A cross-sectional study of the preventive health care activities of western Canadian rural-living patients unattached to primary care providers

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ABSTRACT

Prevention services, such as screening tests and vaccination, are underutilized, especially by rural populations and patients without a usual primary care provider. Little is known about the compounding impacts on preventive care of being unattached and living in a rural area and there has been no comprehensive exploration of this highly vulnerable population’s prevention activities. The twofold purpose of this research was to examine rural unattached patients’ prevention activity self-efficacy and completion and to explore their experiences accessing healthcare, including COVID-19 impacts. Two thirds of patients had been unattached for over one year, and over 20 % had been unattached for over 5 years; males experienced longer unattachment compared to females. Completion rates of prevention activities were relatively low, ranging from 5.9 % (alcohol screening) to 59 % (vision test). Most participants did not complete their prevention care activities in line with the Lifetime Prevention Schedule timeline: 65 % of participants had less than half of their activities up-to-date and only 6.7 % of participants were up to date on 75 % or more of their prevention activities. Participants with higher prevention self-efficacy scores were more likely to be up-to-date on associated prevention activities but the longer patients had been unattached, the fewer their up-to-date prevention activities. Patients expressed negative impacts of COVID-19 including walk-in clinics shutting down limiting access to care. These results suggest serious gaps in rural unattached patients’ preventive care and highlight the need for support when they are without a usual primary care provider, which can be lengthy.

1. Introduction

Preventive care refers to manoeuvres/services pertaining to prevention (i.e., immunization, screening) offered to the general population (asymptomatic) based on age, sex, and disease risk factors (Primary Care Network, 2019). The goal of preventive care is to reduce illness risk, disability, and death. Canada has published best-evidence national guidelines for prevention services (Canadian Task Force on Preventive Health, 2019), yet despite these guidelines, in addition to provincial guidance on lifetime prevention practices (BC Ministry of Health, 2021a), overall use remains low, especially in rural areas (Nelson et al., 2020).

Rural-living patients report lower preventive service utilization rates for a wide range of acute and chronic conditions compared to their urban counterparts (Nelson et al., 2020). Rural patients engage in fewer preventive activities including colorectal cancer screening (Shete et al., 2021), annual dental checkup (Khan et al., 2017), mammography (Davies et al., 2008a), and lipid and glucose testing (Cohen et al., 2016). Further, preventable mortality rates that could be reduced through primary preventive actions, such as immunization, were significantly higher in more remote versus easily accessible areas (Subedi et al., 2019).

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Combined patient, provider and health-system-level barriers influence preventive service uptake and complicate preventive care decision-making in rural areas, that already have limited health care resources and access to care. Not having a regular primary care provider, or unattachment, has consistently been associated with low prevention activity uptake (Kim et al., 2012, Kim et al., 2022). This is of considerable concern in rural and remote Canadian communities, where 18 % of the Canadian population lives but only 13.6 % of family physicians and less than 3 % of specialists practice (Archer et al., 2011).

The COVID-19 pandemic has negatively impacted prevention services use. Urban primary care clinics (May-November 2020), observed decreases in appropriate screening for cervical cancer (-7.5 %), colorectal cancer (-8%), and type 2 diabetes mellitus (-4.5 %); declines that had not returned to baseline despite reopening of services (Laing and Johnston, 2021). The impact of COVID-19 on preventive service uptake for patients without a usual source of care living in rural communities is unknown. However, sustained reductions and deferrals in prevention and screening activities increase risk of undetected early disease (Laing and Johnston, 2021).

Understanding the compounding impacts on preventive care of being unattached and living in a rural area requires a comprehensive examination across multiple prevention domains and activities. The purpose of this study was to examine prevention activities (age/sex specified) and screening behaviors of rural unattached patients. The key research questions this study aimed to address included: 1. What prevention activities did rural unattached patients complete? 2. How is self-efficacy related to the completion of prevention activities? 3. How are demographics (e.g., age, sex) related to completion of prevention activities? 4. What are rural unattached patients’ experiences with preventive care?

2. Methods

2.1. Study Design, Sample, and Recruitment

An online, cross-sectional survey of unattached patients from rural communities in BC was conducted from May to June 2021. The survey included validated instruments, researcher-generated questions, and open-ended questions. Recruitment targeted unattached patients, defined as individuals without access to a regular primary care provider. Recruitment occurred through colleagues advertising on regional Divisions of Family Practice social media pages and to their virtual clinics, researchers posting to specific community pages, paid advertising, and physical posters placed in community centers (e.g., libraries). Ethical approval was obtained from the university behaviour research ethics board (REB # H21-01205).

Participants completed a 15-minute online questionnaire and had their names entered in a draw for a gift certificate valued at $50.00. Inclusion criteria were: being a rural-living adult (19 + years) without a primary care provider, able to read English, and completing the online consent form.

