

Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Needs Assessment Survey

Section I. About you

1. Education
 - a. Some high school
 - b. High school graduate
 - c. Some college
 - d. College graduate
 - e. More than college graduate
2. Insurance at diagnosis (select all that apply)
 - a. Private insurance
 - b. Medicare
 - c. Medicaid
 - d. I don't have health insurance
3. Current insurance (select all that apply)
 - a. Private insurance
 - b. Medicare
 - c. Medicaid
 - d. I don't have health insurance
4. Do you have a primary care provider
 - a. Yes
 - b. No
5. Living arrangements
 - a. Single or divorced or widowed
 - b. Married
 - c. Live alone
 - d. Live with friend, family, partner
6. Household income
 - a. <\$30,000
 - b. \$30,000-\$50,000
 - c. \$50,000-\$75,000
 - d. \$75,000-\$100,000
 - e. >\$100,000
7. Did your employment status change with cancer
 - a. Yes
 - b. No
8. If employment status changed, select all that apply
 - a. Lost job
 - b. Disability
 - c. Unemployment benefits
9. Current employment
 - a. Currently working
 - b. Retired
 - c. Unemployed

Section II. Your needs and concerns

As a cancer survivor, you may experience some lasting side effects from your treatment. Please rate each topic according to how much of a need it is for you today. Please select the number on the scale from 1 (no need) to 5 (high need). Selecting 1 would indicate that you have no need and that this was not a problem for you as a result of having cancer. Selecting 5 would indicate that you have high need for additional help, and that this caused you a lot of concern or discomfort.

Section IIa. Physical effects (1=no need, 5=high need)

1. Pain
2. Fatigue
3. Sleep disturbance
4. Memory and concentration
5. Nausea/vomiting
6. Poor appetite
7. Trouble swallowing
8. Dental or mouth problems
9. Trouble breathing
10. Weight change
11. Balance/mobility
12. Weakness
13. Numbness or tingling (neuropathy)
14. Swelling in arms or legs (lymphedema)
15. Osteoporosis/bone health
16. Hair or skin changes
17. Bowel or bladder changes
18. Hot flashes
19. Sexual and intimacy issues
20. Fertility issues

Section IIb. Social issues (1=no need, 5=high need)

1. Managing daily activities
2. Returning to work
3. Health insurance
4. Financial concerns

Section IIc. Emotional needs (1=no need, 5=high need)

1. Defining a new sense of normal
2. Living with uncertainty
3. Fear of recurrence
4. Managing difficult emotions: anger, fear, anxiety, depression

Section IId. Medical needs (1=no need, 5=high need)

1. Who to call for medical problems
2. Who to call for follow up appointments and tests
3. Finding support resources

4. Keeping your primary care physicians informed of your cancer care

eTable 1. Respondents With Completed vs Uncompleted Surveys

Sociodemographic factors	Overall	Complete Survey	Incomplete Survey	Declined	Withdrawn	p
N (%)	360	232 (64.44)	35 (9.72)	32 (8.89)	61 (16.94)	
Age						
< 65 years	137 (38.06)	85 (36.64)	13 (37.14)	8 (25)	31 (50.82)	0.08
>= 65 years	223 (61.94)	147 (63.36)	22 (62.86)	24 (75)	30 (49.18)	
Median Age	68 (60-75)	69 (60.5-75)	68 (61-75)	71.5 (63.5-76.5)	64 (57-73)	0.09
Sex						
Female	214 (59.44)	144 (62.07)	23 (65.71)	17 (53.13)	30 (49.18)	0.22
Male	146 (40.56)	88 (37.93)	12 (34.29)	15 (46.88)	31 (50.82)	
Race						
African-American	70 (19.44)	33 (14.22)	5 (14.29)	10 (31.25)	22 (36.07)	0.003
Caucasian	248 (68.89)	172 (74.14)	27 (77.14)	17 (53.13)	32 (52.46)	
Other*	42 (11.67)	27 (11.64)	3 (8.57)	5 (15.63)	7 (11.48)	
Smoking status						
Current/Former	229 (63.61)	144 (62.07)	20 (57.14)	24 (75)	41 (67.21)	0.39
Never	131 (36.39)	88 (37.93)	15 (42.86)	8 (25)	20 (32.79)	
Marital Status						
Married	249 (69.17)	165 (71.12)	19 (54.29)	23 (71.88)	42 (68.85)	0.45
Divorced/Single/Widowed	110 (30.56)	66 (28.45)	16 (45.71)	9 (28.13)	19 (31.15)	
Unknown	1 (0.28)	1 (0.43)	0 (0)	0 (0)	0 (0)	
Treatment History						
Stage at Diagnosis						
Stage I	105 (29.17)	70 (30.17)	12 (34.29)	10 (31.25)	13 (21.31)	0.11
Stage II	36 (10)	22 (9.48)	6 (17.14)	2 (6.25)	6 (9.84)	
Stage III	81 (22.5)	43 (18.53)	6 (17.14)	11 (34.38)	21 (34.43)	
Stage IV	138 (38.33)	97 (41.81)	11 (31.43)	9 (28.13)	21 (34.43)	
Tumor Histology						
Adenocarcinoma	288 (80)	194 (83.62)	24 (68.57)	29 (90.63)	41 (67.21)	0.02

