



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 rural¹ 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 behavioural 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.

Attachment/healthcare factors. Questions included length of unattachment, reason(s) for unattachment, where they sought routine care, where they found health information, and who they thought should be responsible for initiating prevention services. Participants could select all that apply and could also select "other" and describe their situation.

Prevention discussions with healthcare team. Questions included discussions they'd had with a healthcare provider in the past 12 months. Prevention discussion Items were selected from the Centers for Medicare and Medicaid Services (2015) quality measures report and the Consumer Assessment of Healthcare Providers and Systems survey (Agency for Healthcare Research and Quality, 2018; Davies et al., 2008b) and modified for unattached patients.

Prevention activity completion and priorities for preventive care services. Seventeen prevention services were selected based on the British Columbia (BC) Lifetime Prevention Schedule Guideline (BC Ministry of Health, 2021a). These included biomedical, behavioral, cancer screening, immunizations, and two additional tests supported by the United States Preventive Service Task Force (bone density testing, chest computed tomography). Respondents indicated each activity they had completed on a frequency scale (less than 1 month ago to 5 + years ago) or "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". The exception was colon cancer screening coded as up-to-date if completing either colonoscopy 5 + years ago (or more recently) or fecal occult blood testing (FOBT) in the past 1–5 years. The total number of prevention activities up-to-date was divided by the total number of activities applicable for each participant to create a total proportion of up-to-date score. Participants were also asked to select all the services that were priorities for them.

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/left 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 =

¹ Our definition of rural was based on a community and hospital classification (BC Ministry of Health, 2015) to include communities with populations of up to 20,000 with some specialized inpatient care and limited general inpatient care.

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

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	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.

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.

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 female participants prioritizing bone density screening (27 % vs 9 %, p =.027) and influenza vaccination (33 % vs 11 %, p =.015).

3.3. Prevention self-efficacy

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 = -0.36, p <.001). Females had significantly higher self-efficacy scores

Table 3
Self-Reported Prevention Discussions in the Past Twelve Months.

In the past 12 months, have any care team members:	N (%)*
[Did not select any of the following seven discussions]	82 (60.7 %)
Reviewed all of the prescription medications you are taking with you?	33 (24.4 %)
Talked to you about tests or screenings that are appropriate for your age (e.g., mammogram, colon cancer screening)?	27 (20.0 %)
Talked with you about your main goals and priorities in caring for your health?	14 (10.4 %)
Asked if there are things that make it hard for you to take care of your health?	11 (8.1 %)
Talked with you about things in your life that worry you or cause you stress?	11 (8.1 %)
Asked you about supports that you need for managing your health?	7 (5.2 %)
Talked with you about things that happened to you as a child that worry you or cause you stress?	2 (1.5 %)

Note: *Percentages total more than 100, because participants could select all that apply.

Table 4
Prevention Activity Completion.

Activity	Recommended population and schedule	Not Applicable	Yes, up to dateN (%)	Not, not up to dateN (%)
<u>Cancer Screening</u>				
Cervical Cancer Screening	Females age 25-69 every 3 years	[47]	50 (56.8 %)	38 (43.2 %)
Colonoscopy/FOBT	Adults age 50-74 FOBT every 2 years OR colonoscopy every 10 years	[45]	51 (56.7 %)	39 (43.3 %)
Mammogram	Females age 50-74 every 2 years	[59]	42 (55.3 %)	34 (44.7 %)
Chest CT Scan	Individually requisitioned, so relied on participant reports	[96]	19 (48.7 %)	20 (51.3 %)
<u>Screening for other asymptomatic diseases and risk factors</u>				
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	[37]	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 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 %)
<u>Immunizations</u>				
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 %)
<u>Behavioural Interventions</u>				
Tobacco Cessation	Adults age 19+ "routinely offered"	[120]	3 (20.0 %)	12 (80.0 %)
Mental Health Check In	Adults age 19+ "routinely offered"	[0]	20 (14.8 %)	115 (85.2 %)
Alcohol Screening	Adults age 19+ "routinely offered"	[0]	8 (5.9 %)	127 (94.1 %)

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

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

Activity	Eligible N	Yes, selected as a priority N (%)
Cancer Screening		
Cervical Cancer Screening	88	41 (46.6 %)
Colonoscopy/FOBT	90	37 (41.1 %)
Mammogram	76	45 (59.2 %)
Chest CT Scan	39	16 (41.0 %)
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 vaccination ($p = .038$) 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 %) respondents reported both positive and negative experiences. A 26-year old female described that amid “loss of social supports and interaction” and it being “harder getting into walk-in clinic with clinics shutting down” she had taken up walking along with “Weight Watchers to control diet and lose weight”. Similarly, a 73-year-old female had taken up “painting”, while experiencing “job loss, home loss, medical care loss, financial loss.” Other participants had experienced either negative ($n = 39$; 28.9 %) or positive ($n = 8$; 5.9 %) impacts only. A 39-year-old male participant described the negative impacts as being “too many to list”, while a 69-year-old female explained there had been a “loss of good medical care and a reasonable doctor and choices for doctor.” A 76-year-old male

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. * $p < .05$, ** $p < .01$, *** $p < .00$.

described how difficult the past year had been, explaining: “twin brother died, wife died, lost my home, unable to care for myself, had to move to BC.” In contrast a 77-year-old female reported her positive experience of having begun “lobbying for home blood tests for seniors” amid COVID-19.

