

Appendix D. Methodology and Results of EFA and CFA Used to Develop the SCQI

Appendix D:

**Methodology and Results of Exploratory and
Confirmatory Factor Analysis Used to Develop the
Survivorship Care Quality Index**

To validate the Survivorship Care Quality Framework and develop the Survivorship Care Quality Index (SCQF&I), the study team conducted a national survivor survey with breast, prostate and colorectal cancer survivors (n=1,278). We identified patient priorities in the 68-item national survey to validate the results from the focus groups and demonstrate generalizability of the SCQF, which resulted from the qualitative analysis. The study team then conducted exploratory and confirmatory factor analysis (EFA/CFA) using SAS® version-9.3. to operationalize the components identified within the SCQF with individual items. Items were deemed a “priority” for cancer survivors if 40% or more responses were reported as “very important” or “absolutely essential.” The scale used in the national survey was a 5-point scale where 1=not important, 2=somewhat important, 3=important, 4=very important, and 5=absolutely essential.

We identified a total of 42 items as priorities and hypothesized how they lined up within the 10 components of survivorship reflected in the Survivorship Care Quality Framework. These items were included in the EFA/CFA to determine whether and on which factors they loaded. Factors in the EFA/CFA were the 10 original components in the SCQF (See Diagram 1). To conduct the EFA/CFA, the sample of survey respondents was randomly split into testing (n=639) and validation (n=639) groups. EFA was run with no predetermined factor structure and no restrictions to explore factor structure. The principal axis factor method, with an oblique rotation, was used because we anticipated moderate correlations between factors. All items were expected to load onto a single construct, and factor loadings were expected to be > 0.4 for each item. The internal consistency reliability, Cronbach’s alpha, was estimated for each factor.

EFA results supported the hypothesized structure with one exception, which reduced the number of factors from 10 to 9. The preliminary qualitative framework structure included the factor *access to care*; however, item 1 from this component had a factor loading >0.4 on *provision of full spectrum of services* and item 2 from the factor *access to care* had a factor loading >0.4 on *Coordination and transitions across providers*. Thus, the *access to care* factor was eliminated and the EFA results were used in the subsequent CFA analysis.

