

# Physician perspectives on delays in cancer diagnosis in Alberta: A qualitative study

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**Abstract**

BACKGROUND: Delays in cancer diagnosis, potentially associated with being diagnosed at a later stage, have been associated with reduced survival, decreased quality of life post-treatment, and suboptimal patient experience. The objective of the study was to examine the perspectives of a group of family physicians and specialists related to cancer regarding potentially avoidable delays in diagnosing cancer, and approaches that could help expedite the process.

METHODS: We conducted a phenomenological, interview-based study. Drawing upon existing physician networks, we invited family physicians and specialists to share their perspectives about potentially avoidable delays in diagnosing cancer and to solicit their recommendations for process improvements. Telephone interviews with 11 family physicians and 22 specialist physicians were conducted between July and September 2019. Data were analyzed thematically using an inductive coding process.

RESULTS: Participants identified numerous barriers to the expeditious diagnosis of cancer, including family physicians' challenges in effectively sorting out non-specific symptoms, determining appropriate testing needs, organizing appropriate testing, identifying suitable specialists, and accessing specialists for information and referral. Overall, participants offered two dominant and overarching recommendations for improvement: the creation of a centralized advice, triage and referral support service for family physicians, and the implementation of standardized care pathways for all major types of cancer.

INTERPRETATION: These findings indicate the need for a multi-faceted approach to streamlining cancer diagnosis, with the goals of enhancing patient outcomes, reducing physician frustration and optimizing efficiency. Bringing key stakeholders together to co-design diagnostic pathways and a centralized information and referral service should be explored.

## 1. Introduction

Longer times from recognition of a first symptom to diagnosis of cancer are associated with reduced survival, decreased quality of life post-treatment, and suboptimal patient experience (1, 2). In Canada, family physicians make important contributions to the care of people with cancer throughout the care continuum (3, 4). Academic discussions related to this topic have focused on providing clarity about the role of family physicians, and identifying challenges and barriers pertaining to the provision of cancer care in the community (3, 5-7). However, the emphasis so far has been mainly on *post-diagnostic* care, with a particular focus on transitions from specialty cancer care back to the community (6). Less attention has been paid to the time *before* diagnosis. In particular, the processes of handling suspicion of cancer and referring to specialists related to cancer, and how these factors impact timelines to diagnosis remains poorly understood (8, 9). Further, little has been published regarding specialist perspectives on delays during the diagnostic period for cancer.

This study was designed to help address these gaps. The objective was to examine the perspectives of a group of family physicians and specialists in Alberta, Canada, regarding factors contributing to unnecessary delays between the first appointment with a family physician and diagnosis of cancer (i.e., the diagnostic interval) (10), and to solicit their recommendations for expediting or improving the process. Results may inform improvements in health system organization and development of interventions to streamline the diagnostic process (2, 11).

## 2. Methods

### Study design and population

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3 72 This qualitative study followed a phenomenological approach (12). Phenomenological studies examine  
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5 73 phenomena as they are consciously experienced by individuals (13). This approach allowed us to explore  
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7 74 the diagnostic interval from the perspective of family physicians and specialists and to identify common  
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10 75 themes (14, 15). Data collection consisted of in-depth, semi-structured interviews (Appendices 1-2).  
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12 76 Interviews were pilot-tested with four participants.  
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16 78 Convenience sampling was used to recruit family physicians and specialists involved in the diagnosis of  
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18 79 cancer in Alberta, drawing upon existing physician networks (16). Email invitations were sent to  
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21 80 physicians who were members of the Core Committee of the Cancer Strategic Clinical Network (17) or  
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23 81 cancer-related service sections of the Alberta Medical Association. We shared study information with  
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25 82 potential participants and asked them to contact us if they were interested in participating. In addition,  
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27 83 we used snowball sampling, wherein participants were asked to recommend physician colleagues  
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29 84 potentially interested in participating (16).  
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34 86 **Data collection and analysis**