2.2. Survey measures (See Appendix A)

Socio-demographic characteristics. Questions asked for age, sex, marital status, race/ethnicity, postal code, level of education, employment, and household income.

Health history. Questions included overall physical and mental health, rated from 1 (very poor) to 5 (excellent), current chronic illnesses (from a list of 16 or ‘other’) and number of times in the past year they had sought care.

Preventive services use self-efficacy (PRESS) is a 16-item validated scale to measure self-efficacy for: communication with physicians, self-management of chronic disease, obtaining screening tests, getting vaccinations regularly, and exercise. Participants responded to items on a response scale ranging from 1 (Not applicable) to 5 (up-to-date) or retained as “not applicable”. Using age and sex-specific guidelines to determine if prevention activities were up-to-date (e.g., cervical cancer screening every 3 years for females age 25–69 years), authors coded each activity as “up-to-date”, “not up-to-date” or retained as “not applicable”.

Preventive services use self-efficacy (PRESS) (Jacob et al., 2016). PRESS is a 16-item validated scale to measure self-efficacy for: communication with physicians, self-management of chronic disease, obtaining screening tests, getting vaccinations regularly, and exercise. Participants responded to items on a response scale ranging from 1 (Not at all) to 10 (Very confident). Mean scores of responses to items comprising each subscale were computed.

Patient experiences. Participants were asked one question about positive and one question about negative impacts of the COVID-19 pandemic (open-ended) and were invited to follow-up with the research team with further reflections on their experiences as unattached patients.

2.3. Analysis

Survey data were analyzed using SPSS (Version 27). A Mann-Whitney U test was used to compare length of unattachment by sex. Independent sample t-tests were used to compare overall proportion of up-to-date prevention activities as well as preventive self-efficacy scores by sex. Chi-square tests were used to examine sex differences in whether or not each individual prevention activity was up-to-date or was a priority or not and for associations between these variables. Correlations (Spearman’s rho) were used to examine the association between age, self-efficacy scale scores, and proportion of up-to-date prevention activities. Participants missing age were excluded from age-related analyses. We tallied open-ended responses on impacts of COVID-19 into 4 possible categories (positive only, negative only, both positive and negative, or no impact/leave blank). We then selected relevant quotes within each category to highlight impacts on preventive care for these participants and for those who followed-up with the research team to provide more detailed experiences.

3. Results

Respondents (N = 135) were an average age of 51.2 years (SD =
15.6) (range 21–79 years), predominantly female (73 %), Caucasian (93 %), with 60 % of participants reporting good/excellent mental and physical health (see Table 1).

3.1. Unattachment and healthcare resources (Table 2)

Over two-thirds of respondents had been unattached for over one year, with over 20 % being unattached for over 5 years; as one 39-year-old male respondent attested: “I was on a waitlist for 8 years in one province and have been on one for 3 years in BC.” Males (Median = 2 to 5 years) had been unattached for significantly longer than females (Median = 1 to 2 years) (p = .038). The most common reasons for unattachment were provider retirement and providers not accepting new patients. Only 3 (2.2 %) respondents had no desire to be attached.

Respondents sought routine care primarily at the emergency department (ED) or did not seek care. When health concerns arose, the majority reported finding information online, followed by family/friends, a doctor/healthcare provider, and social media. The majority of patients thought either they alone should be responsible for initiating preventive care or both they and a provider should be jointly responsible.

Table 1
Socio-Demographic and Health Characteristics of Unattached Patients.

