

Personalizing post-treatment cancer care: a cross-sectional survey of the needs and preferences of well survivors of breast cancer

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ABSTRACT

Background Improved treatments resulting in a rising number of survivors of breast cancer (bca) calls for optimization of current specialist-based follow-up care. In the present study, we evaluated well survivors of bca with respect to their supportive care needs and attitudes toward follow-up with various care providers, in varying settings, or mediated by technology (for example, videoconference or e-mail).

Methods A cross-sectional paper survey of well survivors of early-stage pT1–2N0 bca undergoing posttreatment follow-up was completed. Descriptive and univariable logistic regression analyses were performed to examine associations between survivor characteristics, supportive care needs, and perceived satisfaction with follow-up options. Qualitative responses were analyzed using conventional content analysis.

Results The 190 well survivors of bca who participated (79% response rate) had an average age of 63 ± 10 years. Median time since first follow-up was 21 months. Most had high perceived satisfaction with in-person specialist care (96%, 177 of 185). The second most accepted model was shared care involving specialist and primary care provider follow-up (54%, 102 of 190). Other models received less than 50% perceived satisfaction. Factors associated with higher perceived satisfaction with non-specialist care or virtual follow-up by a specialist included less formal education ($p < 0.01$) and more met supportive care needs ($p < 0.05$). Concerns with virtual follow-up included the perceived impersonal nature of virtual care, potential for inadequate care, and confidentiality.

Conclusions Well survivors of bca want specialists involved in their follow-up care. Compared with virtual follow-up, in-person follow-up is perceived as more reassuring. Certain survivor characteristics (for example, met supportive care needs) might signal survivor readiness for virtual or non-specialist follow-up. Future work should examine multi-stakeholder perspectives about barriers to and facilitators of shared multimodal follow-up care.

Key Words Breast cancer, follow-up, survivorship, supportive care needs, preferences, virtual care

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INTRODUCTION

Breast cancer (bca) is the most common cancer in women worldwide¹. In the United States and Canada, there are currently more than 3 million survivors of bca, and more than 250,000 patients are newly diagnosed annually^{2,3}. After

treatment, survivors of bca require follow-up care to monitor for recurrences, to manage acute and late treatment-related side-effects, and to address supportive care needs⁴. Traditionally, follow-up care has been delivered by oncology specialists at a cancer centre. However, with a predicted shortage of oncologists by 2020⁵ and improved treatments

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resulting in a rising number of survivors⁶, a specialist-only model is not sustainable and might not optimally serve the needs and preferences of well survivors of bca.

Several alternatives to conventional specialist-based in-person follow-up care for the well survivor population have emerged, involving various care providers [specialist nurses and primary care providers (PCPs), among others], clinical settings (for example, cancer centres, community-based hospitals, PCP clinics), and virtual visits (telephone, Web, e-mail)^{7,8}. In the absence of clear evidence advocating for the superiority of any one model, practices for bca follow-up are heterogeneous and show variability in care provider, setting, and modality.

In-person clinic-based primary care follow-up for well survivors of bca has, by far, been the most commonly evaluated alternative to the in-person cancer centre-based specialist model, with results demonstrating equivalent survival outcomes and health-related quality of life regardless of the type of care provider^{9–11}. Although the evidence supports involvement of PCPs in well survivor care, adoption of that model has not been widespread. The current literature suggests that some survivors prefer the expertise of specialists and find that transitioning to a PCP does not provide the continuity of care and support that they desire¹².

Other follow-up models receiving increasing attention include shared care and virtual follow-up visits. Common shared-care models are specialist-PCP or specialist-bca nurse teams. The bca nurse models have been reported to improve support for the psychosocial and informational needs of survivors¹³. Virtual follow-up visits include a range of information and communication technology-based delivery models that replace or complement in-person follow-up appointments⁸. Such virtual care services are more convenient for many survivors, particularly those located in rural regions⁸. In one study, cancer survivors reported high satisfaction for virtual visits with their oncologist, with 95% indicating that it was equivalent to an in-person visit¹⁴. Additionally, e-health applications have been cited as a convenient and timely way to address supportive care needs, such as monitoring quality of life, providing personalized educational information, and navigating the health system¹⁵.

