment in observational studies using weighting based on the propensity score: a primer for practitioners. BMJ, 367, i5657. https://doi.org/10.1136/bmj.l5657

Fredriksen Goldsen, K., Kim, H.-J., Jung, H., & Goldsen, J. (2019). The Evolution of Aging With Pride-National Health, Aging, and Sexuality/Gender Study: Illuminating the Iridescent Life Course of LGBTQ Adults Aged 80 Years and Older in the United States. International journal of aging & human development, 88(4), 380-404. https://doi.org/10.1177/0091415019837591

Godard-Sebillotte C, Sourial, N., Hardouin, M., Rochette, L., Pelletier, E., Gamache, P., Jean, S., Strumpf, E., & Vedel, I. (2019). Development of two hierarchical algorithms identifying the 65+ community-dwelling population in the provincial administrative database in quebec [Poster]. Canadian Association for Health Services and Policy Research Annual conference, Halifax, NS.

Government of Canada. (2020). Canada at a Glance 2020. Population. Statistics Canada. https://www150.statcan.gc.ca/n1/pub/12-581-x/2020001/pop-eng.htm

Government of Canada. (2018). Canada at a Glance 2018. Population [Archived Content]. Statistics Canada. https://www150.statcan.gc.ca/n1/pub/12-581-x/2018000/pop-eng.htm

Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). Lost in knowledge translation: time for a map? J Contin Educ Health Prof, 26(1), 13-24. https://doi.org/10.1002/chp.47

Hacker Teper, M., Godard-Sebillotte, C., & Vedel, I. (2019). Achieving the Goals of Dementia Plans: A Review of Evidence-Informed Implementation Strategies. Healthcare policy = Politiques de sante, 14(4), 10-20. https://doi.org/10.12927/hcopol.2019.25860

Holder, K., & Reddy, P. H. (2020). The COVID-19 Effect on the Immune System and Mitochondrial Dynamics in Diabetes, Obesity, and Dementia. The Neuroscientist, 1073858420960443. https://doi.org/10.1177/1073858420960443

Institut national d’excellence en santé et en services sociaux. (2020). Première vague de la pandémie de COVID-19 au Québec : regard sur les facteurs associés aux hospitalisations et aux décès. https://www.inesss.qc.ca/fileadmin/doc/INESSS/COVID-19/COVID-19_INESSS_EP_Pортrait_cohorte_COVID.pdf

Jaakkimainen, R. L., Bronskill, S. E., Tierney, M. C., Herrmann, N., Green, D., Young, J., Ivers, N., Butt, D., Widdifield, J., & Tu, K. (2016). Identification of Physician-Diagnosed Alzheimer’s Disease and Related Dementias in Population-Based Administrative Data: A Validation Study Using Family Physicians’ Electronic Medical Records. J Alzheimers Dis, 54(1), 337-349. https://doi.org/10.3233/jad-160105

Jagosh, J., Macaulay, A. C., Pluye, P., Salsberg, J., Bush, P. L., Henderson, J., Sirett, E., Wong, G., Cargo, M., Herbert, C. P., Seifer, S. D., Green, L. W., & Greenhalgh, T. (2012). Uncovering the benefits of participatory research: implications of a realist review for health research and practice. Milbank Q, 90(2), 311-346. https://doi.org/10.1111/j.1468-0009.2012.00665.x
Janghorban, R., Roudsari, R. L., & Taghipour, A. (2014). Skype interviewing: The new generation of online synchronous interview in qualitative research. *International Journal of Qualitative Studies on Health and Well-being, 9*(1), 24152. https://doi.org/10.3402/qhw.v9.24152

John Hopkins University. (2020). *Coronavirus Resource Center*. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). https://coronavirus.jhu.edu/map.html

Kaasalainen, M., Vellani & Pereira (2020). Improving End-of-Life Care for People with Dementia in LTC Homes During the COVID-19 Pandemic. Alzheimer Society of Canada. https://alzheimer.ca/sites/default/files/documents/Improving%20End-of-Life%20Care%20for%20People%20with%20Dementia%20in%20LTC%20Homes%20During%20the%20COVID-19%20Pandemic.pdf