| Characteristic                              | All Unattached Patients (n = 135) N (%) |
|---------------------------------------------|----------------------------------------|
| Age (range:21–79)                           |                                        |
| 19–35 years                                 | 26 (19.3 %)                            |
| 36–54 years                                 | 35 (25.9 %)                            |
| 55 + years                                  | 58 (43.0 %)                            |
| Missing/prefer not to answer                | 16 (11.9 %)                            |
| Sex                                         |                                        |
| Female                                      | 98 (72.6 %)                            |
| Male                                        | 35 (25.9 %)                            |
| Non-binary                                  | 1 (0.7 %)                              |
| Prefer not to answer                        | 1 (0.7 %)                              |
| Marital status                              |                                        |
| Married/common-law                         | 70 (51.9 %)                            |
| Single                                      | 30 (22.2 %)                            |
| Separated/divorced                         | 24 (17.8 %)                            |
| Widowed                                     | 5 (3.7 %)                              |
| Missing                                     | 1 (0.7 %)                              |
| Race/ethnicity                              |                                        |
| White                                       | 125 (92.6 %)                           |
| Metis                                       | 4 (3.0 %)                              |
| Asian                                       | 3 (2.2 %)                              |
| First Nations                               | 1 (0.7 %)                              |
| Latin American                              | 1 (0.7 %)                              |
| Other (Canadian)                            | 1 (0.7 %)                              |
| Highest education level                     |                                        |
| No high school diploma                      | 5 (3.7 %)                              |
| High school diploma                         | 30 (22.2 %)                            |
| Post secondary below the bachelors level/Trade | 54 (40.0 %)                        |
| Bachelor’s degree                           | 23 (17.0 %)                            |
| Education above bachelor’s level            | 23 (17.0 %)                            |
| Employment                                  |                                        |
| Employed                                    | 90 (66.7 %)                            |
| Unemployed/retired/on disability            | 45 (33.3 %)                            |
| Income (CND)                                |                                        |
| Less than $25,000                           | 14 (10.4 %)                            |
| $25,000 - $49,000                           | 28 (20.7 %)                            |
| $50,000 - $74,000                           | 29 (21.5 %)                            |
| $75,000 - $99,000                           | 19 (14.1 %)                            |
| Over $100,000                               | 40 (29.6 %)                            |
| Overall physical health                     |                                        |
| Excellent                                   | 11 (8.1 %)                             |
| Good                                       | 70 (51.9 %)                            |
| Fair                                       | 43 (31.9 %)                            |
| Poor                                       | 10 (7.4 %)                             |
| Very poor                                   | 1 (0.7 %)                              |
| Overall mental health                       |                                        |
| Excellent                                   | 13 (9.6 %)                             |
| Good                                       | 68 (50.4 %)                            |
| Fair                                       | 38 (28.1 %)                            |
| Poor                                       | 14 (10.4 %)                            |
| Very poor                                   | 2 (1.5 %)                              |
| Number of chronic health problems           |                                        |
| 0 times                                     | 71 (47.4 %)                            |
| 1                                          | 30 (22.2 %)                            |
| 2                                          | 15 (11.1 %)                            |
| 3                                          | 11 (8.1 %)                             |
| 4-8                                        | 8 (5.8 %)                              |
| How many times sought care in past year     |                                        |
| 0 times                                     | 29 (21.5 %)                            |
| 1-2 times                                   | 46 (34.1 %)                            |
| 3-4 times                                   | 23 (23.0 %)                            |
| 4 + times                                   | 29 (21.5 %)                            |

Table 2
Length and Reasons for Unattachment, Places Where Unattached Patients Seek Healthcare, and Information Sources.

| Length of unattachment | N (%) |
|------------------------|-------|
| Has a former provider they do not attend (e.g., moved) | 11 (8.1 %) |
| Less than 6 months    | 10 (7.4 %) |
| 6 months - 1 year     | 22 (16.3 %) |
| 1-2 years             | 32 (23.7 %) |
| 2-5 years             | 28 (20.7 %) |
| 5-10 years            | 12 (8.9 %) |
| 10 + years            | 12 (8.9 %) |
| Has never been attached | 8 (5.9 %) |

Reason for unattachment N (%)*

| No family doctors in my area accept new patients | 90 (66.7 %) |
| My doctor left/retired | 60 (44.4 %) |
| No clinic close by    | 6 (4.4 %) |
| No desire to be attached | 3 (2.2 %) |
| Haven’t found a clinic that I like | 3 (2.2 %) |
| Provider is not available after hours | 2 (1.5 %) |
| Other (e.g., “relocated”; “moved to a new community”; “doctor passed away”) | 19 (14.1 %) |

When you need healthcare, where do you seek it? N (%)*

| Emergency department (for routine care) | 56 (41.5 %) |
| I don’t seek care | 34 (25.2 %) |
| Walk-in Clinic | 29 (21.5 %) |
| Virtual unattached clinic | 21 (15.6 %) |
| Urgent care clinic | 14 (10.4 %) |
| Telus Babylon | 11 (8.1 %) |
| Call 811 | 9 (6.7 %) |
| Other (e.g., “clinic residency program”; “duty doctor”; “travel across the province to see previous doctor”) | 30 (22.2 %) |

When you have health concerns, where do you find information? N (%)*

| Online | 109 (80.7 %) |
| Friends/family | 40 (29.6 %) |
| Doctor/healthcare provider | 31 (23.0 %) |
| Social Media | 13 (9.6 %) |
| Other (e.g., “I don’t”; “hospital emergency”) | 9 (6.7 %) |

When you receive preventive care services, who do you think should initiate this kind of care? N (%)

| Me (the patient) | 39 (29 %) |
| Provider/Clinic Staff/Nurse/Outside agency | 19 (14 %) |
| Both Me and a provider | 39 (29 %) |
| Unsure | 21 (16 %) |
| [Missing/No response selected] | 17 (13 %) |

Note: “Percentages total more than 100, because participants could select all that apply.”
3.2. Prevention activities and priorities

Sixty percent of respondents (n = 82) did not report any of seven items related to discussions about prevention with a healthcare team member in the past year. Prevention discussions for those reporting them were primarily for reviewing prescriptions and discussing a screening test (see Table 3).