Care transitions between providers, settings, and modalities are opportunities to tailor care to the individual needs and preferences of survivors. Previous studies have assessed the importance of using survivor profiles (for example, demographics, health and psychosocial needs, perceptions of care providers) to personalize cancer care¹⁶. For example, O'Malley *et al.*¹⁶ identified the relationship of greater psychosocial needs and medical comorbidities with increased demand for health education during follow-up care. However, using the supportive care needs and preferences of survivors to personalize follow-up care models requires further investigation.

The purpose of the present study was to examine the relationship between survivor characteristics, supportive care needs, and perceived satisfaction with various models of posttreatment follow-up care. We examined 6 alternatives to traditional specialist-based follow-up that have been receiving increased attention in the literature, that

might be more convenient for survivors, and that could optimize specialist involvement in follow-up care. Our cross-sectional survey asked well survivors of bca about their follow-up care use, characteristics (demographics, disease, use of technology), supportive care needs, and perceived satisfaction with various types of follow-up care. "Perceived satisfaction" (that is, feelings or attitudes about a situation, object, or action) is a measure correlating with acceptability^{17,18}. Additionally, we collected qualitative open-ended survey responses so as to better understand survivor preferences, barriers, and facilitators for implementing various models of follow-up. Overall, the study provides guidance about optimal care transitions from the perspective of survivor supportive care needs and follow-up care preferences.

METHODS

Participants

Study participants were recruited from the radiation oncology clinics of a large academic cancer centre in Toronto, Ontario. Eligibility criteria included survivors who were female, who had previously been diagnosed with a pT1–2N0 estrogen receptor-positive or progesterone receptor-positive (or both) and HER2-negative bca, who had completed radiation treatment, who were undergoing follow-up care, and who were English-speaking. Higher-risk survivor populations (for example, hormone receptor-negative and HER2-positive) were excluded for this well follow-up study. Follow-up accorded with guidelines from Health Canada's Steering Committee on Clinical Practice Guidelines for the Care and Treatment of Breast Cancer⁴. Standard follow-up care for well survivors of bca included history and physical exam (including clinical breast exam) at least every 6 months for 5 years, with an annual mammogram. Survivors were ineligible if they did not complete primary treatment, were less than 18 years of age, could not read or speak English, or had already been transitioned or discharged from the cancer centre. We chose to focus on the perspectives of survivors receiving post-radiation treatment follow-up care to inform the interest on the part of radiation oncology specialists for transitioning to different models of follow-up care delivery. Given that most patients with early-stage bca undergo trimodality therapy, those receiving surgery or chemotherapy were not excluded.

Study Design

The study protocol received institutional research ethics board approval. Our cross-sectional paper survey used a convenience sample with a corresponding medical chart review. Eligible survivors were identified from oncology clinic lists and from review of patient medical records. To obtain diversity in patient-provider relationships and follow-up practices, participants were recruited from 8 different radiation oncology follow-up clinics. All eligible survivors were approached to participate during routine follow-up appointments from August 2012 to May 2013. The research assistant (with permission from the treating physician) approached each eligible patient after they had registered with the clinic receptionist for their visit. Participants provided informed consent and were given

the option to complete a self-administered paper questionnaire in the clinic or to take it home and return it by mail. Non-responders received up to 3 reminder telephone calls.

Measures

The questionnaire (Table 1) collected information about participant demographics (6 items), health care service use (4 items), Internet use (7 items), supportive care needs (35 items, 1 open-ended question), perceived satisfaction with follow-up care options (7 items), and views about follow-up care options (1 open-ended item). The options in the participant demographics, health care service, Internet use, and perceived satisfaction with follow-up care sections were based on previous research with survivors of thyroid¹⁷, bowel¹⁹, breast²⁰, and testicular cancer²¹ and input from a multidisciplinary breast oncology clinical team. The supportive care needs of the participants were assessed using the validated CASUN (Cancer Survivors’ Unmet Needs) measure²². Personal health information extracted from medical records included age, date of diagnosis, treatments (that is, surgery, radiation therapy, chemotherapy), date of first follow-up appointment, and postal code.