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36 87 Informed consent was obtained from each participant prior to interview. Interviews were conducted by  
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38 88 KG, a qualitative researcher with a PhD in social science. She had experience in health services research  
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40 89 but no prior relationship or interaction with the individuals approached for interview. Interviews were  
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42 90 conducted individually by phone, with no presence of non-participants. No repeat interviews were  
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44 91 conducted. During each interview, the researcher took field notes to maintain contextual details.  
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46 92 Interviews took place between June and September, 2019 and lasted an average of 30 minutes (range  
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48 93 20-80 minutes). Additional participants were accepted until data saturation occurred, meaning that no  
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50 94 new themes emerged as we analyzed the interviews already conducted (18).  
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All interviews were audiotaped and transcribed verbatim. Interview transcripts were imported into NVivo Version 11 (QSR International, Australia), and analyzed thematically using an inductive data-driven coding process to reflect on how participants made meaning of their experiences (12, 19). This process entailed a review of each transcript, identification of initial themes, and ongoing development and refinement of themes as data collection and analysis proceeded. Recurrent themes were organized into a set of codes that were applied to text fragments in the transcripts (coding tree in Appendix 3). The researcher who conducted the interviews did all of the coding. To ensure consistency and trustworthiness (19), APB was involved in the coding by periodically discussing with KG her interpretation and codes until they reached consensus.

### **Ethics approval**

Ethics approval was received from the Health Research Ethics Board of Alberta, Cancer Committee (HREBA.CC-10-0163).

### **3. Results**

The sample comprised 33 participants: 11 family physicians and 22 specialists related to cancer diagnosis, with a mean (SD) of 18 (10) years in practice (Table 1). Participants described factors contributing to potentially avoidable delays in diagnosis. These factors were intertwined and related to the nature of primary care practice, initial patient presentation, the investigation process, and specialist advice and referral. As reported by participants, after referral the diagnostic process generally proceeds expeditiously since specialists are able to prioritize urgent cases and generally get tests done promptly. Participants also offered recommendations for process improvement. The two most dominant and overarching recommendations were the creation of a centralized advice, triage and referral support

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119 system for family physicians, and the implementation of care pathways. Tables 2 and 3 summarize  
120 factors and recommendations, supported by representative quotations.

121  
122 **The nature of primary care and initial presentation**

123 Limited cancer training. While medical students typically learn some basic information about cancer  
124 biology, respondents reported that little is taught about cancer diagnosis and treatment in medical  
125 school or family residency programs.

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127 Generalists and information overload. Family physicians see patients with a diverse range of problems  
128 on a daily basis, but typically encounter a relatively low number of cancer cases throughout their  
129 practice. Furthermore, family physicians reported that they find it increasingly difficult to keep up with  
130 the continual outpouring of new information about a myriad of diseases and treatments including  
131 cancer.

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133 Poor continuity of care. Many patients do not have a family physician and instead visit walk-in clinics or  
134 emergency departments for sporadic care. Without a continuous history, the persistence and serious  
135 nature of signs and symptoms related to cancer can easily be missed.

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137 Fee-for-service model. The current model of family physician remuneration in Alberta unintentionally  
138 may incentivize some physicians to see many patients each hour, resulting in short appointments that  
139 may preclude completion of thorough histories and physical examinations.

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141 **Investigation**

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3 142 Difficulties determining appropriate testing. Without clear guidelines to follow for cancer types other  
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5 143 than those with local or provincial programs (i.e., breast, lung and prostate cancers in Alberta), family  
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7 144 physicians are often challenged to know what tests are required to investigate specific signs and  
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9 145 symptoms. Particular challenges are encountered with cancers typified by non-specific presenting  
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11 146 symptoms. In addition, they find it particularly vexing to determine what type of biopsy may be  
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13 147 required, and how to get that biopsy completed expeditiously. Specialists can assist in the task of  
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15 148 identifying appropriate testing or determining specific requirements for testing, but family physicians  
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17 149 reported that accessing specialists is not always easy.  
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23 151 Long waitlists for testing. Family physicians have difficulty expediting testing. Inappropriate testing (i.e.,  
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25 152 unhelpful or erroneous tests) and limited resources may be partially responsible for relatively long wait-  
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27 153 times for testing, in particular for tests such as CT scans and MRIs. Both family physicians and specialists  
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29 154 agreed that, in many cases, an early referral to a specialist might be warranted, since specialists  
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31 155 generally can accelerate testing (with the exception of some tests such as PET scans), especially when a  
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33 156 cancer diagnosis is suspected.  
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### 38 39 158 **Specialist advice and referral**