The total proportion of up-to-date personal prevention activities ranged from 0 to 93.3 %, with an average prevention completion rate of 39.6 %. Overall, 88 (65 %) respondents had less than half of their prevention activities up-to-date, and only 9 (6.7 %) had 75 % or more of their prevention activities up-to-date. Of the 93 participants age 35 and older, 8 (8.6 %) had 75 % or more up to date. Completion rates of individual prevention activities ranged from a low of 5.9 % (alcohol screening) to a high of 59 % (vision test) (see Table 4). When examining groupings of prevention activities in Table 4, cancer screenings consistently were more up to date than others; the behavioural interventions (e.g., smoking, alcohol, mental health check-in) had the lowest completion rates.

Females had a higher, but non-significant proportion of completed personal prevention activities (41.9 %) compared to males (34.6 %) (p =.105). There were significant differences by sex in completion of individual prevention activities for males vs females for colonoscopy/FOBT (36 % vs 66 %, p =.011), eye pressure test (40 % vs 67 %, p =.004), and influenza vaccination (20 % vs 46 %, p =.007).

The proportion of respondents’ who prioritized each relevant prevention service is shown in Table 5. Participants who were up-to-date on cervical cancer screening (p =.014), dental cleaning (p =.030), eye exam (p =.033), and influenza vaccine (p <.001), were more likely to have prioritized these activities. However, significantly more of those who prioritized mental health check-in were not up-to-date on this activity (p =.001). Sex differences in prevention activity priority were found with females age 65 routinely offered “routinely offered” compared to males on communication with physicians (p =.003), obtaining screening tests (p =.017), and getting vaccinations regularly (p =.001).

Respondents who were up-to-date for colonoscopy/FOBT (p <.001), mammography (p =.005), influenza vaccination (p =.012), and tobacco cessation counseling (p <.001) had significantly higher self-efficacy for

### Table 3

| Activity | Recommended population and schedule | Not Applicable (%) | Yes, up to date (%) | Not, not up to date (%) |
|----------|-------------------------------------|--------------------|---------------------|------------------------|
| Cancer Screening | Females age 25–69 every 3 years | [47] 50 (56.8 %) | 38 (43.2 %) | |
| Cervical Cancer Screening | Adults age 50–74 every 2 years | [45] 51 (56.7 %) | 39 (34.3 %) | |
| Colonoscopy/FOBT | FOBT every 2 years OR colonoscopy every 10 years | [59] 42 (55.3 %) | 34 (44.7 %) | |
| Mammogram | Females age 50–74 every 2 years | [96] 19 (48.7 %) | 20 (51.3 %) | |
| Chest CT Scan | Individually requisitioned, so relied on participant reports | | | |

Table 4: Prevention Activity Completion.

| Activity | Recommended population and schedule | Not Applicable (%) | Yes, up to date (%) | Not, not up to date (%) |
|----------|-------------------------------------|--------------------|---------------------|------------------------|
| Eye Pressure Test | Adults age 19+ at least every 2 years | [0] 80 (59.3 %) | 55 (40.7 %) | |
| Dental Cleaning | Adults age 19+ at least once a year | [0] 64 (47.4 %) | 71 (52.6 %) | |
| Cholesterol Screening | Males age 40+ and females age 50+ every 1–5 years | [0] 48 (49.0 %) | 50 (51.0 %) | |
| Blood Glucose Check | Adults age 40+ every 3 years | [27] 48 (44.4 %) | 60 (55.6 %) | |
| Blood Pressure Check | Adults age 18+ at least every appropriate visit | [0] 51 (37.8 %) | 84 (62.2 %) | |
| Hearing Test | Adults age 60+ every 2 years | [45] 27 (30.0 %) | 63 (70.0 %) | |
| Bone Density Testing | Males age 70+ and females age 65+ at least once | [70] 21 (32.3 %) | 48 (67.7 %) | |
| Tetanus Vaccine | Adults age 19+ every 10 years | [0] 74 (54.8 %) | 61 (45.2 %) | |
| Influenza Vaccine | Adults age 19+ yearly | [0] 52 (38.5 %) | 83 (61.5 %) | |
| Pneumococcal Vaccine | Adults age 65+ once | [84] 19 (37.3 %) | 32 (62.7 %) | |

Note: CT, computed tomography; FOBT, fecal occult blood testing.