Squamous	39 (10.83)	23 (9.91)	6 (17.14)	1 (3.13)	9 (14.75)	
Other	33 (9.17)	15 (6.47)	5 (14.29)	2 (6.25)	11 (18.03)	
ECOG at time of survey						
0	163 (45.28)	110 (47.41)	15 (42.86)	16 (50)	22 (36.07)	0.39
1	160 (44.44)	103 (44.4)	16 (45.71)	13 (40.63)	28 (45.9)	
2+	37 (10.28)	19 (8.19)	4 (11.43)	3 (9.38)	11 (18.03)	
Time since diagnosis						
1 - < 2 years	101 (28.06)	65 (28.02)	12 (34.29)	12 (37.5)	12 (19.67)	0.41
2 - < 5 years	163 (45.28)	101 (43.53)	16 (45.71)	12 (37.5)	34 (55.74)	
>= 5 years	96 (26.67)	66 (28.45)	7 (20)	8 (25)	15 (24.59)	
Types of therapy every received						
Surgery						
No	172 (47.78)	107 (46.12)	17 (48.57)	16 (50)	32 (52.46)	0.83
Yes	188 (52.22)	125 (53.88)	18 (51.43)	16 (50)	29 (47.54)	
Radiation						
No	142 (39.44)	97 (41.81)	12 (34.29)	10 (31.25)	23 (37.7)	0.59
Yes	218 (60.56)	135 (58.19)	23 (65.71)	22 (68.75)	38 (62.3)	
Chemotherapy						
No	141 (39.17)	95 (40.95)	14 (40)	13 (40.63)	19 (31.15)	0.57
Yes	219 (60.83)	137 (59.05)	21 (60)	19 (59.38)	42 (68.85)	
Immunotherapy						
No	225 (62.5)	151 (65.09)	20 (57.14)	18 (56.25)	36 (59.02)	0.59
Yes	135 (37.5)	81 (34.91)	15 (42.86)	14 (43.75)	25 (40.98)	
Targeted therapy						
No	220 (61.11)	135 (58.19)	26 (74.29)	22 (68.75)	37 (60.66)	0.24
Yes	140 (38.89)	97 (41.81)	9 (25.71)	10 (31.25)	24 (39.34)	
Lines of systemic therapy						
0	69 (19.17)	45 (19.4)	8 (22.86)	8 (25)	8 (13.11)	0.48

1+	291 (80.83)	187 (80.6)	27 (77.14)	24 (75)	53 (86.89)	
Active therapy						
No	191 (53.06)	117 (50.43)	23 (65.71)	19 (59.38)	32 (52.46)	0.33
Yes	169 (46.94)	115 (49.57)	12 (34.29)	13 (40.63)	29 (47.54)	
Intent of last or active therapy						
Curative	151 (41.94)	92 (39.66)	19 (54.29)	18 (56.25)	22 (36.07)	0.10
Palliative	209 (58.06)	140 (60.34)	16 (45.71)	14 (43.75)	39 (63.93)	
Second primary malignancy						
No	236 (65.56)	148 (63.79)	23 (65.71)	23 (71.88)	42 (68.85)	0.76
Yes	124 (34.44)	84 (36.21)	12 (34.29)	9 (28.13)	19 (31.15)	
Type of second primary malignancy						
Lung only	16 (12.9)	8 (9.52)	2 (16.67)	3 (33.33)	3 (15.79)	0.15
Lung and/or other type	108 (87.1)	76 (90.48)	10 (83.33)	6 (66.67)	16 (84.21)	
Outpatient palliative care						
Yes	46 (12.78)	32 (13.79)	4 (11.43)	0 (0)	10 (16.39)	0.07
No	314 (87.22)	200 (86.21)	31 (88.57)	32 (100)	51 (83.61)	