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41 159 Difficulty determining appropriate specialists. Identifying the most appropriate specialists is largely  
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43 160 dependent upon family physicians having a wide network of physician colleagues. For family physicians  
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45 161 with limited contacts, isolation from the rest of the health system can be problematic. An added  
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47 162 difficulty is the increasing number of healthcare specializations, which makes it harder to determine the  
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49 163 most appropriate referral.  
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Difficulty approaching specialists. Connecting with specialists for advice and referring patients is time-consuming and taxing for family physicians. Some specialists make themselves readily available to family physicians for early advice especially when cancer is suspected, while others prefer to be contacted only once family physicians have ordered some initial tests and have some idea of a potential diagnosis. Practical issues such as low time availability for consultations with physicians, some specialists not taking calls, lack of consistent intake approaches, referral faxes or letters getting lost, and appointments made months into the future were the barriers most often mentioned by family physicians.

Referral patterns. Physicians work hard to maintain their reputation for providing good and timely care, and they spend part of their career building referral patterns. However, delays are created if physicians only refer patients to colleagues they know within their informal networks without considering others whose wait-times could be shorter.

**Recommendations for improvement**

While participants offered several recommendations, two overarching themes were dominant in the data, and raised by specialists and family physicians alike:

Centralized advice, triage and referral service. Participants recommended a single point of entry for family physicians to access supports for diagnosis and referral. Suggestions for what this service would offer included: 1) phone advice about what tests to order, how to get a biopsy, what specialist to refer to, and connecting to the right specialist for guidance; 2) organizing the necessary studies; and, 3) triaging and referring patients to the most appropriate and available specialist. This service was thought to be particularly helpful to support the care of patients with vague presentations or less common cancers.



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190 Care pathways. Clear and seamless care pathways for most common cancers were referred to as tools  
 191 that could help manage patient care. Pathways enhance coordination of care, set care expectations, and  
 192 provide recommendations, processes and timeframes for patients related to a specific type of cancer. In  
 193 addition, they might be linked to resources for clinicians and patients/families, including psychosocial  
 194 support and system navigation. In this study, physicians described optimal pathways as having  
 195 embedded centralized and coordinated diagnostic services, ideally provided at one single location where  
 196 patients could undergo testing and meet with specialists for a definitive diagnosis.

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#### 198 4. Interpretation

199 This qualitative study contributes to the literature by focusing on perceived impediments to the  
 200 expeditious diagnosis of cancer. Findings showed that although family physicians play a critical role in  
 201 early diagnosis of cancer, they may face significant challenges in effectively sorting out non-specific  
 202 symptoms, identifying appropriate testing needs, and accessing diagnostic and specialized resources.  
 203 Findings also showed that there is often a disconnect between family physicians and specialists, yet it is  
 204 the specialists who hold the knowledge of how best to expedite cancer diagnosis.

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206 Our findings are aligned with the handful of previous studies that have examined potentially avoidable  
 207 delays during the diagnostic interval in Canada (3, 20) including poor continuity of care, and inconsistent  
 208 communication and collaboration between family physicians and specialists (3, 6). This study adds to the  
 209 current literature by incorporating the perspectives of specialists, particularly the finding that specialists  
 210 appreciate the important and challenging role of family physicians in diagnosing cancer, and are willing  
 211 to provide advice if cancer is suspected, and expedite diagnosis once patients are in their care. These  
 212 results are relevant in the context of bridging the “two solitudes” of primary and specialist care (4).