Statistical Analysis

The statistical analysis was performed using the SAS software application (version 9.4; SAS Institute, Cary, NC, U.S.A.). Sample means and standard deviations were calculated for continuous or discrete variables (or medians with interquartile range and ranges if variables were not normally

distributed), and proportions were calculated for categorical variables. The relationships of key variables with the outcomes of interest were examined in univariable analysis for exploratory investigation. Specifically, the relationships of age, education (elementary or high-school vs. college or university), employment status (student, unemployed, part-time, full-time, retired), time since first follow-up appointment, health care service use (doctor visits for bca-related issues), travel distance (one way), Internet use (everyday vs. other), and total met and unmet supportive care needs with perceived satisfaction with primary care, shared care, specialist by videoconference, and specialist by e-mail were explored. Given that the outcomes of interest were ordinal (from “strongly disagree” to “strongly agree”), the use of ordinal logistic regression as the main analysis method was selected; *p* values less than 0.05 were considered significant for the exploratory analysis.

Analysis of open-ended survey responses followed the procedures for conventional qualitative content analysis²³. Two team members (JLB, JYYK) independently read and coded the entire dataset. Data were read to derive codes that flowed from the data by highlighting exact words in the text that appeared to capture key thoughts or concepts. Independent coding results were compared, resulting in minor modifications to the coding scheme. Codes were sorted into categories, and categories were used to organize codes into meaningful themes. The qualitative findings were used to explain participant responses to the follow-up options presented and to identify additional variables that

TABLE 1 Surveyed information

Category	Description
Participant characteristics	<i>From the survey:</i> Age, relationship status, country of birth, first spoken language, education, income, and employment status <i>From the medical record:</i> Age, date of diagnosis, treatments (for example, surgery, radiation therapy, chemotherapy), date of first follow-up appointment, and postal code
Health care service use	Number of visits to family doctor, surgeon, oncologists, and other health professionals for cancer-related issues in the preceding year
Internet use	Use of the Internet to search for information about breast cancer (yes or no); frequency of Internet use (daily, weekly, monthly, less than once per month); use of Facebook, Twitter, online discussion forums, Wikipedia (yes, no, unsure); interest in communicating with the health care team through a secure online support network (yes, no, unsure)
Supportive care needs	<i>Cancer Survivors’ Unmet Needs (CaSUN)²² measure:</i> Includes 35 unmet need items and 5 domains (existential survivorship, comprehensive cancer care, information, quality of life, and relationships); response options were simplified into three categories: <ul style="list-style-type: none"> ■ Not needed/not applicable ■ Fully met ■ Not fully met
Perceived satisfaction with follow-up care models	Assessed by asking patient survivors how much they agreed or disagreed (on a 5-point Likert scale: 1, strongly disagree; 2, disagree; 3, neutral; 4, agree; 5, strongly agree) with each follow-up option, using the wording: “I would be satisfied for my follow-up appointments to be with ...” Options included a breast cancer specialist at our institution; a breast cancer specialist in the local community; a primary care provider (PCP) in the local community; a PCP–nurse team specializing in cancer follow-up at a hospital that is partnered with our institution; shared with a breast cancer specialist and the PCP; a breast cancer specialist from our institution through secure videoconferencing; and a breast cancer specialist from our institution through secure e-mail or Web site. Perceptions were also assessed by asking survivors to “Take a moment to tell us your thoughts about these options” in one open-ended question.

might explain the variance in perceived satisfaction with follow-up options on the part of the participants.

An average travel distance in kilometres from a survivor's home to our institution was calculated based on postal code data, using the Google Maps Web mapping software (Google, Mountain View, CA, U.S.A.) and Google Maps travel calculator.

