

Determinants of quality prostate cancer survivorship care across the primary and specialty care interface: lessons from the Veterans Health Administration

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Conflicts of Interest

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Precis: Using the Theoretical Domains Framework to guide our interviews of primary and cancer specialty care physicians, we were able to identify several behavioral domains acting as determinants of high-quality, team-based prostate cancer survivorship care. These results can inform prostate cancer survivorship care plan content, and may guide tailored, multi-disciplinary implementation strategies to improve survivorship care across the primary and specialty care interface.

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ABSTRACT

Background: With over 3 million US prostate cancer survivors, ensuring high-quality, coordinated cancer survivorship care is important. However, implementation of recommended team-based cancer care has lagged, and determinants of quality care across primary and specialty care remain unclear. Guided by the Theoretical Domains Framework (TDF), we explored multi-disciplinary determinants of quality survivorship care in an integrated delivery system.

Methods: We conducted semi-structured interviews with primary (4) and specialty (7) care providers across six Veterans Health Administration clinic sites. Using template analysis, we coded interview transcripts into the TDF, mapping statements to specific constructs within each domain. We assessed whether each construct was perceived a barrier or facilitator, examining results for both primary care providers (PCPs) and prostate cancer specialists.

Results: Cancer specialists and PCPs identified 2 primary TDF domains impacting their prostate cancer survivorship care: Knowledge and Environmental context and resources. Both groups noted knowledge (about survivorship care) and procedural knowledge (about how to deliver survivorship care) as positive determinants or facilitators, whereas resources/material resources (to deliver survivorship care) was noted as a negative determinant or barrier to care. Additional domains more commonly referenced by cancer specialists included Social/professional role and identity and Goals, while PCPs reported the domain Beliefs about capabilities as relevant.

Conclusions: We used the TDF to identify several behavioral domains acting as determinants of high-quality, team-based prostate cancer survivorship care. These results can inform prostate cancer survivorship care plan content, and may guide tailored, multi-disciplinary implementation strategies to improve survivorship care across the primary and specialty care interface.

Introduction

32

33 Providing high-quality cancer survivorship care is challenging. Not only are the number
34 of cancer survivors rapidly growing and older with a higher number of medical comorbidities,
35 but there is an increasing oncologist shortage, leading to an inability to meet the demands of the
36 cancer survivor population.^{1,2} Nearly a quarter of cancer survivors have faced prostate cancer
37 and many of these men have persistent urinary, sexual, bowel, and psychosocial symptoms,
38 necessitating long-term management similar to a chronic disease.³ While most men have follow-
39 up with both primary care providers (PCPs) and cancer specialists, which provider is responsible
40 for delivering survivorship care is often unclear leading to gaps in quality prostate cancer
41 survivorship care.⁴⁻⁸

42 Over a decade ago, the National Academies of Sciences released “From Cancer Patient to
43 Cancer Survivor”³ calling for research on the determinants of high-quality survivorship care
44 across the primary and specialty care interface.⁹ Several strategies such as formal survivorship
45 care plans and shared-care models between primary and specialty care providers have been
46 recommended, however, their success has been mixed.¹⁰⁻¹³ One potential explanation rests upon
47 a poor understanding of what primary and specialty care providers identify as drivers, or
48 determinants, of high-quality survivorship care. For example, PCPs might endorse a lack of
49 knowledge in survivorship care, while oncologists report lack of time and resources to deliver
50 this care.¹⁴⁻¹⁶ Indeed, optimizing survivorship care requires better understanding behavioral
51 determinants acting as barriers and facilitators, and addressing those determinants through
52 tailored, multi-disciplinary interventions.

53 For these reasons, we explored prostate cancer survivorship care among PCPs and cancer
54 specialists within an integrated healthcare delivery system. We used an innovative
55 implementation research framework to characterize multi-disciplinary determinants associated
56 with quality care. Our approach to provider interviews informs survivorship care content and
57 tailored interventions to support cancer specialists and PCPs to deliver quality prostate cancer
58 survivorship care.

59 **Methods**

60 Participant recruitment

61 We recruited providers from 3 different Veterans Health Administration (VHA) clinical
62 sites within the Midwest region. We purposefully sampled participants from primary care,

63 urology, medical oncology, and radiation oncology clinics to maximize variation in the sample
64 and achieve a sample representative of the types of providers involved in prostate cancer
65 survivorship care. We first contacted service chiefs to obtain permission to contact their
66 providers. Once permission was obtained, an e-mail was sent to providers that explained the
67 study and gave them the option to opt-out of participating. Providers were excluded if they had
68 not provided care to at least 3 men with prostate cancer within the past year. This study was
69 approved by the VA Ann Arbor Healthcare System Institutional Review Board.

70 Interview guide development

71 We developed our interview guide based on the Theoretical Domains Framework (TDF)
72 to understand determinants of provider behavior regarding prostate cancer survivorship care, and
73 to inform future implementation strategies aimed at improving care across the primary and
74 specialty care interface.¹⁷ The TDF uses constructs from over 30 psychological behavior change
75 theories to assess barriers to practice change, and to inform the design of effective interventions
76 based on those constructs acting as barriers and facilitators. There are 14 TDF domains
77 (Knowledge, Skills, Social/professional role and identity, Beliefs about capabilities, Optimism,
78 Beliefs about consequences, Reinforcement, Intentions, Goals, Memory, attention and decision
79 processes, Environmental context and resources, Social influences, Emotion, and Behavioral
80 regulation), each linked with evidence-based behavior change techniques. Using this robust
81 systematic approach to our interview guide development and to structure our qualitative findings
82 is important because using TDF not only enables us to identify determinants of quality
83 survivorship care across the primary and specialty care interface, but we can subsequently use
84 these TDF determinants to direct selection of behavior change strategies and interventions most
85 likely to address survivorship care gaps.¹⁸ For example, barriers endorsed by patients in the
86 Beliefs about capabilities domain of TDF (e.g., patient's belief regarding their PCP's capability
87 to manage active surveillance) can be intervened upon by providing written or visual information
88 to clarify provider roles and responsibilities. This may, in turn, improve the patient's professional
89 confidence in their PCP to provide cancer care.