Lavis, J. N., Boyko, J. A., & Gauvin, F.-P. (2014). Evaluating deliberative dialogues focussed on healthy public policy. *BMC Public Health, 14*(1), 1287. https://doi.org/10.1186/1471-2458-14-1287

Longo, C., Rahimzadeh, V., & Bartlett, G. (2021). Communication of Pharmacogenomic test results and treatment plans in pediatric oncology: deliberative stakeholder consultations with parents. *BMC Palliative Care*. 20(15), 1-12. https://doi.org/10.1186/s12904-021-00709-2

Lupton D. (2020). *Doing fieldwork in a pandemic* (crowd-sourced document). https://docs.google.com/document/d/1clGjGABB2h2qbdU2gfrqHmog986P0mVgVulzG18/edit?ts=5e88ae0a#

Hérnan, M.A., & Robins, J.M. (2020). *Causal Inference: What If*. Boca Raton: Chapman & Hall/CRC.

McGilton, K. S., Escrib-Pinol, A., Gordon, A., Chu, C. H., Zülliga, F., Sanchez, M. G., Boscart, V., Meyer, J., Corazzini, K. N., Jacinto, A. F., Spilsbury, K., Backman, A., Scales, K., Fagertun, A., Wu, B., Edvardsson, D., Lepore, M. J., Leung, A. Y. M., Siegel, E. O., Noguchi-Watanabe, M., Wang, J., & Bowers, B. (2020). Uncovering the Devaluation of Nursing Home Staff During COVID-19: Are We Fuelling the Next Health Care Crisis? *Journal of the American Medical Directors Association*, 21(7), 962-965. https://doi.org/10.1016/j.jamda.2020.06.010

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed). Sage Publications, Inc.

Mok, V. C. T., Pendlebury, S., Wong, A., Alladi, S., Au, L., Bath, P. M., Biessels, G. J., Chen, C., Cordonnier, C., Dichgans, M., Dominguez, J., Gorelick, P. B., Kim, S., Kwok, T., Greenberg, S. M., Jia, J., Kalaria, R., Kivipelto, M., Naegandran, K., Scheltens, P. (2020). Tackling challenges in care of Alzheimer's disease and other dementias amid the COVID-19 pandemic, now and in the future. *Alzheimer's & Dementia, 16*(11), 1571-1581. https://doi.org/10.1002/alz.12143

Mondor, L., Maxwell, C. J., Hogan, D. B., Bronskill, S. E., Gruneir, A., Lane, N. E., & Wodchis, W. P. (2017). Multimorbidity and healthcare utilization among home care clients with dementia in Ontario, Canada: A retrospective analysis of a population-based cohort. *PLOS Medicine, 14*(3), e1002249. https://doi.org/10.1371/journal.pmed.1002249

O’Brien, N., Law, S., Proulx-Boucher, K., Ménard, B., Skerritt, L., Boucoiran, I., Cox, J., Andersson, N., & de Pokomandy, A. (2020). Codesigning care improvements for women living with HIV: a patient-centred qualitative study. *Canadian Family Physician*, 66(9), 957-961. https://doi.org/10.3402/cp.v66i9.39803

O’Cathain, A., Murphy, E., & Nicholl, J. (2010). Three techniques for integrating data in mixed methods studies. *BMJ, 341*, c4587. https://doi.org/10.1136/bmj.c4587

Pluye, P., & Hong, Q. N. (2014). Combining the power of stories and the power of numbers: mixed methods research and mixed studies reviews. *Ann Rev Public Health*, 35, 29-45. https://doi.org/10.1146/annurev-publhealth-032013-182440