Diagram 1: Path Diagram of Survivorship Care Quality Index Factors and Items

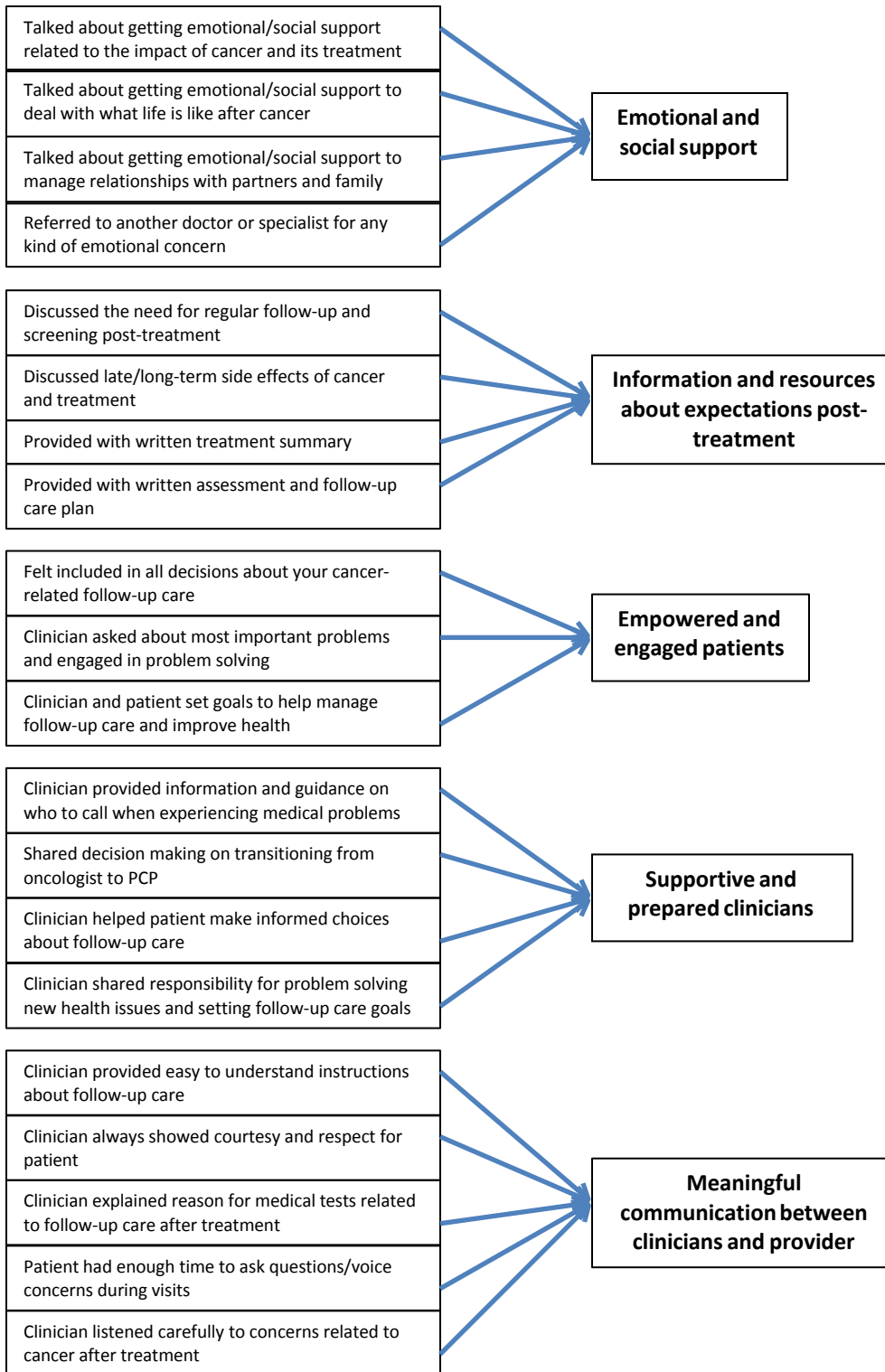


Diagram 1: Continued

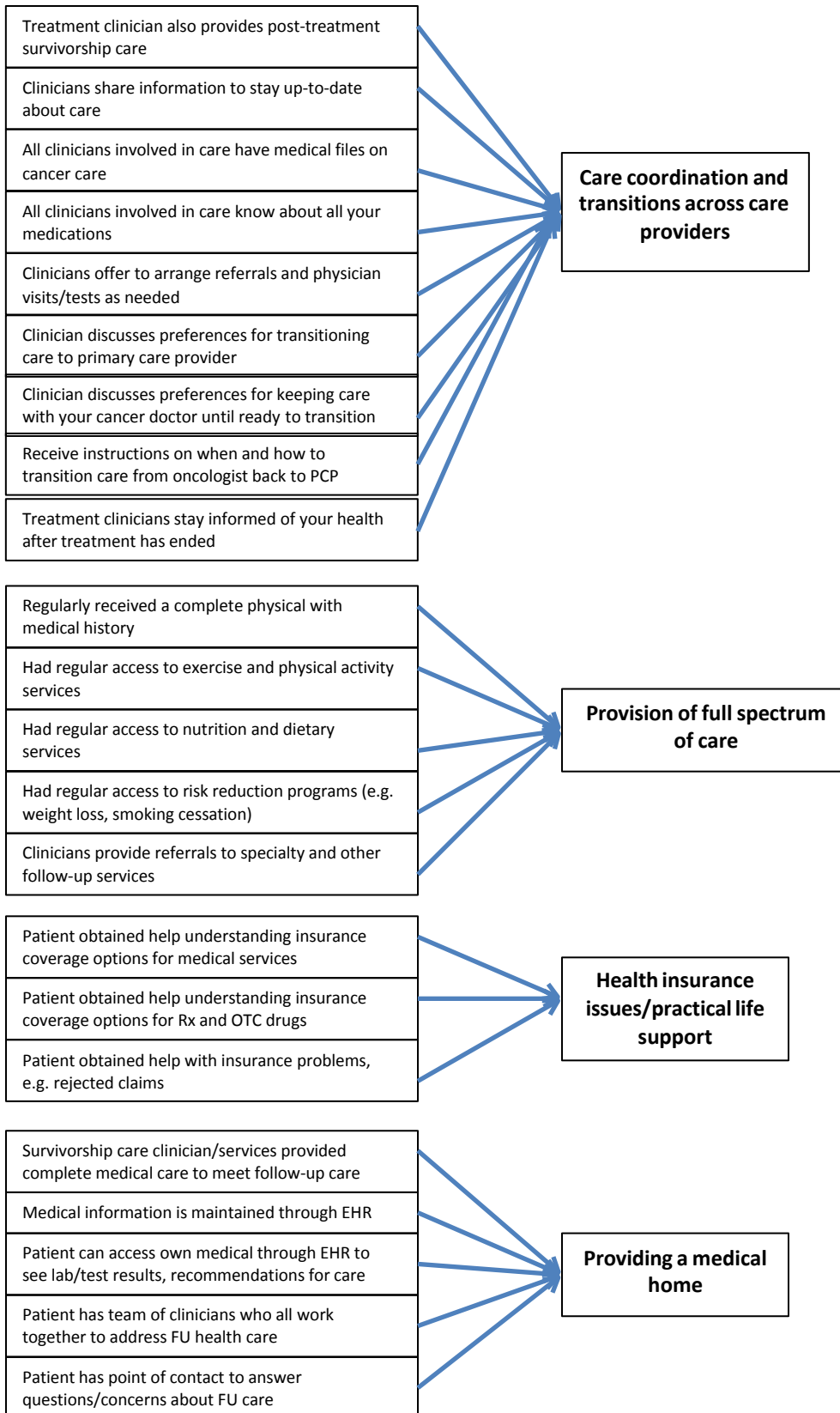


Table 1 lists the number of items in each factor, its alpha, and the mean (s.d.) for the respective factor score. All factors have an alpha >0.75 (most are above 0.86) demonstrating that each factor has a patterned relationship among the items. The correlation matrix between the final 9 factors is significant ($p < .001$) validating the overall theoretical premise and structure of the preliminary qualitative framework (see Table 2).

Table 1: Results of Exploratory Factor Analysis by Component

Item Description: "How important is it that you(r)":	Actual # of Items used	Mean (s.d.)	alpha
<i>Component A: Informed and Grounded Patient</i>			
<i>Factor 1: Mental health and social support</i>			
-Talk with clinician about getting emotional/social support related to the impact of cancer and its treatment	4	2.63 (1.18)	0.90
-Talk with clinician about getting emotional/social support to deal with what life is like after cancer			
-Talk with clinician about getting emotional/social support to manage relationships with partners and family			
-Clinician can give referrals to another doctor or specialist for any kind of emotional concern			
<i>Factor 2: Expectations post-treatment / Information and resources</i>			
-Discuss the need for regular follow-up and screening post-treatment with your clinician	4	3.20 (1.18)	0.90
-Discuss late/long-term side effects of cancer and treatment with your clinician			
-Clinician provides a written treatment summary			
-Clinician provides a written assessment and follow-up care plan			
<i>Component B: Productive partnerships</i>			
<i>Factor 3: Empowered and engaged patients</i>			
-Feel included in all decisions about your cancer-related follow-up care	3	4.06 (0.86)	0.87
-Know as much as you can about health problems and how to take care of them			
-Feel in control and can manage follow-up care to improve health			
<i>Factor 4: Respectful and supportive providers</i>			
-Clinician provides information and guidance on who to call when experiencing medical problems	4	3.18 (1.09)	0.86
-Clinician and you share in decision making on transitioning from oncologist to PCP			
-Clinician helps you make informed choices to follow through on follow-up care			
-Clinician shares responsibility for problem solving new health issues			

<i>Factor 5: Communication with clinicians</i>			