90 We designed our interview guide to assess several aspects of survivorship care including:
91 (1) provider recognition of prostate cancer survivorship care (e.g., monitoring PSA for
92 recurrence, bone health) and the benefits of survivorship interventions (e.g., treatment of
93 osteoporosis, incontinence, impotence); (2) the interface between primary care providers and

94 cancer specialists (e.g., cancer specialty care availability) and survivorship care practice patterns;
95 (3) behavioral control barriers to delivering survivorship care (e.g., beliefs about capabilities);
96 and (4) intention to perform prostate cancer survivorship care (see Appendix for interview
97 guide).

98 Eleven semi-structured interviews were conducted by two members of the study team (JH
99 and TS) and included 4 PCPs, 4 urologists, and 3 oncologists (2 radiation, 1 medical). No new
100 major themes arose by the end of eleven interviews, implying that saturation had been reached.
101 Based on the location and availability of the provider, we conducted 5 in-person and 6 telephone
102 interviews. All participants gave verbal consent prior to beginning the interview. Each interview
103 began with a description of an index patient who was one-year post-robotic prostatectomy that
104 the interviewee was told to keep in mind while responding to the interview questions. Interview
105 questions probed the content areas highlighted above. Interviews were audio-recorded,
106 transcribed verbatim, and entered into NVivo software (NVivo, Version 11) for analysis.

107 Data analysis

108 We conducted data analysis in two steps. First, we mapped all content from each
109 interview to a relevant TDF domain (KZ, JH, TS). Then, our research team (KZ, JH), including a
110 prostate cancer specialist (TS) and primary care physician (AR) both with extensive survivorship
111 care clinical and research expertise, mapped all TDF domain content to TDF constructs (see
112 Appendix for coding definitions). During this process, our research team collectively assessed
113 whether the construct was perceived as a barrier (negative determinant) or facilitator (positive
114 determinant) by the interviewee by rating responses within a range (-2 strong barrier, -1, 0, 1, 2
115 strong facilitator). Coding disagreements were resolved by group consensus, and we selected
116 exemplar quotes where appropriate. We examined results both overall and separately by cancer
117 specialists and PCPs using NVivo. This included an assessment of total references to TDF
118 domains by primary care providers and cancer specialists, and the valence of determinants across
119 the range of barriers and facilitators for a given TDF domain.¹⁹

120

121 Results

122 We identified two primary domains impacting the multi-disciplinary delivery of quality
123 prostate cancer survivorship care: Knowledge and Environmental context and resources. These

124 two domains accounted for the majority of all interview content, followed by Social influences,
125 Beliefs about capabilities, and Goals, among others (Figure 1).

126 Knowledge

127 Knowledge, defined as the ‘awareness of the existence of something,’ was the most
128 frequently identified domain by all providers, referenced 64 times by PCPs and 43 times by
129 cancer specialists (Appendix Table). Both cancer specialists and PCPs had general knowledge
130 about prostate cancer survivorship care including assessing for treatment side effects and
131 managing complications (e.g., erectile dysfunction) and monitoring for recurrence (e.g., serial
132 prostate specific antigen (PSA) testing). However, knowledge barriers to survivorship care were
133 also noted by both provider types. Cancer specialists reported not using formal survivorship care
134 plans or not having them available within their clinics while PCPs reported lack of familiarity with
135 or not receiving survivorship care plans. Both cancer specialists and PCPs also endorsed having
136 procedural knowledge about how to deliver survivorship care, a construct within the domain of
137 Knowledge (refer to Table for example quotes). For example, cancer specialists reported
138 referencing National Cancer Comprehensive Network guidelines for monitoring protocols and
139 using standardized measures for symptom assessment (e.g. International Prostate Symptom
140 Score). On the other hand, PCPs endorsed using organizational resources such as electronic
141 consults, a service available within the electronic medical record, to contact a cancer specialist
142 about follow-up on PSA tests on their mutual patient. One PCP noted, “Yeah, I mean e-consults
143 are I think a fabulous way of getting questions answered. You know it allows specialists to kind
144 of lay out a detailed structure plan if things, you know plan a, and if you need to go to plan b,
145 and c, so I think e-consults for that purpose are great”.

146 Environmental context and resources

147 Defined as ‘any circumstance of a person’s situation or environment that discourages or
148 encourages the development of skills and abilities, independence, social competence, and
149 adaptive behavior,’ environmental context and availability of resources were often noted by
150 providers as barriers to delivering quality prostate cancer survivorship care (Figure 2).
151 Specifically, the lack of resources/material resources was reported by several providers
152 including: 1) lack of communication from cancer specialists regarding the standardized follow-
153 up care a patient needs (PCP noted, “it would be nice to have a summary of what all was the
154 diagnosis...their Gleason score...what was the treatment...what all complications that the patient

155 currently [is] having and...the current plan that's being done by Urology or radiation"); 2) lack
156 of access to specialists (cancer specialist noted "...we have certain barriers currently...where if a
157 patient does want to have treatment for bad incontinence..., we currently don't have a
158 reconstructive surgeon..."); 3) lack of time during clinic visits to properly address all of the
159 patient's concerns, especially in the context of other chronic conditions (cancer specialist stated,
160 "There's just no time. We barely have time to talk about their new fracture from their growing
161 prostate cancer let alone, I mean every other clinic I'm admitting someone to the hospital
162 because of some other life-threatening thing, so talking about sexual dysfunction is just not kind
163 of at the top of that radar"); and 4) lack of support services for providers (e.g., mental health
164 services to address psychological concerns) and patients (e.g., support groups).