Overall, self-efficacy scores were highest for exercise and lowest for communication with physicians (See Table 6). Age was negatively correlated with self-efficacy for exercise, but positively correlated with self-efficacy for obtaining screenings and vaccinations. Proportion of up-to-date prevention activities was positively correlated with self-efficacy for obtaining screenings and vaccinations. The length of time spent unattached was negatively correlated with self-efficacy for obtaining screening as well as proportion of prevention activities completed (r =.36, p <.001). Females had significantly higher self-efficacy scores compared to males on communication with physicians (p <.003), obtaining screening tests (p <.017), and getting vaccinations regularly (p <.001).
and it being
old female described that amid
year-old female explained there had been a
changes in their lives since the onset of COVID-19, 35 (25.9 %) re-

3.4. Patient experiences

Although 53 (39.3 %) respondents reported no positive or negative
changes in their lives since the onset of COVID-19, 35 (25.9 %) re-

Table 5
Proportion of participants who selected each prevention service as a priority (of
those for whom each activity was relevant).

| Activity                          | Eligible | Yes, selected as a priority\N (%) |
|----------------------------------|----------|----------------------------------|
| Cancer Screening                 | 88       | 41 (46.6 %)                      |
| Cervical Cancer Screening        | 90       | 37 (41.1 %)                      |
| Colonoscopy/FOBT                 | 90       | 45 (50.2 %)                      |
| Mammogram                        | 76       | 16 (40.0 %)                      |
| Chest CT Scan                    | 39       |                                  |
| Screening for other asymptomatic diseases and risk factors |          |                                  |
| Eye Pressure Test                | 135      | 39 (28.9 %)                      |
| Dental Cleaning                  | 135      | 69 (51.1 %)                      |
| Cholesterol Screening            | 98       | 25 (25.5 %)                      |
| Blood Glucose Check              | 108      | 38 (35.2 %)                      |
| Blood Pressure Check             | 135      | 67 (49.6 %)                      |
| Hearing Test                     | 90       | 26 (28.9 %)                      |
| Bone Density Testing             | 65       | 29 (44.6 %)                      |
| Immunizations                    |          |                                  |
| Tetanus Vaccine                  | 135      | 13 (9.6 %)                       |
| Influenza Vaccine                | 135      | 36 (26.7 %)                      |
| Pneumococcal Vaccine             | 51       | 12 (23.5 %)                      |
| Behavioural Interventions        |          |                                  |
| Tobacco Cessation                | 15       | 5 (13.3 %)                       |
| Mental Health Check In           | 135      | 34 (25.2 %)                      |
| Alcohol Screening                | 135      | 3 (2.2 %)                        |

Note: CT, computed tomography; FOBT, fecal occult blood testing.

obtaining screening compared to those not up-to-date. Similarly, those
who were up-to-date on influenza (p <.001) and pneumococcal vacci-
nation (p = .038) had higher self-efficacy for getting vaccines compared
to those not-up-to-date; those receiving the influenza vaccination also
had higher self-efficacy scores for communication with physicians (p
=.030).

3.4. Patient experiences

Although 53 (39.3 %) respondents reported no positive or negative
changes in their lives since the onset of COVID-19, 35 (25.9 %) re-

Table 6
Correlations between Self-Efficacy Scale Scores with Age, Proportion of Up-To-Date Prevention Activities, and Length of Time Unattached.

|                      | Self-efficacy for exercise | Self-efficacy for communicating with physicians | Self-efficacy for managing chronic disease | Self-efficacy for obtaining screening | Self-efficacy for getting vaccinations |
|----------------------|-----------------------------|-----------------------------------------------|------------------------------------------|--------------------------------------|---------------------------------------|
| M (SD)               | 7.77 (2.57)                 | 3.36 (2.93)                                   | 6.46 (2.67)                              | 4.66 (3.17)                          | 6.88 (3.08)                           |
| Age                  |                             |                                              |                                          |                                      |                                       |
| r                    | -0.259**                    | 0.077                                        | 0.035                                    | 0.257*                              | 0.221*                                |
| p                    | 0.008                       | 0.486                                        | 0.737                                    | 0.010                               | 0.046                                 |
| Personal prevention proportion |                    |                                              |                                          |                                      |                                       |
| r                    | 0.004                       | 0.023                                        | 0.132                                    | 0.298**                             | 0.293**                               |
| p                    | 0.963                       | 0.828                                        | 0.174                                    | 0.002                               | 0.005                                 |
| Length of time unattached |                    |                                              |                                          |                                      |                                       |
| R                    | 0.166                       | -0.190                                       | 0.077                                    | -0.193*                             | -0.167                                |
| p                    | 0.073                       | 0.063                                        | 0.429                                    | 0.043                               | 0.112                                 |

Note: Spearman’s coefficients reported. *p <.05, **p <.01, ***p <.00.
4.1. Composite and individual prevention activities with comparisons to targets

It is concerning that over 65% of rural, unattached patients in this study were not up-to-date on half of the high-priority prevention services examined, and only 8.6% of our respondents aged 35 years or older had 75% or more of their prevention activities up-to-date. This figure is far lower than the 22% of urban-based US adults greater than 35 years who had completed 75% or more prevention activities during pre-COVID-19, although attachment status was not reported (Borsky et al., 2018). It is likely that COVID-19 exacerbated the low completion of prevention activities, as preventive care completion rates in several urban-Canadian clinics dropped considerably during the pandemic, a trend that continued despite re-opening measures (Laiing and Johnston, 2021). A pre-COVID-19 Canadian study, however, found unattached compared to attached patients were three times less likely to report receiving routine care such as monitoring of health issues or check-ups (26% vs 73% versus) (Hay et al., 2010).