-Clinician explains things in a way that is easy to understand about follow-up care			
-Clinician always shows courtesy and respect for patient	5	3.57 (1.05)	0.93
-Clinician explains reason for medical tests related to follow-up care after treatment			
-Have enough time to ask questions/voice concerns during visits			
-Clinician listens carefully to concerns related to cancer after treatment			
Component C: Supportive Health and Wellness			
<i>Factor 6: Coordination of care and Transitions across care providers</i>			
-Treatment clinician also provides post-treatment survivorship care			
-Clinicians share information to stay up-to-date about care			
-All clinicians involved in care have medical files on cancer care			
-All clinicians involved in care know about all your medications			
- Clinicians offer to arrange referrals and physician visits/tests as needed			
-Clinician discusses preferences for transitioning care to primary care provider	9	3.66 (0.90)	0.90
-Clinician discusses preferences for keeping care with your cancer doctor until you feel ready to transition care			
-Receive instructions on when and how to transition care from oncologist back to PCP			
-Treatment clinicians stay informed of your health after treatment has ended			
<i>Factor 7: Provision of full spectrum of care</i>			
-Regularly receive a complete physical with medical history			
-Have regular access to exercise and physical activity services			
-Have regular access to nutrition and dietary services	5	3.48 (0.86)	0.79
-Have regular access to risk reduction programs (e.g. weight loss, smoking cessation)			
-Clinicians provide referrals to specialty and other follow-up services			
<i>Factor 8: Health insurance issues/practical life support</i>			
-Have help understanding insurance coverage options for medical services			
-Have help understanding insurance coverage options for Rx and OTC drugs	3	3.46 (1.13)	0.91
- Have help with insurance problems, e.g. rejected claims			
<i>Factor 9: Wanting a medical home</i>			
-Have a regular doctor or place after treatment where you can get complete medical care to meet follow-up care needs			
-Medical information is maintained through EHR where all your clinicians can access it	5	3.46 (0.99)	0.87
-Can access own medical records through EHR to see lab/test results, recommendations for care			
-Have team of clinicians who all work together to address FU health care			
-Have a point of contact to answer questions/concerns about FU care			
Total	42		