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5 214 The recommendations made by participants about the implementation of care pathways alongside  
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7 215 further support for family physicians is important given the strong promotion of pathways in the  
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9 216 Canadian context to guide care of patients with different types of cancer (20). A successful example is  
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11 217 the Alberta Breast Cancer Diagnostic Assessment Pathway, addressing variation and wait-time between  
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13 218 discovery of a highly suspicious imaging finding and referral to a breast program (21). Our study  
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15 219 validated the perceived value of such pathways amongst study participants, while suggesting the need  
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17 220 to explore the development of novel pathways centred on serious, non-specific symptoms, as done in  
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19 221 other countries (22-24). This idea is particularly relevant, and garnering interest around the world, given  
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21 222 the fact that up to half of patients with cancer present with vague symptoms (25). Some jurisdictions,  
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23 223 including but not limited to the United Kingdom, Denmark and Manitoba provide rapid referral  
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25 224 pathways that facilitate quick access to testing for patients with specific symptoms and types of cancer  
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27 225 (9, 24, 26). In addition, our findings suggest it might be unrealistic to expect that family physicians have  
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29 226 every different existing pathways in mind and readily available when required, which might indicate the  
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31 227 need to explore the creation of pathway catalogues or maps as done in Ontario  
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33 228 (<https://www.cancercareontario.ca/en/pathway-maps>). Finally, our findings indicated a desire for the  
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35 229 development and implementation of a centralized service where primary and specialist care converge to  
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37 230 facilitate access to specialty information and appropriate testing. This would help address the issue of  
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39 231 getting patients promptly to the right provider even if family physicians do not have a strong informal  
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41 232 network of physician colleagues to draw upon. Initiatives such as specialty tele-consultation systems  
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43 233 (27), and diagnostic assessment programs (28) should be considered.  
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47 235 Action to better support the important role of primary care in the diagnostic interval is particularly  
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49 236 relevant in the context of the growing number of cancer cases (29-31), and the increased demands put  
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237 on primary care for further involvement throughout the cancer care continuum (32). Future studies  
 238 should further explore and rigorously assess current and innovative approaches that may improve  
 239 integration between primary and specialist care. Consideration of how different contextual factors  
 240 might impede or enhance effectiveness are warranted. Furthermore, approaches to support co-design  
 241 by all key stakeholders of pathways, centralized referral and support systems with the goal of optimizing  
 242 the care of patients with a potential cancer diagnosis are needed.

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#### 244 **Limitations**

245 There are limitations to consider when interpreting the findings of this study. First, given our reliance on  
 246 convenience and snowball sampling, results might be subject to selection bias. Because participants self-  
 247 selected for the study due to an interest in early cancer diagnosis, their views may not be representative  
 248 of the broader population of physicians. Second, due to resource constraints we opted to interview  
 249 additional physicians rather than to seek participant feedback on their transcripts or summary reports.  
 250 This allowed us to achieve data saturation, lending greater credibility to findings and richer  
 251 understanding of physician experiences. Lastly, only a handful of physicians residing outside large urban  
 252 centres participated in the study, and a majority of them were from communities near major centres. As  
 253 such, the findings may not reflect the experiences of rural and remote communities of the province.  
 254 Additional research is required to further understand the perspectives of the broader population of  
 255 physicians, with particular emphasis on physicians in rural and remote areas, who might experience  
 256 different challenges.

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#### 258 **Conclusion**

259 The study revealed that family physicians have an important contribution in the timely diagnosis of  
 260 patients with cancer, but an expeditious diagnosis is often a complex and time-consuming endeavour.

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Findings suggested the need for enhanced support for family physicians, and better integration of primary and specialty care before diagnosis. Findings further suggested the need to promote innovative approaches including the development of pathways for non-specific symptoms, pathway maps, and a centralized service that facilitates primary care’s access to specialty information, testing and referral. Initiatives developed in this direction could result in an enhanced contribution of primary care in advancing cancer diagnosis, which could lead to improved patient outcomes (2).

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356 **Tables**

357 Table 1. Characteristics of participants

358 Table 2. Perceived factors impacting timelines to diagnosis of cancer

359 Table 3. Perceived recommendations for accelerated diagnosis of cancer

360

361 **Supplementary files**

362 Appendix 1. Interview guide for family physicians

363 Appendix 2. Interview guide for specialists related to cancer

364 Appendix 3. Coding tree

Confidential

Table 1. Characteristics of participants

Characteristic	Frequency n (%)
Gender	
Female	11 (33.3)
Male	22 (66.7)
Role or specialty	
Primary care physician	11 (33.3)
Surgery/surgical oncology (breast, gastrointestinal, thoracic)	7 (21.2)
Pathology	3 (9.1)
Radiology/diagnostic imaging	3 (9.1)
Hematology	2 (6.1)
Emergency medicine	2 (6.1)
Gynecologic oncology	1 (3.0)
Medical oncology	1 (3.0)
Otolaryngology	1 (3.0)
Public health physician	1 (3.0)
Respirology	1 (3.0)
Geographical location of practice (*)	
Large urban centre	27 (81.8)
Mid-size urban centre	5 (15.2)
Rural centres	1 (3.0)

(\*) Locations are classified based on Alberta Health Services and Alberta Health Standard Guidelines.