RESULTS

Of 259 individuals who were approached to participate in the study, 18 did not meet the eligibility criteria, and 51 declined to participate (Figure 1). The 190 participants who completed the questionnaire represent a 79% (190 of 241) response rate. For context, approximately 440 new pT1–2N0 estrogen receptor–positive or progesterone receptor–positive (or both) bca patients are seen by the radiation oncology department annually.

Participant Characteristics

Average age of the participants was 63 years, with 100 of the 190 (53%) having been born in Canada, 88 (46%) having been born in another country, and 2 (1%) not stating their birthplace. Most participants were married, retired, had greater than secondary school education, and had a household income greater than \$80,000. All participants underwent at least surgery and radiotherapy treatments for their bca management. Median time since first follow-up appointment had been 21 months (Table II).

Quantitative Responses

Existing Follow-Up Care and Related Health Care Services Use

Survivors attended a median of 4 health care professional visits per year for follow-up of their cancer or other general

cancer-related issues. Most (76%, 145 of 190) identified their bca specialist as the person in charge of their cancer follow-up care. However, 98% (187 of 190) had access to a PCP.

Health-Related Internet Use and Preferences

Of the 190 participants, 131 (69%, 131 of 190) had used the Internet to search for information about bca. Familiarity with the Internet was characterized by extent of Internet use and engagement in various Internet activities. Of those survivors, 56% (107 of 190) reported using the Internet daily. Most reported using Wikipedia (53%, 100 of 190), and fewer than half reported using interactive Web sites such as Facebook (33%, 62 of 190), Twitter (9%, 17 of 190),

TABLE II Characteristics of 190 participants

Characteristic	Value
Mean age (years)	63±10
Nationality [n (%)]	
Born in Canada	100 (53)
Born in another country	88 (46)
Unknown	2 (1)
Relationship status [n (%)]	
Single, divorced, widowed	73 (38)
Married or in a relationship	112 (59)
Unknown	5 (3)
Education [n (%)]	
Secondary school or less	39 (21)
College, technical school, university	145 (76)
Unknown	6 (3)
Employment [n (%)]	
Unemployed	18 (9)
Part-time	16 (8)
Full-time	65 (34)
Retired	87 (46)
Unknown	4 (2)
Total household income [n (%)]	
≤\$40,000	34 (18)
\$40,001–\$80,000	54 (28)
≥\$80,001	76 (40)
Unknown	26 (14)
Mean one-way travel distance to treatment centre (km)	22±28
Treatment received [n (%)]	
Surgery	190 (100)
Chemotherapy	40 (21)
Radiation	190 (100)
Time since first follow-up (months)	
Median	21
IQR	29

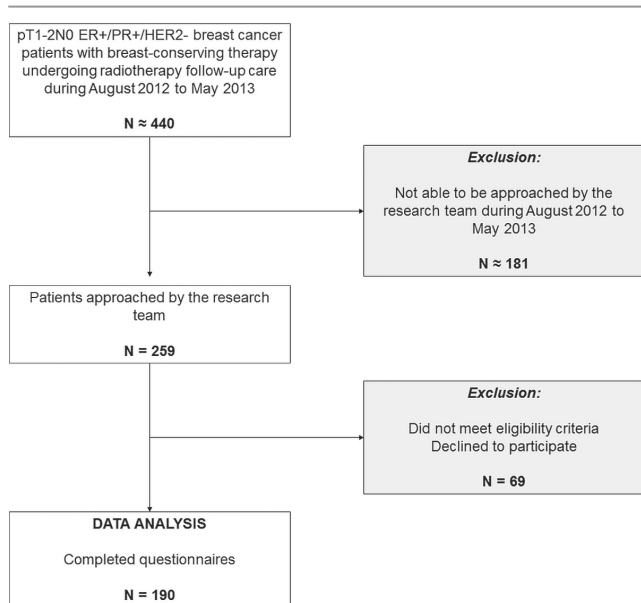


FIGURE 1 Patient recruitment. ER+ = estrogen receptor–positive; PR+ = progesterone receptor–positive; HER2 = human epidermal growth factor receptor 2.