165 In contrast, what providers reported as a facilitator to providing survivorship care
166 involved the organizational culture/climate. Often, this was described as having:

167 "...good relationships with urology, medical oncology...it makes a big difference in
168 really getting these patients where they need to be in a timely fashion and getting the
169 answers that they need because when they sit in your office and they're asking you
170 questions that you can't necessarily deal with, it's very comforting that I can tell a
171 patient, you know "I don't know that answer but I can go find out..."

172 In addition, the person x environment interaction was also noted as a facilitator to be able to
173 deliver survivorship care. In other words, co-location of PCPs with cancer specialists was
174 endorsed as facilitating communication between providers. As one PCP noted, "I think it's
175 definitely helpful to be onsite, you can actually ask questions...It's not always that we know
176 what we're doing, so it's kind of nice to curbside and ask..."

177 Comparison between PCPs and cancer specialists

178 Compared to cancer specialists, PCPs made more references to Beliefs about capabilities
179 in their delivery of prostate cancer survivorship care (Appendix Table, 17 vs. 9 references
180 respectively for PCPs and cancer specialists). PCPs endorsed having professional confidence (an
181 individual's belief in his or her repertoire of skills, and ability especially as it is applied to a task
182 or set of tasks) in handling many aspects of follow-up care for their patients and feeling
183 comfortable doing so. One PCP noted, "...I think we try to manage them...most of the time
184 probably. Primary Care does the majority of managing of the symptoms...and then for the ones
185 that are really refractory we end up sending them back to urology, but I do feel kind of

186 responsible for a pretty broad range.” Cancer specialists, on the other hand, reported
187 Social/professional role and identity more frequently as relevant to their care (26 vs. 18
188 references respectively for cancer specialists and PCPs). The majority of cancer specialists
189 discussed feeling responsible for the patient’s cancer control (i.e., monitoring for recurrence) and
190 assessing quality of life (e.g., managing side effects from treatment). Cancer specialists varied in
191 their views on sharing care with PCPs. One cancer specialist determined their continued
192 involvement in their patient’s care based on how involved the PCP was. But several others
193 reported being involved in all aspects of their patient’s survivorship care and even assuming
194 primary care roles.

195

196 **Discussion**

197 This study used the TDF to identify determinants of team-based prostate cancer
198 survivorship care within an integrated delivery system. Both PCPs and cancer specialists
199 endorsed Knowledge (as a facilitator) and Environmental context and resources (as a barrier) as
200 relevant to their survivorship care delivery. As the population of cancer survivors grows,
201 understanding factors that influence provider abilities to deliver high-quality survivorship care is
202 critical. Increasingly, team-based care models have been proposed to meet the diverse health
203 needs of cancer survivors, however, how PCPs and cancer specialists deliver coordinated care
204 have remained unclear. Our study helps clarify issues facing primary and specialty care and
205 suggest directions forward to support them in their care for men surviving prostate cancer.

206 We found Knowledge was the most frequent domain referenced by providers in this
207 study, with both PCPs and cancer specialists endorsing having knowledge about prostate cancer
208 survivorship care and perceiving it as a facilitator to delivering care. Prior studies have
209 highlighted that PCPs often report lacking knowledge about survivorship care but also that
210 cancer specialists lack confidence in PCPs’ abilities to do so.^{20,21} There are several possible
211 reasons for the differences noted in our study. First, providers endorsed having procedural
212 knowledge, in other words, ‘knowing how to do something.’ This is critical as PCPs have
213 previously reported needing not only detailed plans for follow-up care during survivorship but
214 also having access to cancer specialists to ask questions.^{22,23} Being within an integrated delivery
215 system, such as the VHA, may facilitate this and interventions that leverage similar resources,
216 such as universal access to electronic medical records and electronic consults to improve

217 communication between providers, will be important. Second, VHA largely consists of male
218 patients, making prostate cancer and its sequelae more common, thereby adding to PCP
219 expertise. Third, the majority of prostate cancer in this population is localized limiting the scope
220 of survivorship care. For example, compared to pediatric malignancies where screening for
221 secondary malignancies and repetitive imaging are common, the long-term and late effects of
222 definitively treated localized prostate cancer among older men may be more straightforward.²⁴
223 Leveraging knowledge as a facilitator to providing survivorship care, especially by PCPs, will be
224 instrumental moving forward in designing strategies to increase PCP involvement and transition
225 survivorship care from the cancer specialist to the PCP.

226 Quality survivorship care delivery requires both time and resources, and this was a barrier
227 frequently reported as negatively impacting clinical practice. As increasing calls to improve
228 cancer survivorship care delivery have been made over the past decade, policy changes at
229 various levels (organizational, national) to facilitate implementation of efficient and effective
230 survivorship care programs are needed.²⁵ This becomes more relevant as provision of
231 survivorship care plans is now a quality metric used in cancer center accreditation, placing the
232 burden primarily on cancer specialists and their teams.²⁶ This was supported by our findings
233 attributing stronger negative determinants to the Environment domain among cancer specialists.
234 Additionally, in an example of an intervention implemented to improve survivorship care,
235 resources specifically included dedicated staff to complete survivorship care plans, an oncology
236 nurse practitioner to review treatment summaries and recommendations, and a social worker to
237 address late- and long-term psychosocial effects.²⁷ This model of care led to comprehensively
238 addressing physical and psychosocial effects from treatment and high patient satisfaction.
239 Coupled with our work, these findings indicate addressing resource needs for survivorship care is
240 critical to optimize survivorship care models in and outside of this system.

241 One key challenge to team-based survivorship care models is a lack of clarity among
242 providers regarding responsibility for survivor follow-up care. Results from our study highlight
243 the discrepancy between cancer specialists and PCPs on their respective roles. While some
244 cancer specialists perceived their roles as extending to addressing primary care needs, PCPs
245 reported feeling comfortable and having confidence in managing their patient's prostate cancer
246 follow-up care. This suggests that improving care coordination between cancer specialists and
247 PCPs requires clear delineation of responsibilities for what each provider will handle, and this

248 ideally needs to be communicated to patients. For example, strategies, such as web-based patient
249 tools that describe team-based models of survivorship care and specific roles for cancer
250 specialists and PCPs, can be helpful in accomplishing this.