Large urban centres, population >500,000; mid-size urban centre population between 25,000 and 500,000, and rural centres, population <25,000 (33)

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Table 2. Perceived factors impacting timelines to diagnosis of cancer

Category	Factors	Representative quotations
Nature of primary care and initial presentation	Limited cancer training	“The biggest problem is that most doctors, both specialists and general practitioners, have no oncology training and the oncology training that they have is directed mostly to classroom work on the very detailed idiosyncrasies of cancers so the genetics, the parts of it that people really won’t have to use as GPs [general practitioners] because they’re not specialists. Most docs have no idea how to diagnose cancer, and they really don’t know what to do with it when they get it. Some of the cancers are getting better. Bowel cancers are getting more publicity, prostate maybe but by and large, it’s really now a dog’s breakfast as to what you know and how you manage it so they essentially turf it to the oncology world [...]. From a GP point of view, the biggest barrier is an understanding of the disease itself and that’s an education thing.” [FP-7]
	Generalists and information overload	“It depends on the family doc, but you have to realize that a lot of family docs may only see one cancer in their practice, in their life, in their career [...]. I see cancer 24/7, right? You sort of think it’s everywhere, but it’s not.” [SP-10]  “[Things are getting more complex] and there are more different tests we have to do and more drugs. You know,

		<p>when I was a lad, there were four different drugs to treat diabetes. It's just massive the numbers now and you've got to know all about those." [FP-6]</p>
	Poor continuity of care	<p>"Lack of having a dedicated family doctor is a problem. Certainly, we see big delays in people that go from walk-in clinic to walk-in clinic with no continuity of care. So, you know, often people have symptoms and I think if they're seeing the same physician each time, [that physician] would realize that they're progressing and that there must be something more significant going on. But, in the walk-in clinics, I don't know if sometimes it's just another prescription for antibiotics and, 'See ya'. So, that's a big problem." [SP-7]</p> <p>"Cancer can be really obvious and sometimes it can be really insidious, and you have to do a real thorough history [...]. The most important thing, in my opinion is sitting down and talking to a patient." [FP-1]</p>
	Fee-for-service model	<p>"Patients need a good family doctor, and that's the problem. We have a system that's set up to make it very difficult to be a good family doctor, because the payment system is fundamentally set up for seeing six patients an hour. And to actually engage with people properly, you need to take more time. You need to actually hear what people are</p>

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		<p>concerned about; you need to tune in to vague stories. It's easy to just do a quick ten-minute consultation when someone is just coming with a sore throat or even to diagnose pneumonia. But when somebody comes in and they're looking really sick. They've got a cough and a fever. You can diagnose and treat that in ten minutes. But when you're talking about vague, uncertain symptoms, you've got to tease out the problem and think through issues. That takes time and energy, and the system isn't set up to allow that. And family doctors who do that are doing it at a cost in terms of finance." [FP-6]</p>
Investigation	Difficulties determining appropriate testing	<p>"I see frustrated family practitioners who, while they're trying to sort out 'Where do I send this patient?', or try to get an answer, and in the meantime, they order a bunch of tests that are not helpful or are even unnecessary. So, we waste peoples' time. We waste resources within the healthcare system doing things that aren't helpful in coming to a diagnosis." [SP-5]</p> <p>"For us [family physicians], we know there is a mass; we've got some idea of what it is from the imaging. Really, I think it's up to the specialist to decide what it is they need. So, in the end, I had to call the on-call, then I had to call a surgeon on call to get him in. Then, a big hoo-haw and ultimately the surgeon said,</p>

		<p>'No', and the patient actually came in with an obstruction and [we] sent him to the emerg [...]. At the end of the day, I'm playing ping-pong between the radiologist and the surgeon. Who wants to do it? I don't know, I think the ball's in our court a little bit too long here." [FP-11]</p> <p>"It's confusing because we're not experts in particularly uncommon cancers and sometimes it's just really hard to know what the next step is." [FP-2]</p>
	<p>Long waitlists for testing</p>	<p>"Most of the time patients present with a lymph node in the neck or armpit or groin, and they present to a walk-in clinic or GP as the first kind of contact. And then generally what happens is the GP orders an imaging test, usually an ultrasound, to confirm that there's actual lymph nodes, which to me is kind of silly because if you can feel it, then it's abnormal but that's what they do. And they do it to characterize it, and then often the radiology report would say, 'Please do a CT scan', and so that's fed back to the physician who then orders a CT scan, but that's not the test we want for the patient. The patient needs a diagnostic biopsy, so the CT scan is actually not the most appropriate next step, and that often delays things." [SP-4]</p>