Table 2: Exploratory Factor Analysis Correlation Matrix

Component #	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1.00								
C2	0.63	1.00							
C3	0.39	0.64	1.00						
C4	0.76	0.80	0.54	1.00					
C5	0.63	0.76	0.64	0.83	1.00				
C6	0.61	0.68	0.55	0.71	0.71	1.00			
C7	0.63	0.64	0.56	0.65	0.64	0.71	1.00		
C8	0.61	0.58	0.48	0.64	0.58	0.63	0.60	1.00	
C9	0.61	0.69	0.61	0.78	0.80	0.65	0.61	0.59	1.00

N=638-639; all correlation sig $p < .0001$

Following the EFA, CFA was conducted using the validation sample to support the factor structure in the testing sample. Standard fit statistics and modification indices (e.g., RMSEA, CFI) were examined to identify the final model. Model fit was improved by freeing correlations between items across factors. The model achieved acceptable fit (RMSEA < 0.10, CFI & NNFI \geq 0.9) without modifications to the EFA specification of items per factor. Fit was improved by estimating 14 covariances between items across domains with large Lagrange Multiplier estimates (See Table 5 for items with 14 error covariances). The fit statistics for the models tested are displayed in Table 3. The CFA final model with standardized factor loadings, standard error and composite reliability by factor is presented in Table 4. All standardized estimates are significant at $p < .001$, and are of moderate to strong magnitude. All factors have a composite reliability value above 0.6 (the lowest value is CR=0.75), demonstrating that composite reliability for each construct has been achieved. Based on the final CFA, we developed the SCQI as the measurement tool of quality survivorship care for the CER (See Appendix G for the survey instrument).

Table 3: Confirmatory factor analysis model fit statistics

Fit Statistics				
Model	Chi-square (df)	RMSEA (90% CI)	CFI	NNFI
Original	4028 (783)	0.086 (0.084-0.089)	0.83	0.81
Mod (14 COV)	2688 (769)	0.063 (0.060-0.065)	0.92	0.91

Table 4: Confirmatory Factor Analysis Final Model by Quality Component

CFA Final Model by Item with standardized factor loading, standard error, and composite reliability	
Item Description: “How important is it that you(r)”: α=composite reliability by component	Standardized Estimate (std. err.)
Component A: INFORMED AND GROUNDED PATIENT	
Factor 1: Mental health and social support (α=0.89)	
Talk with clinician about getting emotional/social support related to the impact of cancer and its treatment	0.86 (0.02)
Talk with clinician about getting emotional/social support to deal with what life is like after cancer	0.82 (0.02)
Talk with clinician about getting emotional/social support to manage relationships with partners and family	0.76 (0.02)
Clinician can give referrals to another doctor or specialist for any kind of emotional concern	0.82 (0.02)
Factor 2: Information and Resources about expectations post-treatment (α=0.87)	
Discuss the need for regular follow-up and screening post-treatment with your clinician	0.76 (0.02)
Discuss late/long-term side effects of cancer and treatment with your clinician	0.79 (0.02)
Clinician provides a written treatment summary	0.77 (0.02)
Clinician provides a written assessment and follow-up care plan	0.85 (0.02)
Component B: THE PATIENT-PROVIDER ALLIANCE	
Factor 3: Empowered and engaged patients (α=0.87)	
Feel included in all decisions about your cancer-related follow-up care	0.77 (0.02)
Know as much as you can about health problems and how to take care of them	0.85 (0.02)
Feel in control and can manage follow-up care to improve health	0.88 (0.01)
Factor 4: Supportive and prepared providers (α=0.86)	
Clinician provides information and guidance on who to call when experiencing medical problems	0.73 (0.02)
Clinician and you share in decision making on transitioning from oncologist to PCP	0.81 (0.02)
Clinician helps you make informed choices to follow through on follow-up care	0.79 (0.02)
Clinician shares responsibility for problem solving new health issues	0.78 (0.02)
Factor 5: Communication with clinicians (α=0.91)	
Clinician explains things in a way that is easy to understand about follow-up care	0.84 (0.01)
Clinician always shows courtesy and respect for patient	0.77 (0.02)
Clinician explains reason for medical tests related to follow-up care after treatment	0.86 (0.01)
Have enough time to ask questions/voice concerns during visits	0.79 (0.02)
Clinician listens carefully to concerns related to cancer after treatment	0.82 (0.02)
Component C: SUPPORTIVE HEALTH AND WELLNESS	