Unlike previous research suggesting lower colonoscopy screening among rural females (Rosenwasser et al., 2013), we found that unattached rural females had nearly double the colonoscopy screening rates of unattached rural males. Overall, data on sex differences in colonoscopy completion have been mixed (Valery et al., 2020), but attachment status was not examined. Attachment may play a key role in increasing men’s colorectal screening. Females also had higher completion of eye pressure tests which is positive given females are at higher risk of glaucoma than males (Vajaranant et al., 2010). Finally, a higher proportion of females in the present study were up-to-date on influenza compared to males, consistent with other evidence showing significantly higher vaccination rates among females (Applewhit et al., 2020).

Although study participant completion rates of prevention activities (ranging from 6% to 59%) were low compared to best-in-world targets which range from 51 to 88% (BC Ministry of Health, 2021b), completion rates were comparable to BC-wide figures for colonoscopy/FOBT (57% and 50% BC-wide), mammography (55% and 52% BC-wide), and tobacco cessation conversation (20% and 19% BC-wide), but lower for cervical cancer screening (57% and 69% BC-wide) (BC Ministry of Health, 2021b). This is not surprising as obtaining cervical cancer screening is often provider-dependent.

4.2. Prevention activity prioritizing

Prioritizing prevention activities was associated with being up-to-date on four prevention activities: dental, eye exam, influenza vaccine, and cervical cancer screening. Recent evidence suggests that goal prioritization influences behavior change (Conner et al., 2021). Conner et al. (2021) found that goal prioritization increased performance of focal health behaviours without any adverse influence on non-prioritized health behaviors, controlling for behavior intentions and past behavior.

In contrast, those who were not up-to-date for mental health check-in were more likely to prioritize this activity. The COVID-19 pandemic has driven up demand for mental health services given the high post-pandemic levels of depression and anxiety reported world-wide (Cataldelli-Maia et al., 2021). Interestingly, a recent survey of rural citizens suggested greater access to mental health services for those who needed them during compared to prior to the pandemic (Rush et al., 2022). This may be due to the increasing availability of virtual mental health services. Authors of a rapid review identified 31 mobile apps and 114 web-based resources (e.g., telemedicine) that could be used to support mental health for Canadians during the pandemic (Strudwick et al., 2021). Many barriers exist to accessing these resources, including awareness, cost and connectivity and these may be responsible for reported high priority but lack of completion of mental health checks in this study (Schultz et al., 2021).

4.3. Self-efficacy and prevention activities

Self-efficacy (screening and vaccination) was significantly positively correlated with five specific prevention activities, consistent with evidence demonstrating the positive effect of self-efficacy on screening for colorectal (von Wagner et al., 2009) and cervical cancer (Tiraki and Yilmaz, 2018). Unattached patients with higher self-efficacy may pay more attention to their own health and to prevention and screening activities. Notably self-efficacy scores for communication with physicians (M = 3.65) was less than half that of an urban sample of older women (M = 9.17) (Jacob et al., 2016), possibly reflecting the unattached rural patient population. Encouragingly, self-efficacy can be improved through health education and motivational interventions, as shown in studies of diabetes (Lee et al., 2019) and cancer screening (Chan and So, 2021; Merluzzi et al., 2019).

4.4. Patient experiences

Overall, patients expressed more negative than positive impacts of COVID-19 such as reduced access to care due to walk-in clinics closing. The drastic shift to virtual care amid the pandemic (Glazier et al., 2021) may have created a situation where care remained accessible to attached patients, leaving those without a primary source of care with fewer perceived options. Patients in this study reported that the centralized waitlist, a major initiative in seven Canadian provinces including BC (Breton et al., 2018, Breton et al., 2017), wasn’t a viable solution as most had become unattached through provider attrition and found no local providers who were accepting new patients. There is a need for additional support to access prevention services during the often lengthy unattachment period many rural unattached patients experience.