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		<p>“There is not enough budget or new investment into AHS DI [diagnostic imaging] to keep up with demand for CT and MRI to keep waitlists where they are. Waitlists are going up.”</p> <p>[SP-20]</p> <p>“Often, if a family physician has a possible mass that could be a sarcoma, they get an ultrasound. The ultrasound people say, ‘Needs an MRI’. They order an MRI. The MRI is twelve to eighteen months. Hopefully that’s not good enough and someone like me gets a call or a fax [from the family doctor] and then I’m able to triage that, maybe see them in my clinic a bit quicker. And then, if my name is on an MRI requisition, I can usually get it within weeks. I’ve seen it many times.” [SP-17]</p>
Specialist advice and referral	Difficulty determining appropriate specialists	<p>“My main thing is figuring out a way for family docs to get reconnected to the system. What I see happening is [that] medicine is obviously evolving and we’re realizing team-based care is really important. And, what I see is Alberta Health Services and the specialist services really working on that, and getting on top of that, and working in inter-disciplinary teams and that kind of thing. [...] And then, family medicine is just kind of on its own. We built this system where we’re like, ‘Okay, family docs are out in the</p>



		<p>community, you're on your own'. [...] Family medicine is an afterthought." [FP-3]</p> <p>"Specialists get more and more sub-specialized which is a problem because it leads to fragmentation. [...] We see that – gastroenterologists who only do hepatology with our liver specialists. They don't do inflammatory bowel disease or colonoscopy or gastroscopy." [SP-5]</p>
	<p>Difficulty approaching specialists</p>	<p>"There isn't a way for a family doctor to reach out. It's kind of discouraged. My experience in training as a family doctor is nobody likes to get that phone call. Their day is already packed 9 to 5 and there's no time to schedule an unscheduled phone call from family medicine asking for advice. So, if you're going to bother a specialist, you've got to have a really good reason. And that puts the family doc in a tough situation, where you're looking for more information but you're scared that if you ask that it might be inappropriate." [FP-3]</p> <p>"[Making referrals] is one of the most confusing, non-cohesive parts of the province because the College is clear about what they want, but every specialist doctor kind of takes a different direction about how they do [referrals]."</p> <p>[FP-2]</p>

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		<p>“If a family doctor phones me up and says, ‘I’ve got this person. They’ve got change in bowel habits and weight loss. I’m really worried they have cancer’. Then I’ll try and get them in sooner. But if they just fire in a fax that looks the same as all the other hemorrhoid consults -you know, ‘had some bleeding, please see for a scope’, then, unfortunately a lot of times those sit in a big pile and they finally get in seven months later. And then you’ve got this patient with advanced cancer who says, ‘I’ve been telling my doctor. I knew something was wrong and why did it take so long?’ and understandably, they’re angry.” [SP-1]</p>
	Referral patterns	<p>“If you’re a surgeon and you’ve got another specialist who refers patients to you for surgery, then it’s your job to provide a good service to that other specialist because if you provide bad service, then your customer will go somewhere else. [...] They say, ‘Oh, the patient doesn’t really need to come to hospital, but I’m going to admit them anyway because it’s the quickest way to get a CT scan’. And, ‘The patient doesn’t really need emergency surgery, but I’m going to put them on the emergency operating list because I want to impress you with how quick I am so you keep on sending me all of this work’. [...] If the practice leads to patients getting their care quickly, then I’m kind of okay with</p>

		<p>that [...]. The difficulty is there are patients who are getting lost in the system, and getting lost in the cold, because they just don't happen to be with the physician who's got the rapid access. So, I'd like us to see a system where every single patient gets treated the same way, has the same opportunity access rapid care, as opposed to just being randomly assigned to somebody who might or might not be able to get you in quickly." [SP-3]</p>
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FP = family physician, SP = specialist physician related to cancer