Factor 6: Coordination of care and transitions across care providers ($\alpha=0.89$)	
-Treatment clinician also provides post-treatment survivorship care	0.44 (0.04)
-Clinicians share information to stay up-to-date about care	0.82 (0.02)
-All clinicians involved in care have medical files on cancer care	0.83 (0.02)
-All clinicians involved in care know about all your medications	0.82 (0.02)
- Clinicians offer to arrange referrals and physician visits/tests as needed	0.83 (0.02)
-Clinician discusses preferences for transitioning care to primary care provider	0.61 (0.03)
-Clinician discusses preferences for keeping care with your cancer doctor until you feel ready to transition care	0.63 (0.03)
-Receive instructions on when and how to transition care from oncologist back to PCP	0.62 (0.03)
-Treatment clinicians stay informed of your health after treatment has ended	0.55 (0.03)
Factor 7: Provision of full spectrum of care ($\alpha=0.75$)	
-Regularly receive a complete physical with medical history	0.66 (0.03)
-Have regular access to exercise and physical activity services	0.56 (0.03)
-Have regular access to nutrition and dietary services	0.61 (0.03)
-Have regular access to risk reduction programs (e.g. weight loss, smoking cessation)	0.59 (0.03)
-Clinicians provide referrals to specialty and other follow-up services	0.66 (0.03)
Factor 8: Health insurance issues/practical life support ($\alpha=0.90$)	
-Have help understanding insurance coverage options for medical services	0.88 (0.01)
-Have help understanding insurance coverage options for Rx and OTC drugs	0.92 (0.01)
- Have help with insurance problems, e.g. rejected claims	0.81 (0.02)
Factor 9: Wanting a medical home ($\alpha=0.85$)	
-Have a regular doctor or place after treatment where you can get complete medical care to meet follow-up care needs	0.79 (0.02)
-medical information is maintained through EHR where all your clinicians can access it	0.66 (0.03)
-Can access own medical records through EHR to see lab/test results, recommendations for care	0.61 (0.03)
-have team of clinicians who all work together to address FU health care	0.73 (0.02)
-have a point of contact to answer questions/concerns about FU care	0.82 (0.02)
<i>All standardized estimates are significant at $p < .001$</i>	

Table 5: 14 covariance between items for final CFA model

1	Received instructions on how to move your overall care from oncologist back to PCP	Clinician discusses preferences for transitioning care to PCP
2	Treatment clinicians stay informed of your health after treatment has ended	Clinician discusses preferences for keeping care with your cancer doctor until you feel ready to transition care
3	Discuss late/long-term side effects of cancer and treatment with your clinician	Discuss the need for regular follow-up and screening post-treatment with your clinician
4	Medical information is maintained through EHR where all your clinicians can access it	Can access own medical records through EHR to see lab/test results,

		recommendations for care
5	Talk with clinician about getting emotional/social support to deal with what life is like after cancer	Talk with clinician about getting emotional/social support to manage relationships with partners and family
6	Treatment clinicians stay informed of your health after treatment has ended	Treatment clinician also provides post-treatment survivorship care
7	Have regular access to exercise and physical activity services	Have regular access to nutrition and dietary services
8	Clinician listens carefully to concerns related to cancer after treatment	Have enough time to ask questions/voice concerns during visits
9	Have regular access to risk reduction programs (e.g. weight loss, smoking cessation)	Have regular access to nutrition and dietary services
10	Clinician discusses preferences for keeping care with your cancer doctor until you feel ready to transition care	Treatment clinician also provides post-treatment survivorship care
11	Clinician always shows courtesy and respect for patient	Clinician listens carefully to concerns related to cancer after treatment
12	Clinician provides a written assessment and follow-up care plan	Clinician provides a written treatment summary
13	Can access own medical records through EHR to see lab/test results, recommendations for care	Clinician provides a written treatment summary
14	Clinician always shows courtesy and respect for patient	Have enough time to ask questions/voice concerns during visits