4.5. Limitations

Diversity of our recruitment strategies made it difficult to determine response rates and non-response bias, limiting understanding about sample representativeness. However, using participant-provided postal codes, we were able to ascertain that our sample had slightly higher representation of White, English-speaking, married, highly educated, higher income, and older adults compared to Statistics Canada data for the same regions (Statistics Canada, 2016), suggesting more research is needed that includes less privileged groups, who may be in even greater need of prevention services. In addition, the prevention services composite was based on self-report, and respondents may have forgotten about receiving services or misremembered how long it had been since receiving them or self-reported irrelevant services being relevant to them. Further, some prevention activities were more likely to have been disrupted by COVID-19 (e.g., dental cleaning) compared to others more easily shifted to virtual care (e.g., behavioural screening/brief intervention); this likely influenced completion rates. Relatedly, the association between self-efficacy and prevention completion was correlational, and it is possible that lack of access to prevention services for some patients led to a cycle of lower self-efficacy. Because some prevention activities had lower completion rates (e.g., alcohol screening, bone density, pneumococcal vaccination, and tobacco cessation), and fewer males than females completed our survey, future research with larger samples are needed to identify potential sex differences in these. Finally, the online nature of the survey excluded those without access to the internet, limiting generalization to that population.

4.6. Conclusion

We found low completion rates of most prevention services in this rural unattached patient population, with length of time spent unattached negatively correlated with proportion of prevention activities completed. Self-efficacy appears to play an important role in prevention.
activity completion. These findings suggest important gaps in rural unattached patient prevention activities, pointing to the need for tailored interventions for this population. Preventive care is not optional but a necessity and policy-makers, primary care providers and patients need to work together to proactively address this inequitable healthcare issue.

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**CRediT authorship contribution statement**

**Kathy L. Rush**: Conceptualization, Methodology, Writing – original draft, Funding acquisition, Supervision. **Lindsay Burton**: Conceptualization, Methodology, Investigation, Project administration, Writing – original draft. **Cherisse L. Seaton**: Conceptualization, Methodology, Data curation, Formal analysis, Visualization, Writing – original draft. **Mindy A. Smith**: Conceptualization, Methodology, Writing – review & editing. **Eric P.H. Li**: Conceptualization, Methodology, Writing – review & editing. **Charlene E. Ronquillo**: Conceptualization, Methodology, Writing – review & editing. **Khalad Hasan**: Conceptualization, Methodology, Writing – review & editing. **Selena Davis**: Conceptualization, Methodology, Writing – review & editing. **Mona Mattei**: Conceptualization, Methodology, Resources, Writing – review & editing.

**Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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**Appendix A**

Unattached patient survey

Technology supported preventive care for rural unattached patients.

Age in years: ___.

Sex:

- Male
- Female
- Intersex
- Prefer not to answer
- Different identity (please specify) __________________________

Marital Status.

- Single (never married)
- Married or Remarried or common-law
- Widowed
- Separated
- Divorced
- Other (specify): __________________________
- Postal code: ____________

Do you identify as an Aboriginal person, that is, First Nations (North American Indian), Métis or Inuk (Inuit)?

- No, I am not an Aboriginal person.
- Yes, First Nations (North American Indian).
- Yes, Métis.
- Yes, Inuk (Inuit).

Race/Ethnicity (mark more than one or specify, if applicable).

- Black
- White
- South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
- Chinese
- Filipino
- Latin American
- Arab
- Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.)
- West Asian (e.g., Iranian, Afghan, etc.)
- Korean
Japanese
Other (specify): __________________________

Highest Level of Education.
o No high school diploma
o High school diploma
o Postsecondary diploma below the bachelor level
o Bachelor’s degree
o Diploma or certificate above the bachelor level
o Other (specify): __________________________

Employment.
• Full time
• Part time
• Casual
• Unemployed
• Retired
• Self-employed
• Seasonal worker
• Other (specify): __________________________

Including yourself, how many people currently live in your household? ____________.
What is your total annual income, before taxes, of all members of your household?
• Less than $25,000
• $25,000 - $49,000
• $50,000 - $74,000
• $75,000 - $99,000
• Over $100,000

How would you rate your overall physical health?
• Excellent
• Good
• Fair
• Poor
• Very Poor

How would you rate your overall mental health?
• Excellent
• Good
• Fair
• Poor
• Very Poor

Do you have any chronic health problems?
• Yes
• No

If “Yes” is selected: Chronic Health Problems.
• Arthritis
• Atrial Fibrillation
• Cancer
• Chronic Kidney Disease
• Chronic Obstructive Pulmonary Disease
• Coronary Heart Disease
• Dementia (e.g. Alzheimer’s)
• Diabetes
• Eye Problems
• Heart Failure
• High Blood Pressure
- Ischemic Heart disease,
- Osteoarthritis,
- Sleep Apnea
- Stroke
- Thyroid Disease
- Other (specify): _____________________________________________

How many times in the past year have you sought health care?

- 0 times
- 1–2 times
- 3–4 times
- 4+ times

How long have you been without a regular primary care provider (e.g., family doctor or nurse practitioner)?