251 This study has some limitations. First, because we were able to achieve thematic
252 saturation with eleven providers, it is likely that we identified the two key domains necessary for
253 quality survivorship care. In fact, our findings are consistent with others regarding resources as a
254 determinant of survivorship care plan use.¹⁹ While we were able to achieve granularity in
255 understanding factors that impact primary and specialty care providers' daily clinical practices,
256 and identify domains and constructs as potential targets for future interventions to improve
257 survivorship care, further work is needed to understand how best to effectively address those
258 determinants in clinical practice. Second, our providers were from the VHA, which is an
259 integrated delivery system where providers have universal access to electronic medical records.
260 While this may not be fully generalizable to other care settings, it represents an important case
261 scenario for how to coordinate care at the primary and specialty care interface; an increasing
262 number of health care systems have similar capacity. Third, while we used TDF to guide our
263 interviews, it is possible that some domains were not represented. For example, the importance
264 of "communication" between cancer specialists and PCPs was mentioned in several cases with
265 one cancer specialist noting, "It's very helpful in terms of coordinating care if I can communicate
266 with the other physicians easily..." while a PCP reported as a problem not receiving medical
267 records regarding patient treatment from providers outside of their medical system. While our
268 coding using the TDF classified these as barriers (within Environmental resources/context
269 domain) and knowledge (within Knowledge domain), a more accurate classification might be
270 "communication." Nonetheless, evidence-based behavior change strategies within these domains
271 targeting increased communication among providers would appear valid (i.e., supporting
272 communication of survivorship care plans or outside medical records). Overall, the rigorous
273 development and validation of this behavioral framework along with its ties to evidence-based
274 behavior change techniques make it an excellent tool for dissecting survivorship care practices
275 and directing future efforts to improve care.^{18,28,29} In addition, while our quantification of
276 references to TDF domains and constructs has limitations, the relative relationships among the
277 domains in terms of relevance to survivorship care intervention development is an important
278 take-away message. For example, interventions might consider targeting the leading domains

279 rather than those infrequently referenced (e.g., emotion, intention) as the focus of changing
280 behavior with respect to primary and specialty survivorship care.

281 Primary care providers and cancer specialists identified several constructs within the TDF
282 domains as relevant to their prostate cancer survivorship care delivery. While knowledge about
283 survivorship care was perceived as a facilitator, limited resources to be able to deliver
284 survivorship care was reported as a barrier. Our results provide critical insight into factors that
285 providers perceive as being important in their clinical practices. These behavioral theory-based
286 results may inform future efforts in the design and implementation of prostate cancer
287 survivorship care plan content, and guide tailored, multi-disciplinary implementation strategies
288 to improve prostate cancer survivorship care across the specialty and primary care interface.

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Table. Summary of most commonly referenced TDF domains and constructs

Domain	Subdomain	Primary Care Providers		Cancer Specialists	
		Summary	Example	Summary	Example
Knowledge	Knowledge	PCPs have knowledge about survivorship care, but rarely receive formal survivorship care plans or specific training or education.	"I've not seen specific survivorship treatment plans in terms of what that should look like or what that profile might look like. I think we're largely building our own you know based on the individual malignancy that we're taking care of."	Specialists are knowledgeable about survivorship care but unfamiliar with formal survivorship care plans.	"What I have seen limiting survivorship care in general is just a lack of knowledge or lack of understanding of a) what resources are available to somebody and b) a lack of understanding of what survivorship care really means."
	Knowledge of task Environment	PCPs are aware of processes of care within their clinical contexts and know how to utilize resources available to deliver survivorship care.	"...people have ED, you have ED kind of service...so we refer people for that. Um...we're pretty familiar with Primary Care Mental Health you know and so people who have kind of symptoms ...we'll	Specialists use their notes to track patient care and assist when transferring patients back to PCPs.	"...let's say I'm seeing patients for follow up and...I put... 'Return to PCP,' and what is the plan of care,... 'PSA once a year and alert Urology if PSA is rising or any other problem,' and again

			send them to that..."		realistically...patients can schedule appointments themselves. So if let's say something happens...they can always do it, sort of initiate or re-initiate follow up, things like that."
	Procedural knowledge	PCPs are aware of how to treat prostate cancer patients, and communicate with specialists in a dynamic process.	"I use the e-consults...I'll say you know "the PSA is up to this, is this okay or should I check it again quickly or do you guys want to see him?"	Specialists are responsible for the patient's direct cancer care, and then transition the patient to primary care.	"I usually after 2 years and they're having stable PSA, and they're comfortable with their outcomes, then we'll move to Primary Care and with recommendations of when they should come back to us."
Environmental context and resources	Facilitators and barriers	Veterans receiving specialty care outside of the VA is a barrier to primary care treatment.	"... but the biggest barrier is when we don't have that information... they were seeing a urologist on the outside, but now are transferring care here, so until we are able to get	Factors that affect communication between specialists and PCPs can be barriers or facilitators to treating patients.	"It's very helpful in terms of coordinating care if I know where their care is coming from and if I can communicate with the other physicians easily, and then things that hinder care are