Roach, P., Zwiers, A., Cox, E., Fischer, K., Charlton, A., Josephson, C. B., Patten, S. B., Seitz, D., Ismail, Z., & Smith, E. E. (2020). Understanding the impact of the COVID-19 pandemic on well-being and virtual care for people living with dementia and care partners living in the community. *Dementia, 1*-7. https://doi.org/10.1177/1471301220977639

Sanità, I. S. d. (2020). *Most common comorbidities observed in coronavirus (COVID-19) deceased patients in Italy as of April 29, 2020*. In Statista. https://www.statista.com/statistics/1110949/common-comorbidities-in-covid-19-deceased-patients-in-italy/

Schwarz, S., Froelich, L., & Burns, A. (2012). Pharmacological treatment of dementia. *Curr Opin Psychiatry, 25*(6), 542-550. https://doi.org/10.1097/YCO.0b013e328358e4f2

Sivananthan, S. N., Laverne, M. R., & McGrail, K. M. (2015). Caring for dementia: A population-based study examining variations in guideline-consistent medical care. *Alzheimer’s & Dementia, 11*(8), 906-916. https://doi.org/10.1016/j.jalz.2015.02.008

Smith, E. E., Couillard, P., Fisk, J. D., Ismail, Z., Montero-Odasso, M., Robillard, J. M., Vedel, I., Sivananthan, S., & Gauthier, S. (2020). Pandemic Dementia Scarce Resource Allocation. *Canadian geriatrics journal*, 23(3), 260-262. https://doi.org/10.5770/cgi.23.457

Sourial N., Godard-Sebillette C., Bronskill S., Hardouin M., Vedel I. (2021). Framework and prioritization of dementia primary care performance and health service use indicators [Accepted]. *Canadian Family Physician.*
Sourial, N., Vedel, I., Godard-Sebillotte, C., Etches, J., Arsenault-Lapierre, G., & Bronskill, S. E. (2020). Sex Differences in Dementia Primary Care Performance and Health Service Use: A Population-Based Study. Journal of the American Geriatrics Society, 68(15), 1056-1063. https://doi.org/10.1111/jgs.16347

SPIRIT Group. (2013). The SPIRIT Checklist. https://www.spirit-statement.org

Tippin M, Kalbach J, & Chin, D. (2020). The Definitive Guide To Facilitating Remote Workshops. Mural. https://www.mural.co/ebook

University College London. (2020). Carry On Co-Producing. Public Engagement Blog. https://blogs.ucl.ac.uk/public-engagement/2020/05/06/carry-on-co-producing-part2/?fbclid=IwAR1Wf5-gblzXdOy-3PTzMuL-mbHPb_ZKSj9loRDHU4bj2cfJnlAk7zoY5Qs

Vedel, I., Kaur, N., Hong, Q. N., El Sherif, R., Khanassov, V., Godard-Sebillotte, C., Sourial, N., Yang, X. Q., & Pluye, P. (2019). Why and how to use mixed methods in primary health care research. Family practice, 36(3), 365-368. https://doi.org/10.1093/fampra/cmy127

Walsh, M., & Semeniuk, I. (2020, April 28). Long-term care connected to 79 per cent of COVID-19 deaths in Canada. The Globe and Mail. https://www.theglobeandmail.com/politics/article-long-term-care-connected-to-79-per-cent-of-covid-19-deaths-in-canada/

Wang, H., Li, T., Barbarino, P., Gauthier, S., Brodaty, H., Molinuevo, J. L., Xie, H., Sun, Y., Yu, E., Tang, Y., Weidner, W., & Yu, X. (2020). Dementia care during COVID-19. The Lancet, 395(10231), 1190-1191. https://doi.org/10.1016/S0140-6736(20)30755-8

Wilkerson, J. M., Iantaffi, A., Grey, J. A., Bockting, W. O., & Rosser, B. R. (2014). Recommendations for internet-based qualitative health research with hard-to-reach populations. Qual Health Res, 24(4), 561-574. https://doi.org/10.1177/1049732314524635

Yin. (2009). Case Study Research: Design and Methods (4th ed.). Sage Publications.