^a 144 Responses.
IQR = interquartile range.

online discussion forums (27%, 52 of 190), or blogs (5%, 9 of 190). Nevertheless, most of the survivors indicated that they would be interested in using online resources created by the cancer centre, including private messaging tools designed for communication with the health care team (52%, 98 of 190).

Supportive Care Needs

The highest domains of met and unmet supportive needs were existential survivorship needs (for example, managing concerns about cancer recurrence, anxiety over body image) and comprehensive cancer care (for example, hospital parking, care coordination). Of the participants, 47% [87 of 187 (3 participants did not respond)] reported at least 1 unmet need item. Top unmet needs were access to an ongoing case manager, availability of hospital parking, and concerns about cancer recurrence. Those items were reported by fewer than 20% of the participants (Table III).

Perceived Satisfaction with Follow-Up Care Options

Of these survivors, 93% (177 of 190) agreed or strongly agreed that they were satisfied with in-person specialist follow-up. The second most accepted model was shared care involving specialist and PCP follow-up (54%, 102 of 190). The other follow-up care models received less than 50% perceived satisfaction (Table IV).

Factors Associated with Perceived Satisfaction with Follow-up Care Options

Less formal education was associated with greater perceived satisfaction for follow-up care by a PCP [odds ratio (OR): 3.0; 95% confidence interval (CI): 1.5 to 5.8; *p* = 0.001] and by community specialists (OR: 2.4; 95% CI: 1.3 to 4.8; *p* = 0.006). Having more met supportive care needs was associated with greater perceived satisfaction for care delivered in virtual visits such as videoconferencing (OR: 1.1; 95% CI: 1.0 to 1.1; *p* = 0.012) and e-mail (OR: 1.1; 95% CI: 1.0 to 1.1;

p = 0.016). Conversely, greater perceived satisfaction with videoconferencing (OR: 3.1; 95% CI: 1.6 to 6.0; *p* = 0.001) and e-mail (OR: 2.4; 95% CI: 1.2 to 4.7; *p* = 0.015) were inversely correlated with health-care related Internet experience. None of the other factors, including those commonly associated with Internet use (for example, age and education) or those related to convenience or clinical need (for example, travel distance from the cancer centre, health services use, or longer time in follow-up care) were associated with perceived satisfaction with virtual follow-up care options. Table V outlines key associated factors.

Qualitative Responses

Of our 190 participants, 110 (58%) provided views about the follow-up care options presented in the survey. Comments emphasized the advantages of specialist follow-up, including perceived expertise, consistency, and reassurance. Participants explained that they preferred in-person follow-up care with their specialist at the cancer centre because they believed that their specialist was the most qualified, knew their case the best, and provided the best care. Some survivors identified advantages of virtual follow-up (for example, for bloodwork, minor questions, convenience, and reduced travel and parking costs) and explained that virtual follow-up would be an efficient and reasonable option when they had fewer needs and less risk of cancer recurrence. Those findings support the quantitative findings, which revealed that participants with more met supportive care needs were more likely to be satisfied with virtual follow-up. However, many participants commented on perceived disadvantages of virtual follow-up. Those disadvantages included the perceived impersonal nature of virtual care, potential for inadequate care (for example, loss of the physical exam and limited opportunity for questions and discussion), and apprehension about confidentiality. In particular, the perceived impersonal nature of communication using technology was raised by 25% of participants (28 of 110) as a concern. As one

TABLE III Unmet need items most frequently reported by breast cancer participants (needs are not mutually exclusive)