		<p>Consulting Urology can be a barrier for PCPs.</p>	<p>those results we are kind of lost about what to do." "I mean one of the biggest barriers I have is about consulting Urology... some thought needs to go into what I'm presenting and giving a meaningful consultant response..."</p>		<p>patients that don't stay within the system or kind of bounce around that can hinder an ability to get a sense of what the Primary Care doctor is doing."</p>
	<p>Resources/ material resources</p>	<p>Educational materials and/or tools would be helpful in clinical practice.</p>	<p>"...it would be nice to have kind of a go-to brief education area...where you can say, "this is what to expect when you're treating someone with prostate cancer who's had a prostatectomy or who's had radiation, you know these are the common things you're probably going to have to deal with..."</p>	<p>Time is a scarce resource and acts as a barrier to specialists.</p>	<p>"There's just no time. We barely have time to talk about their diabetes and their like new fracture, their growing prostate cancer let alone, I mean every other clinic I'm admitting someone to the hospital because of like some other life-threatening thing so talking about like sexual dysfunction is just not kind of at the top of the radar."</p>

	Organizational culture/climate	PCPs have high caseloads and understand that specialty care should be reserved for patients who need that care	"The key is, is that primary care then needs to be supported with the correct amount of time, correct amount of patients, and correct amount of support staff."	Positive working relationships with specialists facilitates best patient care practices.	"Having a good relationship with urology, medical oncology makes a big difference, even nuclear medicine for bone scans and things, it makes a big difference in really getting these patients where they need to be in a timely fashion and getting the answers that they need"
	Person x environment interaction	Co-location of primary care and urology facilitates communication	"I think Urology is actually fairly good here about communicating with Primary Care maybe also because it's co-located and I'm sure proximity helps right, so you can walk down the hall and talk with someone."	An integrated healthcare system can facilitate care delivery (e.g. communication between providers, access to resources).	"...I think most patients like to come for follow up to see their doctors about cancer care, to find out that everything is reassured, that things are going in the right track, so I think there are great benefits of providing that type of follow up."

	<p>Environmental stressors</p>	<p>Providers must consider the insurance coverage and cost to their patients.</p>	<p>“But for their office visit I’ll ask like, ‘Do you get a bill from here, do you pay for coming here, do you pay for coming in here?’ and sometimes it’s also that they get only one bill depending upon several services they see on that day... so we say, ‘Okay, we’ll try and coordinate it for you so that you get seen on the same day and you get charged only one co-pay.’”</p>	<p>In order for survivorship care plans to be successful in VA, providers need more support.</p>	<p>"We need to have...people helping us in clinic...like a survivorship care person who's going to do all these survivorship care plans for all the patients and work with the physicians. So we can't have physicians now doing everything. It's just not sustainable, they need their, they're already burning out.</p>
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Appendix Table. Number of references to Theoretical Domain Framework constructs for prostate cancer survivorship care according to provider type.

TDF domain with constructs	All interviewees	Primary care providers	Cancer specialists
Behavioral regulation	4	3	1
Action planning	2	1	1
Breaking habit	0	0	0
Self-monitoring	2	2	0
Beliefs about capabilities	26	17	9
Beliefs	0	0	0
Empowerment	0	0	0
Perceived behavioral control	6	3	3
Perceived competence	4	1	3
Professional confidence	11	9	2
Self-confidence	4	3	1
Self-efficacy	2	1	1
Self-esteem	0	0	0
Beliefs about consequences	13	9	4
Anticipated regret	1	1	0
Beliefs	5	2	3
Characteristics of outcome expectancies	0	0	0
Consequents	3	3	0
Outcome expectancies	5	3	2
Emotion	6	3	3
Affect	0	0	0
Anxiety	0	0	0
Burn-out	0	0	0
Depression	1	0	1
Fear	1	0	1

Positive/negative affect	1	1	0
Stress	2	1	1
Environmental context and resources	88	42	46
Barriers and facilitators	19	7	12
Environmental stressors	4	3	1
Organizational culture/climate	15	7	8
Person x environment interaction	9	5	4
Resources/material resources	44	21	23
Salient events/critical incidents	0	0	0
Intentions	1	0	1
Stability of intentions	1	0	1
Stages of change model	0	0	0
Transtheoretical model and stages of change	0	0	0
Knowledge	107	64	43
Knowledge of task environment	13	8	5
Knowledge	57	34	23
Procedural knowledge	36	21	15
Memory, attention and decision processes	14	7	7
Attention	7	5	2
Attention control	2	0	2
Cognitive overload or tiredness	0	0	0
Decision making	5	2	3
Memory	0	0	0
Goals	24	9	15
Action planning	0	0	0
Goal - target setting	0	0	0
Goal priority	4	2	2
Goals - autonomous or controlled	0	0	0
Goals - distal or proximal	2	2	0
Implementation intention	1	1	0

Optimism	6	5	1
Identity	0	0	0
Optimism	2	2	0
Pessimism	3	2	1
Unrealistic optimism	1	1	0
Reinforcement	1	1	0
Consequents	0	0	0
Contingencies	0	0	0
Incentives	0	0	0
Punishment	0	0	0
Reinforcement	1	1	0
Rewards	0	0	0
Sanctions	0	0	0
Skills	18	8	10
Ability	1	1	0
Competence	4	2	2
Interpersonal skills	4	2	2
Practice	0	0	0
Skill assessment	4	2	2
Skills development	0	0	0
Skills	3	1	2
Social influences	11	8	3
Alienation	1	1	0
Group conformity	1	1	0
Group identity	0	0	0
Group norms	0	0	0
Intergroup conflict	0	0	0
Modeling	0	0	0
Power	0	0	0
Social comparisons	1	1	0

Social norms	3	2	1
Social pressure	4	2	2
Social support	1	1	0
Social/professional role and identity	44	18	26
Group identity	3	1	2
Identity	0	0	0
Leadership	0	0	0
Organizational commitment	0	0	0
Professional boundaries	9	4	5
Professional confidence	3	1	2
Professional identity	3	1	2
Professional role	30	12	18
Social identity	0	0	0

Appendix: Interview Guide for Provider Semi Structured Interview

Time:45 minutes

Introduction:

Is this still a good time for you? Are you in a place where you can be free from distractions and feel free to give candid responses? Would it be OK with you if I record this call? [If they ask why, say for research and training purposes.]