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Table 3. Perceived recommendations for accelerated diagnosis of cancer

Recommendations	Representative quotations
Centralized advice, triage and referral service	<p>“A phone consultation system where you’ve got somebody, just not quite sure the next step to take, and you phone up somebody and get an immediate consult that says, ‘Okay, given that, this is what you should do, go in this direction, do those tests’. So, those are very helpful because that helps us get far enough along that we know there is something there or maybe there isn’t something there.” [FP-6]</p> <p>“What we really need is a central triage place where we say, ‘Here’s the chest mass. Here’s what it looks like. Here’s what it is.’ And then, it would be decided who is going to do what and where, what’s that going to look like.” [SP-19]</p> <p>“If there was a central cancer booking office, for example, referral’s gone in, it’s been triaged by the appropriate specialist and the ball is in the system. And if there’s something like, ‘Oh, the specialist thinks that we should have done something more’, then they can call us and inform us. We’re happy to take that. But I just feel like until you get a proven tissue diagnosis to the “enth” degree, they don’t even want to know. Then by that point, it’s a little bit delayed.” [FP-11]</p>
Care pathways	<p>“It would be helpful to have pathways because then, if a family doctor said, ‘Look, I have a pathway in front of me here, this is what they’re asking me to do. I need this within a certain period of time’. And if we’ve set expectations in our discussions with surgeons, diagnostic imaging, family docs, then hopefully we</p>

start to get rid of those unnecessary tests that are being done. Because that's what's contributing to the wait-times, and getting the right tests at the right time for the right patients would actually improve access." [SP-5]

"For [family physicians], if it's an abnormality on a mammogram, it's clear where I go. If it's something on a chest x-ray, it's clear which way to go. But for the patients where there isn't a program, they really struggle and they're calling surgeons, 'Can you see the patient to do a biopsy?', calling the oncologist on call, 'What do I do? They've clearly got cancer'. And so, they're scrambling around calling several different people in the course of a busy day trying to facilitate something that to me [as a specialist], we need a single point of contact so that we can assist with the triage and the appropriate direction of patients for whatever service is required to get them to a diagnosis." [SP-5]

"I think getting the breast health-type clinics for every major type of cancer, and for the "weird and wonderful" that we just don't know, like 'I just feel uneasy, I think something is wrong', the weird stuff [...]. I think that would be a great use of resources. It's confusing because we're not experts in particularly uncommon cancers, and sometimes it's just really hard to know what the next step is... Having access to speak to the appropriate person, and a lot of times maybe that's not even an oncologist yet. Maybe that's a nurse that specializes in cancer care [...]. So I think there's this whole notion of having a number you can call." [FP-2]

FP = family physician, SP = specialist physician related to cancer

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Appendix 1. Interview guide for family physicians

About you

1. Could you please tell me a little bit about yourself and your practice?

About early diagnosis of cancer

2. From your perspective, what is the role of family physicians in diagnosing cancer as early as possible? What is the role of cancer specialists in diagnosing cancer as early as possible?
3. Can you please help me understand how you generally proceed when a patient presents to you with signs/symptoms that might be related to cancer?
4. Once patients present to you with signs/symptoms, what challenges have you faced in getting to a cancer diagnosis as quickly as possible? What things influence the time it takes to get to that diagnosis?

Expediting the diagnostic process

5. In your experience, what are some facilitators or enablers of making a cancer diagnosis as early as possible?
6. Given your experience, what are some opportunities for streamlining the pathways in Alberta from the time a patient presents to a family physician to diagnosis of cancer?

Improving patient and family experiences

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**7.** We know from a previous study that the diagnostic period can be a time of high anxiety for patients and families. What, in your opinion, could be done to better support them during this period?

Anything else?

**8.** Is there anything else you wish to say?

Thank you

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Appendix 2. Interview guide for specialists related to cancer

About you

1. Could you please tell me a little bit about yourself and your practice?

About early diagnosis of cancer

2. From your perspective, what is the role of family physicians in diagnosing cancer as early as possible? What is the role of cancer specialists in diagnosing cancer as early as possible?
3. What challenges have you faced in getting to a cancer diagnosis as quickly as possible? And what things influence the time it takes to get to that diagnosis?