Three respondents followed up with the research team to elaborate on their experiences accessing care as unattached rural patients. A female participant explained that the doctors who remained in the town had reduced their hours/availability, perhaps because “historically, doctors probably had to work so much overtime and now they’re choosing a more balanced lifestyle” but that this “has a huge impact on preventatives and getting appointments and regular checkups, and often prescriptions are forgotten.” A male participant described: “I’ve been waiting 2 years for a family doctor, so it’s hard to get appointments...you have to go through emergency.” He also attributed his wife’s miscarriage to lack of access to essential testing, causing grief and anger. Another female participant explained how the centralized waitlist doesn’t seem to be a viable solution: “I’m on a very long waitlist trying to get a family doctor, but our doctors keep leaving, and they’re not being replaced, so the list is just growing”.

4. Discussion

Rural BC unattached patients reported low completion rates of prevention activities with fewer up-to-date prevention activities with longer periods of unattachment. Encouragingly, many patients believed either they alone, or in conjunction with a healthcare provider, should be responsible for initiating preventive care. Similarly, higher screening self-efficacy was associated with being up-to-date on colonoscopy/FOBT, mammography, influenza vaccination, and tobacco cessation counseling, and correlated with the proportion of up-to-date prevention activities. Although life changes during the pandemic allowed some patients to engage in healthy activities, many more reported negative impacts.

Nearly 40 % of these unattached patients reported using the ED when seeking care compared to 20 % of urban unattached patients in an Ontario study (Hay et al., 2010). The more costly ED is often the only option for rural patients as fewer walk-in clinics are located in rural communities but a costly alternative at \$304 CDN per ED visit in 2018–19 (Canadian Institute for Health Information, 2022). One quarter of unattached patients in our study had not sought care in the past year, slightly lower than the 30 % of Canadian who had not sought care over the same time period although attachment status was not reported (Statistics Canada, 2022). Whether this was due to COVID-19, their perceived lack of need, or other factors is unknown. These two extremes of ED usage or no care seeking point to the need for alternative models given the lack of walk-in clinics in rural communities.

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 age 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 (Laing 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 (Applewhite 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 (Castaldelli-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.

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

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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- 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:

	Yes	No	Not needed
Asked if there are things that make it hard for you to take care of your health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked with you about your main goals and priorities in caring for your health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked with you about things in your life that worry you or cause you stress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked with you about things that happened to you as a child that worry you or cause you stress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asked you about supports that you need for managing your health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(continued on next page)

(continued)

	Yes	No	Not needed
Reviewed all of the prescription medications you are taking with you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked to you about tests or screenings that are appropriate for your age (e.g. mammogram, FIT colon cancer screening)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Prevention 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.

	less than 1 month ago	1–6 months ago	6 months – 1 year ago	1–5 years ago	5 + years ago	Want, but have not received	Not Applicable
Alcohol Screening/Conversation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blood Glucose Check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blood Pressure Check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bone Density Testing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chest CT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Colonoscopy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Colorectal cancer stool test	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental Cleaning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influenza Vaccine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hearing test	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lipid/Cholesterol Screening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mammogram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mental Health Check In	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pap Smear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pneumococcal Vaccine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tetanus Vaccine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tobacco Cessation Conversation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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) _____

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?

	Not confident at all 1	2	3	4	5	6	7	8	9	Very confident 10	N/A
Gentle exercises for muscle strength 2–3 times/week?	○	○	○	○	○	○	○	○	○	○	○
Gentle exercises for flexibility?	○	○	○	○	○	○	○	○	○	○	○
Moderate physical activity for at least 2.5 h/week?	○	○	○	○	○	○	○	○	○	○	○
Exercise without making symptoms worse?	○	○	○	○	○	○	○	○	○	○	○
Ask your doctor things about health issues that concern you?	○	○	○	○	○	○	○	○	○	○	○
Discuss openly with your doctor any personal problems that may be related to your health?	○	○	○	○	○	○	○	○	○	○	○
Work out differences with your doctor when they arise?	○	○	○	○	○	○	○	○	○	○	○
Take an active role to manage your systolic blood pressure?	○	○	○	○	○	○	○	○	○	○	○
Take an active role to manage your blood glucose (sugar) level?	○	○	○	○	○	○	○	○	○	○	○
Take an active role to manage your LDL cholesterol level?	○	○	○	○	○	○	○	○	○	○	○
Get a colonoscopy test?	○	○	○	○	○	○	○	○	○	○	○
Get an influenza vaccine?	○	○	○	○	○	○	○	○	○	○	○
Get a pneumonia vaccine?	○	○	○	○	○	○	○	○	○	○	○
Get a mammogram? (women-specific)	○	○	○	○	○	○	○	○	○	○	○
Get a pap test and pelvic exam? (women-specific)	○	○	○	○	○	○	○	○	○	○	○
Get a bone density test? (women-specific)	○	○	○	○	○	○	○	○	○	○	○

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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