Thank you for agreeing to participate in this interview. The aim of the study is to help us understand improve prostate cancer survivorship care by learning more about it. As a provider, you serve as a primary source of information and will be able to provide us with valuable information. During this interview, I will ask about your behavior and perspective on survivorship care of prostate cancer patients.

Your responses will help to inform conclusions regarding the appropriate role of various specialists in survivorship care. All of your responses will remain confidential and will only be

reported in aggregate. You may choose to stop the interview at any time, and there is no penalty to your or your organization for not completing the interview.

Do you have any questions before we begin?

Index patient: 68 year old male status post robotic prostatectomy 1 year ago with urine leakage (2 pads per day) and erectile dysfunction.

Interview

Let's start with some general questions about survivorship care and then move into your specific involvement.

In a few sentences can you describe the role of a (PCP, urologist, radiation and medical oncologist) in the survivorship of patients with prostate cancer?

If one of your patients has prostate cancer, what aspects of his survivorship care do you feel personally responsible for?

What do you consider to be the most fundamental aspects of quality survivorship care for a patient with prostate cancer?

What is the purpose of prostate cancer survivorship care?

Is survivorship care part of your job as a (PCP, urologist, radiation or medical oncologist)?

Can you tell me how personally involved you are in the survivorship care of your prostate cancer patients?

How much personal experience do you have in survivorship care?

Do you believe it should be part of your job?

Is survivorship care consistent amongst your practice? Hospital?

Have you received training that is specific to providing survivorship care?

Walk me through the steps you take in planning/carrying out survivorship care.

- Prompts: Does it depend? If so, what does it depend on? Does the stage change your plan? The patient's comfort level? Life expectancy? Severity of pain? Cost of care? Patient satisfaction? Peer behavior? Possible consequences? Which of these do you consider most important?

What do you consider to be your most frequently used intervention method for prostate cancer survivorship care?

- Prompts: ADT injections, PSA monitoring, monitoring bone health, treatment of osteoporosis, incontinence, impotence, etc.

From your perspective, what are the main barriers and facilitators to you providing quality survivorship care?

- Prompts: What specifically helps you or hinders you? What encourages you? e.g. reminders, incentives. Which of these helps you most?

Do you feel you have adequate access to all cancer specialty care resources?

- Prompts: Do other specialties have resources you do not have?

In what way does your specific facility enable or inhibit your survivorship care?

Which patients specifically will you take on to provide survivorship care?

- Prompts: Which patients will you not take? Who assumes care at that point and why? Does it depend on the situation?

Would you feel obliged as a (PCP, urologist, medical oncologist) to assume survivorship care for the index patient?

Would you feel completely comfortable assuming care for the index patient?

How optimistic would you feel when treating the index patient?

- Prompts: Do you usually expect the best? Are you always optimistic about the future?

Does the amount of time you have influence your decision to provide survivorship care?

What things do you usually do in preparation for longitudinal survivorship care?

- Prompts: Do you discuss the treatment plan with the patient? Do you review the literature? Consult colleagues? Schedule appointments?

Do patients see a (PCP, urologist, medical oncologist) each time they have an appointment?

In what ways do your feelings influence your care?

- Prompts: e.g. if you feel anxious about the patient's situation are you likely to act differently?

How do you follow such patients' PSA values?

- Prompts: Every 3, 9, 16 months?

Do many of your patients receive ADT injections?

- Prompts: What sorts of patients do receive ADT injections?

How much experience with ADT?

What is the purpose of ADT?

How do patients feel on ADT?

What are the side effects you are concerned about with ADT?

During the past two months, do you feel the outcomes of your survivorship patients have affected your day-to-day life more than other patients?

How do patients typically feel about their care from you?

What do you consider the benefits to the patient to be of following with you?

- Prompts: Would the benefits be similar with a (other specialist)

What are the expectations, requirements, and costs for your survivorship patients?

- Prompts: e.g. time taken away from other tasks, need for occasional treatment/procedure, stress of PSA results, out of pocket costs etc.

Have these factors ever affected your decision to follow a patient?

Do you that feel the benefits of your care outweigh the costs?

- Prompts: How so?

How important is it to you that your patient population consists of prostate cancer survivorship patients?

- Prompts: How much do you want to do it? Do you feel you are best suited? Are you compelled to do it? Are there other tasks that you perform in your job that are more important? Why?

Approximately how many patients will you offer to provide survivorship care to in the next two months?

- Prompts: How strong is this intention?

Have you ever forgotten about certain survivorship care options when treating patients?

- Prompts: Why do you think that is? Are there certain systems you could implement to prevent this in the future? Do you think a (PCP, urologist, medical oncologist) would have forgotten that aspect?

Let's talk about opinions and what people in your clinical team think about survivorship care.

In your opinion, how much does providing survivorship care to prostate cancer patients align with what somebody in your position should be doing?

What influential individuals or groups are in favor of (PCPs, urologists, medical oncologists) providing majority survivorship care?

- Prompts: Please tell me about them and their perspectives. Prompts: e.g. clinical leaders, management, patients, top researchers etc.

Do you think about the opinions of these influential people when considering whether to take on a patient?

Do you feel that most people whose opinion you value would approve of you providing majority survivorship care to the index patient?

- Prompts: If you got the sense that others didn't approve, would that influence whether or how you provide care?

If you sensed that your decision damaged your relationships in any way (with patients, other providers) would you be likely to change your actions?

Do you feel motivated in general to provide survivorship care?

- Prompts: Does this motivation level affect the likelihood of you providing care or not?

Conclusion:

That's all the questions I have for you, has anything occurred to you about this topic that I haven't asked about?