Rank	Unmet need item	Selected [<i>n</i> (%)]
1	An ongoing case manager to whom I can go to find out about services whenever they are needed	32 (17)
2	More accessible hospital parking	30 (16)
3	Help to manage my concerns about the cancer coming back	24 (13)
4	Help to reduce stress in my life	23 (12)
	Help to cope with others not acknowledging the impact that cancer has had on my life	23 (12)
	Help to deal with my own and others' expectations of me as a cancer survivor	23 (12)
5	To know that all my doctors talk to each other to coordinate my care	22 (12)
6	Access to complementary and alternative therapy	19 (10)
7	Help to adjust to changes in the way I feel about my body	19 (10)
8	Help to manage ongoing symptoms and side effects	18 (9)
	Help to make decisions about my life in the context of uncertainty	18 (9)
9	Help to adjust to changes in my quality of life as a result of the cancer	17 (9)
	Help to cope with changes to my belief that nothing bad will ever happen in my life	17 (9)
10	Emotional support	16 (8)

participant explained, “Breast cancer was a profoundly personal experience for me. Videoconference or e-mail would be too impersonal for me.” Table VI shows themes, with representative quotes from the participants.

DISCUSSION

For this study, we surveyed well survivors of early-stage bca currently receiving posttreatment follow-up by cancer

TABLE IV Perceived satisfaction with breast cancer follow-up care models

Follow-up format	Responses (n)	Mean score	Assigned score [n (%)]				
			5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly Disagree
Tertiary care specialist	185	4.8	161 (87)	16 (9)	4 (2)	2 (1)	2 (1)
Specialist and PCP	180	3.6	71 (39)	31 (17)	36 (20)	20 (11)	22 (12)
PCP–nurse team with training in oncology	180	3.1	32 (18)	45 (25)	42 (23)	29 (16)	32 (18)
Community specialist	178	2.9	47 (26)	22 (12)	29 (16)	26 (15)	54 (30)
Community PCP	183	2.2	18 (10)	17 (9)	33 (18)	34 (19)	81 (44)
Specialist by videoconferencing	184	2.0	11 (6)	18 (10)	22 (12)	40 (22)	93 (51)
Specialist by e-mail	184	1.9	12 (7)	16 (9)	22 (12)	27 (15)	107 (58)

PCP = primary care provider.

TABLE V Factors associated with perceived satisfaction by 190 patients of alternative breast cancer follow-up care models

Follow-up format	Associated factor	OR	95% CI	p Value
Specialist and PCP	Lives closer to specialist centre	1.0	1.0 to 1.02	0.046
PCP–nurse team	Fewer visits to oncology health care professionals	1.1	1.0 to 1.1	0.026
Community specialist	Fewer years of formal education	2.4	1.3 to 4.8	0.006
Community PCP	Fewer years of formal education	3.0	1.5 to 5.8	0.001
	Less frequent Internet use	2.3	1.3 to 4.0	0.003
Specialist by videoconferencing	More met needs	1.1	1.0 to 1.1	0.012
	Not using the Internet to search for information about breast cancer	3.1	1.6 to 6.0	0.001
Specialist by e-mail	More met needs	1.1	1.0 to 1.1	0.016
	Not using the Internet to search for information about breast cancer	2.4	1.2 to 4.7	0.015

OR = odds ratio; CI = confidence interval; PCP = primary care provider.

TABLE VI Perspectives of 110 patients about breast cancer follow-up care models

Category	Concept	Representative quote
<i>Specialist follow-up</i>		
Advantages	Expertise	I would prefer to come to [this specialist centre] where they are dealing with this all the time.
	Consistency	I would like to see a person that is part of a team that knows me.
	Reassurance	Cancer patients feel vulnerable, and we need reassurance that we get the best follow-up available.
<i>Virtual follow-up</i>		
Advantages	Accessibility	if I lived in a remote rural community, videoconference might be okay.
	Convenience	E-mail as an option would be preferred ... especially if there are no problems or issues.
	Economics	Too expensive to park!
Disadvantages	Impersonal nature	I still feel that the personal touch is what helps reassure me.
	Inadequate care	I still require physical exam!
	Lack of access to technology	I don't own a computer!
	Concern about confidentiality	I would not want health-related e-mails—how secure could they really be? What if your iPhone is stolen?

specialists at a large tertiary care centre. Compared with the general population, participants had above-average education, average socioeconomic status, and above-average access to a PCP^{24–26}. Despite being clinically amenable to alternative follow-up options, our participants had not yet been transitioned out of tertiary care follow-up because of survivorship needs or a preference for continuity of care, or both²⁷. The results provide guidance for optimal care transitions from the perspective of survivor supportive care needs and preferences.