Expediting the diagnostic process

4. In your experience, what are some facilitators or enablers of making a cancer diagnosis as early as possible?
5. Given your experience, what are some opportunities for streamlining the pathways in Alberta from the time a patient presents to a family physician to diagnosis of cancer?

Improving patient and family experiences

6. We know from a previous study that the diagnostic period can be a time of high anxiety for patients and families. What, in your opinion, could be done to better support them during this period?

Anything else?

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7. Is there anything else you wish to say?

Thank you

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## Appendix 3. Coding tree

Theme	Subthemes/codes
Delays related to nature of primary care practice	<ul style="list-style-type: none"> <li>- Limited cancer education/training               <ul style="list-style-type: none"> <li>○ Medical school</li> <li>○ Family medicine residency</li> </ul> </li> <li>- Family physicians are generalists               <ul style="list-style-type: none"> <li>○ Diversity of patients/nature of practice</li> <li>○ Not seeing a lot of cancer cases</li> <li>○ Information overload</li> </ul> </li> </ul>
Delays in initial patient presentation	<ul style="list-style-type: none"> <li>- Poor continuity of care               <ul style="list-style-type: none"> <li>○ Use of walk-in clinics</li> <li>○ Use of emergency department</li> </ul> </li> <li>- Funding model [fee for service]</li> <li>- Failure to complete full history and physical exams</li> </ul>
Delays in investigation process	<ul style="list-style-type: none"> <li>- No guidelines for all cancer types</li> <li>- Time involved with vague symptoms</li> <li>- Difficulty determining appropriate testing               <ul style="list-style-type: none"> <li>○ Not knowing what tests are needed</li> <li>○ Challenges associated with vague presentations</li> </ul> </li> <li>- Ordering wrong or unnecessary tests</li> <li>- Biopsies               <ul style="list-style-type: none"> <li>○ Knowing what type of biopsy is required</li> <li>○ Knowing how to get timely biopsies</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"><li>- Assistance/advice on testing from specialists</li><li>- Long waitlists for testing<ul style="list-style-type: none"><li>o Longer wait-times if family doctor orders</li><li>o Insufficient resourcing for radiology</li></ul></li><li>- Expeditious testing by specialists</li></ul>
Delays in specialist advice and referral	<ul style="list-style-type: none"><li>- Family physicians disconnected from rest of the system<ul style="list-style-type: none"><li>o Limited network of colleagues</li></ul></li><li>- Difficulty determining appropriate specialists<ul style="list-style-type: none"><li>o Referral to wrong specialist</li></ul></li><li>- Difficulty approaching specialists<ul style="list-style-type: none"><li>o Time consuming</li><li>o Some specialists readily available</li><li>o Some specialists want initial testing and provisional diagnosis</li></ul></li><li>- Barriers to referral<ul style="list-style-type: none"><li>o Specialists lack time for consultation</li><li>o Specialists not taking calls</li><li>o Inconsistent intake approaches</li><li>o Referral letters/faxes getting lost</li><li>o Appointments months into the future</li><li>o Need for making a compelling case to get specialist attention</li></ul></li><li>- Referral patterns (referral to known colleagues)</li></ul>
Recommendations	<ul style="list-style-type: none"><li>- Centralized advice, triage and referral service (single point of entry)<ul style="list-style-type: none"><li>o Phone advice<ul style="list-style-type: none"><li>▪ Determine tests to order</li></ul></li></ul></li></ul>

	<ul style="list-style-type: none"><li>▪ Determine specialist to refer to</li><li>▪ Connecting with appropriate specialist</li><li>○ Setting up necessary studies</li><li>○ Triage of individual patients</li><li>○ Referral of patients to appropriate specialist</li><li>- Pathways for all major types of cancer<ul style="list-style-type: none"><li>○ Strengthening primary care and role of family physicians</li><li>○ Centralized intake</li><li>○ Coordination, integration of primary and specialist care<ul style="list-style-type: none"><li>▪ Diagnostic services</li><li>▪ Single location</li></ul></li><li>○ Supports and resources for physicians</li><li>○ Supports and resources for patients/families<ul style="list-style-type: none"><li>▪ Psychosocial supports</li><li>▪ System navigation</li></ul></li></ul></li></ul>
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COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher’s credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
<b>Domain 3: analysis and findings</b>			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**