Appendix: Coding of Theoretical Domains Framework Constructs

DOMAINS	CONSTRUCTS
1) Knowledge (An awareness of the existence of something)	Knowledge: an awareness of the existence of something
	Procedural knowledge: knowing how to do something
	Knowledge of task environment: knowledge of social and material context in which task undertaken
2) Skills (An ability or proficiency acquired through practice)	Skills: an ability or proficiency acquired through training and/or practice
	Skills development: repetition of an act, behavior, or series of activities, often to improve performance or acquire a skill
	Competence: one's repertoire of skills, and ability especially as it is applied to a task or set of tasks
	Ability: competence or capacity to perform a physical or mental act. Ability may be either unlearned or acquired by education and practice
	Interpersonal skills: an aptitude enabling a person to carry on effective relationships with others, such as an ability to cooperate, to assume appropriate social responsibilities or to exhibit adequate flexibility
	Practice: repetition of an act, behavior, or series of activities, often to improve performance or acquire a skill

	Skill assessment: a judgment of the quality, worth, importance, level, or value of an ability or proficiency acquired through training and practice
3) Social/ professional role and identity (A coherent set of behaviors and displayed personal qualities of an individual in a social or work setting)	Professional identity: the characteristics by which an individual is recognized relating to, connected with or befitting a particular profession
	Professional role: the behavior considered appropriate for a particular kind of work or social position
	Social identity: the set of behavioral or personal characteristics by which an individual is recognizable (and portrays) as a member of a social group
	Identity: an individual's sense of self defined by a) a set of physical and psychological characteristics that is not wholly shared with any other person and b) a range of social and interpersonal affiliations (e.g. ethnicity) and social roles
	Professional boundaries
	Professional confidence: an individual's belief in his or her repertoire of skills, and ability especially as it is applied to a task or set of tasks
	Group identity: the image of a group (e.g. reputation, appraisal, expectations about) held by its members or by those external to the group; an individual's sense of self as defined by group membership
	Leadership: the processes involved in leading others, including organizing, directing, coordinating and motivating their efforts toward achievement of certain group or organization goals
	Organizational commitment: a distinctive pattern of

	thought and behavior shared by members of the same organization and reflected in their language, values, attitudes, beliefs and customs
4) Beliefs about capabilities (Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use)	Self-confidence: self-assurance or trust in one's own abilities, capabilities and judgment
	Perceived competence: an individual's belief in his or her ability to learn and execute skills
	Self-efficacy: an individual's capacity to act effectively to bring about desired results, as perceived by the individual
	Perceived behavioral control: authority, power, or influence over events, behaviors, situations or people
	Beliefs: the thing believed; the proposition or set of propositions held true
	Self-esteem: degree to which the qualities and characteristics contained in one's self-concept are perceived to be positive
	Empowerment: the promotion of the skills, knowledge and confidence necessary to take great control of one's life as in certain educational or social schemes; the delegation of increased decision-making powers to individuals or groups in a society or organization
	Professional confidence: an individual's belief in his or her repertoire of skills, and ability especially as it is applied to a task or set of tasks
5) Optimism (The confidence that things will happen for the best or that desired)	Optimism: attitude that outcomes will be positive and that people's wishes or aims will ultimately be fulfilled

goals will be attained)	
	Pessimism: attitude that things will go wrong and that people's wishes or aims are unlikely to be fulfilled
	Unrealistic optimism: return or recompense made to, or received by a person contingent on some performance
	Identity: an individual's sense of self defined by a) a set of physical and psychological characteristics that is not wholly shared with any other person and b) a range of social and interpersonal affiliations (e.g. ethnicity) and social roles
6) Beliefs about consequences (Acceptance of the truth, reality, or validity about outcomes of a behavior in a given situation)	Beliefs
	Outcomes expectancies: cognitive, emotional, behavioral, and affective outcomes that are assumed to be associated with future or intended behaviors. These assumed outcomes can either promote or inhibit future behaviors
	Characteristics of outcome expectancies: characteristics of the cognitive, emotional, and behavioral outcomes that individuals believe are associated with future or intended behaviors and that are believed to either promote or inhibit these behaviors.
	Anticipated regret: a sense of the potential negative consequences of a decision that influences the choice made
	Consequents
7) Reinforcement (Increasing the probability of a response by arranging a dependent	Rewards (proximal/distal, valued/not valued, probable/improbable)

relationship, or contingency, between the response and a given stimulus)	
	Incentives: an external stimulus, such as condition or object, that enhances or serves as a motive for behavior
	Punishment: the process in which the relationship between a response and some stimulus or circumstance results in the response becoming less probable; a painful, unwanted or undesired event or circumstance imposed as a penalty on a wrongdoer
	Consequents: an outcome of a behavior in a given situation
	Reinforcement: the process in which the frequency of a response is increased by a dependent relationship or contingency with a stimulus
	Contingencies
	Sanctions: a punishment or other coercive measure, usually administered by a recognized authority, that is used to penalize and deter inappropriate or unauthorized actions
8) Intentions (A conscious decision to perform a behavior or a resolve to act in a certain way)	Stability of intentions: ability of one's resolve to remain in spite of disturbing influences
	Stages of change model: a model that proposes that behavior change is accomplished through 5 specific stages: precontemplation, contemplation, preparation, action, maintenance
	Transtheoretical model and stages of change: a model that proposes that behavior change is accomplished through 5 specific stages: precontemplation, contemplation, preparation, action, maintenance

<p>9) Goals (Mental representations of outcomes or end states that an individual wants to achieve)</p>	<p>Goals (distal/proximal): Distal: ultimate level of performances to be achieved. Proximal: preliminary levels of performances to be achieved while working toward distal*</p>
	<p>Goal priority: order of importance or urgency of end states toward which one is striving</p>
	<p>Goal/target setting: process that establishes specific time-based behavior targets that are measurable, achievable, and realistic.</p>
	<p>Goals (autonomous/ controlled): assuredness of one's resolve to act in a certain way</p>
	<p>Action planning: the action or process of forming a plan regarding a thing to be done or a deed</p>
	<p>Implementation intention: the plan that one creates in advance of when, where, and how one will enact a behavior</p>
<p>10) Memory, attention and decision processes (The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives)</p>	<p>Memory: the ability to retain information or a representation of past experience, based on the mental processes; specific information or a specific past experience that is recalled</p>
	<p>Attention: Focus on certain aspects of the environment rather than on others</p>
	<p>Attention control: action selection is held to be controlled by choices between routine functions that are performed automatically and nonroutine situations involving decision making</p>
	<p>Decision making: cognitive processes of choosing between two or more alternatives, ranging from the relatively clear cut to the complex</p>