In examining current health care use in the study population, the frequency of oncology visits by survivors was on the higher end of the recommended guidelines—that is, a median of 4 visits annually compared with the 2–4 visits recommended^{10,28,29}. That observation is consistent with findings published by Grunfeld *et al.*²⁹, which demonstrated both overuse and underuse of oncology visits throughout our region. The greater number of oncology visits might in part explain the low number of unmet supportive care needs reported by the cohort.

In general, this well bca survivor population had a low prevalence of unmet needs: fewer than half the participants reported 1 or more unmet needs. That prevalence is lower than the prevalence of unmet needs reported by survivors of head-and-neck cancers (61%)³⁰ and lung cancers (78%)³¹. It is also lower than the prevalence reported in other bca studies (61%)³². However, of reported unmet supportive care needs, the items requiring the most attention were those in the existential survivorship needs domain. Needs in that challenging domain have consistently been reported by other groups as well^{32–34}. Existential survivorship services refer to psychosocial oncology supports that address the social, emotional, and spiritual needs of a survivor. All cancer care providers, including the medical team and allied health workers, are responsible for ensuring the psychosocial health of survivors and their families³⁵. It would appear that traditional in-person specialist follow-up with access to an on-site multidisciplinary cancer care team (for example, with palliative care and psychosocial oncology services) might have been helpful in partly addressing that unmet need in our cohort. Further improvement in follow-up care for existential survivorship needs could be achieved through supplementation of current practice with nurse-led follow-up, cancer rehabilitation programs, or virtual care, all of which have demonstrated efficacy in this particular supportive care domain^{13,36,37}.

For survivors with a high number of met needs, our study shows that transition to virtual follow-up care might be acceptable. As one participant explained, “E-mail as an option would be preferred ... especially if there are no problems or issues.” Interestingly, even survivors with minimal health-related Internet experience were amenable to virtual-only follow-up visits. In fact, less health-related Internet use was correlated with higher perceived satisfaction with virtual follow-up visits. That counterintuitive finding suggests that familiarity with technology does not equate with positive perceptions of virtual care. However, it is important to emphasize that only 15% of survivors of bca in our cohort reported that they would be satisfied with virtual-only follow-up care. Similar findings were reported in a study of Canadian thyroid cancer survivors¹⁷ and also

in a study of U.S. survivors of bca³⁸. In particular, Mayer *et al.* reported that virtual visits were ranked least likely to improve survival and to decrease cancer-related worry among survivors of bca³⁸.

In their qualitative responses, study participants expressed several key concerns with virtual follow-up care that can help reach a better understanding their apprehension about the virtual option. Their concerns revolved around a fear of inadequate care. Previous studies similarly support the idea that survivors can be wary of the quality of Internet-based health care services³⁹. The most common concern about virtual care in our cohort was loss of personalized care and a need for reassurance. In a previous study, thyroid cancer survivors explained that they would feel more secure with in-person follow-up care, which they believed would be more personal and reassuring than virtual care would be¹⁷. Well survivors of bca in the present study similarly explained that the personal touch received from in-person visits is reassuring, and that that reassurance is a critical component of follow-up care.

Another major barrier to virtual-only follow-up care reported by survivors in our cohort and in a prior study with thyroid cancer survivors¹⁷ was the loss of the clinical exam. Many survivors placed large emphasis on the utility of the clinical breast exam, which they felt is a valuable missing item in virtual-only follow-up care models. However, based on the evidence, the sensitivity of physical examination is 27.6% compared with 77.6% for mammography⁴⁰, which would be included in a virtual visit model. Furthermore, performance of the clinical breast exam shows variability between providers⁴¹; in fact, using the U.S. National Cancer Database, it was recently demonstrated that physical examination had only modest value in detecting bca recurrences⁴².