- I have a former provider I do not attend (e.g., moved)
- Less than 6 months
- 6 months – 1 year
- 1–2 years
- 2–5 years
- 5–10 years
- 10+ years
- I have never been attached

Reason for unattachment (check all that apply)?

- No desire to be attached
- My doctor left/retired
- No clinic close by
- I haven’t found a clinic I like
- No family doctors in my area are accepting new patients
- Provider is not available after hours
- Other (specify): _____________________________________________
- Prefer not to answer

When you need health care, where do you seek it? (Check all that apply).

- Walk-in clinic
- Virtual Unattached Clinic (e.g., Bridge Care Virtual Clinic, Cranbrook Virtual Clinic)
- Urgent care clinic
- Call 811
- Telus Babylon
- Emergency department (for routine care)
- I don’t seek care
- Other (specify) _____________________________________________

When you have health concerns, where do you find information?

- Online
- Doctor/healthcare provider
- Friends/Family
- Social media
- Other (specify) _____________________________________________

This section of questions is about the quality of care you have received and things that may make it difficult for you to manage your health. In the past 12 months, have any care team members:

| Question                                                                 | Yes | No | Not needed |
|-------------------------------------------------------------------------|-----|----|------------|
| Asked if there are things that make it hard for you to take care of your health | o   | o  | o          |
| Talked with you about your main goals and priorities in caring for your health | o   | o  | o          |
| Talked with you about things in your life that worry you or cause you stress | o   | o  | o          |
| Talked with you about things that happened to you as a child that worry you or cause you stress | o   | o  | o          |
| Asked you about supports that you need for managing your health          | o   | o  | o          |

(continued on next page)
Preventive activities are those meant to keep you healthy (e.g., exercise, diet), pick up problems/disease early (e.g., breast or colon cancer), or keep your problem/disease from getting worse (e.g., blood pressure monitoring). In the past months/years have you completed any of the following activities? Please check off any completed activity and about when it was completed.

| Activity                                      | Yes | No | Not needed |
|-----------------------------------------------|-----|----|------------|
| Alcohol Screening/Conversation                |     |    |            |
| Blood Glucose Check                           |     |    |            |
| Blood Pressure Check                          |     |    |            |
| Bone Density Testing                          |     |    |            |
| Chest CT                                      |     |    |            |
| Colonoscopy                                   |     |    |            |
| Colorectal cancer stool test                  |     |    |            |
| Dental Cleaning                               |     |    |            |
| Influenza Vaccine                             |     |    |            |
| Hearing test                                  |     |    |            |
| Lipid/Cholesterol Screening                   |     |    |            |
| Mammogram                                     |     |    |            |
| Mental Health Check In                        |     |    |            |
| Pap Smear                                      |     |    |            |
| Pneumococcal Vaccine                          |     |    |            |
| Tetanus Vaccine                               |     |    |            |
| Tobacco Cessation Conversation               |     |    |            |
| Other (please specify)                        |     |    |            |

When you receive preventive care services, who do you think should initiate this kind of care?

- Me
- The Provider
- Clinic Staff
- Nurse
- An outside agency
- Unsure
- Other (specify) _______________________________

On a scale of 1 to 10, with 1 indicating “not confident at all” and 10 indicating “very confident”, how confident are you that you can do the following?

- Alcohol Cessation Conversation
- Blood Glucose Check
- Blood Pressure Check
- Bone Density Testing
- Chest CT
- Colonoscopy / Colorectal cancer stool test
- Dental Cleaning
- Eye Pressure Test
- Influenza Vaccine
- Hearing Test
- Lipid Screening
- Mammogram
- Mental Health Check In
- Pap Smear
- Pneumococcal Vaccine
- Tetanus Vaccine
- Tobacco Cessation Conversation
- Other (please specify) _______________________________

Which of the following preventive care services do you consider a priority for yourself at this stage of your life (check all that apply).

- Alcohol Cessation Conversation
- Blood Glucose Check
- Blood Pressure Check
- Bone Density Testing
- Chest CT
- Colonoscopy / Colorectal cancer stool test
- Dental Cleaning
- Eye Pressure Test
- Influenza Vaccine
- Hearing Test
- Lipid Screening
- Mammogram
- Mental Health Check In
- Pap Smear
- Pneumococcal Vaccine
- Tetanus Vaccine
- Tobacco Cessation Conversation
- Other (please specify) _______________________________
The next two questions will ask you about changes to your life (both positive and negative) since the COVID-19 pandemic. We are asking these questions in order to find out how the COVID-19 pandemic has impacted your lifestyle.

Have you taken up anything since the COVID-19 pandemic that will or has improved your life (e.g., running, new hobby)?

Have there been any changes to your life since the beginning of the COVID-19 pandemic that may leave a negative impact (e.g. job loss, diet change)?

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