	Cognitive overload/tiredness: the situation in which the demands placed on a person by mental work are greater than a person's mental abilities
11) Environmental context and resources (Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior)	Environmental stressors: External factors that requires one to change in some way (causing stress); stressors that are found in our surroundings*
	Resources/material resources: : Assets that can be utilized to function effectively*
	Organizational culture/ climate: A system of shared assumptions, values, and beliefs, which governs how people behave. Dictate how they perform their jobs*
	Salient events/critical incidents: Most important, noticeable*
	Person x environment interaction: The properties of the environment (benefits, reinforcers, satisfiers, payoffs) that correspond to the desires of the person (abilities, demands); match between individuals and environments (congruence, fit)*
	Barriers and facilitators: in psychological contexts barriers/facilitators are mental, emotional or behavioral limitations/strengths in individuals or groups
12) Social influences (Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviors)	Social pressure: The exertion of influence on a person or group by another person or group. [like Group Pressure, social pressure include rational argument and persuasion, calls for conformity. Demands, threats, personal attacks, rewards, social approval

	Social norms: any of the socially determined consensual standards that indicate what behaviors are considered typical in a given context and what behaviors are considered proper in the context
	Group conformity
	Social comparisons: people evaluate their abilities and attitudes in relation to those of others
	Group norms: See Social Norms
	Social support: the provision of assistance or comfort to others
	Power: the capacity to influence others
	Intergroup conflict: disagreement or confrontation between two or more groups and their members
	Alienation: estrangement from one's social group; a deep-seated sense of dissatisfaction with one's personal experiences that can be a source of lack of trust in one's social or physical environment or in oneself; the experience of separation between thoughts and feelings
	Group identity: the image of a group held by its members or by those external to the group; an individual's sense of self as defined by group membership
	Modeling: learning occurring through observation and imitation
13) Emotion (A complex reaction pattern, involving experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event)	Fear: an intense emotion aroused by the detection of imminent threat, involving an immediate alarm reaction that mobilizes the organism by triggering a set of physiological changes

	Anxiety: a mood state characterized by apprehension and somatic symptoms of tension in which an individual anticipates impending danger, catastrophe or misfortune
	Affect: an experience or feeling of emotion, ranging from suffering to elation, from the simplest to the most complex sensations of feelings, and from the most normal to the most pathological emotional reactions
	Stress: a state of physiological or psychological response to internal or external stressors
	Depression: a mental state that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration
	Positive/negative affect: the internal feeling/state that occurs when a goal has/has not been attained, a source of threat has/has not been avoided, or the individual is/is not satisfied with the present state of affairs
	Burn-out: physical, emotional or mental exhaustion, especially in one's job or career, accompanied by decreased motivation, lowered performance and negative attitudes towards oneself and others
14) Behavioral regulation (Anything aimed at managing or changing objectively observed or measured actions)	Self-monitoring: a method used in behavioral management in which individuals keep a record of their behavior, especially in connection with efforts to change or regulate the self
	Breaking habit: to discontinue a behavior or sequence of behaviors that is automatically activated by relevant situational cues
	Action planning: the action or process of forming a plan regarding a thing to be done or a deed

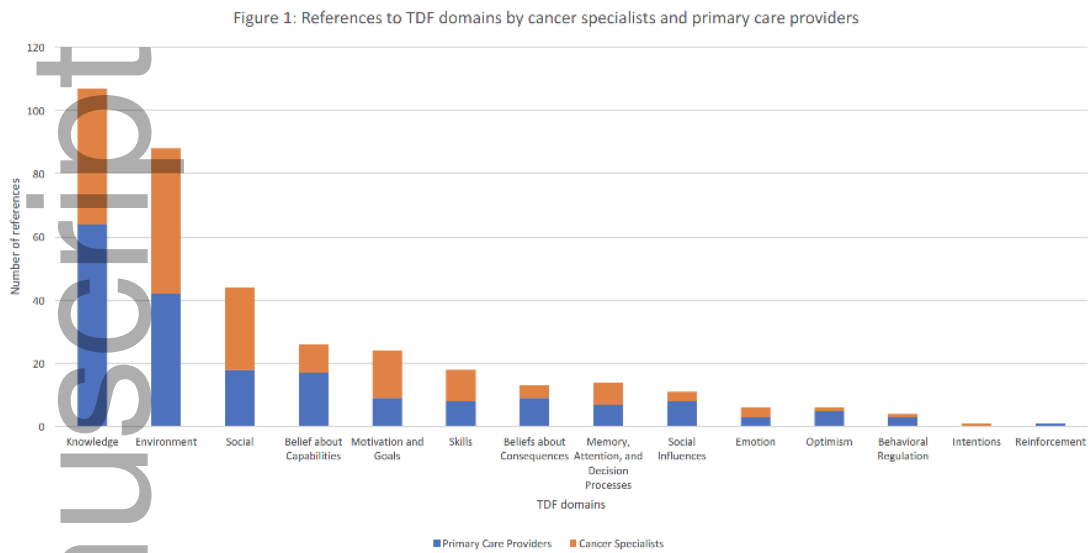
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Figure 1. References to TDF domains by PCPs and cancer specialists

*TDF = theoretical domains framework

Figure 2. Perceptions of TDF domains as positive determinants (facilitators) or negative determinants (barriers) to quality prostate cancer survivorship care according to provider type