Both of the foregoing issues—the need for reassurance and the loss of the clinical exam—could be solved with survivor education and reassurance, and physician training. They also suggest that performance expectancy about the virtual visit by survivors is an important determinant of their acceptance and likely adoption of virtual visits. That finding aligns with the Unified Theory of Acceptance of Information Technology (version 2), which explains that performance expectancy (defined as the degree to which using a technology will provide benefits to consumers in performing certain activities) is the strongest predictor of intention to use a technology⁴³. Physician help in clarifying the quality and benefits of the virtual care being introduced could address survivor anxiety about the performance expectancy of the technology. With respect to the issue of the missing clinical exam by an oncologist in non-cancer-centre-based care, physicians would need to inform and reassure survivors that the physical exam (including the clinical breast exam) can be adequately performed by community PCPs and will be supplemented by mammography (which has a higher sensitivity for cancer detection of 78% compared with 28% for the clinical exam)^{40–42}.

With respect to other non-specialist-only follow-up models, the second most highly rated option was a shared-care model that integrates specialists with primary care (endorsed by 54% of our cohort). In addition, survivors living close to the specialist cancer care centre reported higher perceived satisfaction with cancer centre specialist

involvement through a shared-care model. That observation suggests that there might be a cost (travel distance) and benefit (convenient access to supportive care services) trade-off to consider when assigning survivors to cancer centre follow-up compared with community care follow-up. Follow-up by primary care alone was the least preferred in-person care option, endorsed by 19% of our cohort. Survivors with less formal education were found to be more accepting of PCP care. That observation might be related to increased comfort on the part of those survivors in communicating in-person with their established PCP rather than in navigating any or all of potentially unfamiliar technologies, medical jargon, and relatively new relationships with multiple specialists in a fast-paced environment. Increased satisfaction with follow-up has previously been associated with opportunities for survivors to ask questions about their cancer and to receive easy-to-understand explanations⁴⁴. For some survivors, such opportunities might be better facilitated through PCPs. Also, survivors requiring fewer oncology-related health care visits per year indicated higher perceived satisfaction with follow-up from PCP–nurse teams with training in oncology. The omission of specialist care at a tertiary care cancer centre might be acceptable for those survivors because of their lower need for supportive care services provided at the centre.

Strengths of the present study include the high response rate, implementation of a validated supportive care needs assessment tool, and use of both quantitative and qualitative methods to examine survivor perceptions of follow-up models. Limitations of the study include recruitment through radiation oncology clinics at a single academic cancer centre offering specialist follow-up, convenience sampling, and exclusion of survivors lacking English proficiency.

CONCLUSIONS

Overall, the present study suggests that its sample of well survivors of bca want specialist involvement in their follow-up care and that they prefer in-person follow-up, which, compared with virtual follow-up, is perceived to be more reassuring. Our study also identified survivor characteristics that could signal survivor readiness for, and acceptance of, alternative models of follow-up care. For example, survivors who have had many of their supportive care needs met could be ready for transition to virtual care. Guiding transitions to alternative follow-up options based on survivor needs and preferences might yield greater survivor satisfaction and compliance. Future research should investigate the optimal model of multimodal shared care, involving specialist and PCP follow-up and using a combination of in-person and virtual interactions, and should identify multi-stakeholder perspectives about the barriers and facilitators to implementation of such care. Additionally, cost-effectiveness analyses of current follow-up models compared with virtual follow-up models is required. Lastly, our study has highlighted a need to enhance communication between physicians and survivors to clarify the quality and efficacy of follow-up cancer care and to build trust when transitioning to new care models.

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CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology's* policy on disclosing conflicts of interest, and we declare the following interests: TP has received honoraria from Celgene Canada Inc. The remaining authors have no conflicts to disclose.

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