*includes American Indian or Alaska Native, Asian, or Native Hawaiian and Other Pacific Islander.

eTable 2. Univariate Analysis of Unmet Needs and Quality of Life (QOL) and Comprehensive Score for Financial Toxicity (COST)

Factor	EORTC-Global Health Status/QOL Score (Median (IQR))	p	COST – Financial Toxicity Score (Median (IQR))	p
Sociodemographic factor				
Age				
< 65 years	66.67	0.66	25 (20-32)	0.01
>= 65 years	66.67		28(24.2-35)	
Sex				
Female	66.67 (50-83.33)	0.64	28 (22-33)	0.89
Male	66.67 (50-83.33)		27.75 (22-34)	
Race				
African-American	66.67 (50-83.33)	0.60	28 (20-34)	0.19
Caucasian	66.67 (50-83.33)		28 (24-34)	
Other	66.67 (50-75)		25 (17-33)	
Smoking status				
Current/Former	66.67 (50-83.33)	0.03	28 (23.5-34)	0.70
Never	70.83 (54.17-83.33)		27 (21-34)	
Marital Status				
Married	66.67 (50-83.33)	0.43	28 (23-34)	0.91
Divorced/Single/Widowed	66.67 (50-83.33)		27.75 (21-34)	
Unknown	83.33 (83.33-83.33)		27.5 (27.5-27.5)	
Household Income				
< \$30,000	62.5 (50-66.67)	0.12	20.5 (17-26)	0.0003
\$30,000-\$75,000	66.67 (50-83.33)		27 (21-32)	
>\$75,000	66.67 (50-83.33)		28 (24-36)	
Employment				
Employed	75 (58.33-83.33)	0.01	27 (20-33)	0.0006
Retired	66.67 (50-83.33)		28 (25-36)	
Unemployed/No response	58.33 (50-66.67)		23.83 (15-29)	
Education				
High school or less	58.33 (50-75)	0.09	25 (17-31)	0.05
Some college or more	66.67 (50-83.33)		28 (23.83-34)	
No response	50 (50-50)		39 (39-39)	
Living arrangements				
Married/live with friend/family/partner	66.67 (50-83.33)	0.69	28 (23-34)	0.28
Single/divorced/widowed/live alone	66.67 (50-83.33)		27.75 (21-34)	

No response	54.17 (33.33-75)		19.5 (19-20)	
Current insurance				
Private with or without Medicare	66.67 (50-83.33)	0.11	28 (23-34)	0.32
Medicare and/or Medicaid	66.67 (50-75)		26 (22-32)	
Treatment History				
Stage at Diagnosis				
Stage I	75 (50-83.33)	0.61	28 (24.2-36)	0.32
Stage II	66.67 (58.33-83.33)		27.75 (23-33)	
Stage III	66.67 (50-83.33)		28 (20-33)	
Stage IV	66.67 (50-83.33)		27 (21-32)	
Tumor Histology				
Adenocarcinoma	66.67 (50-83.33)	0.06	27.75 (23-34)	0.81
Squamous	58.33 (41.67-75)		30 (22-34)	
Other	66.67 (50-83.33)		25.3 (18-40)	
ECOG at time of survey				
0	75 (58.33-83.33)	<0.001	28 (21-35)	0.78
1	66.67 (50-75)		28 (23-33)	
2+	50 (41.67-58.33)		27 (22-33)	
Time since diagnosis				
1 - < 2 years	66.67 (50-83.33)	0.72	27 (20-34)	0.35
2 - < 5 years	66.67 (50-83.33)		28 (22-34)	
>= 5 years	75 (50-83.33)		28 (25-34)	
Types of therapy every received				
Surgery				
No	66.67 (50-83.33)	0.68	25 (20-32)	0.02
Yes	66.67 (50-83.33)		28 (25-34)	
Radiation				
No	66.67 (50-83.33)	0.03	30 (25-37)	0.001
Yes	66.67 (50-83.33)		27 (20-32)	
Chemotherapy				
No	75 (58.33-83.33)	0.005	28 (24-36)	0.05
Yes	66.67 (50-83.33)		27 (20-32)	
Immunotherapy				
No	66.67 (50-83.33)	0.03	28 (23.83-34)	0.17
Yes	66.67 (50-83.33)		27 (20-33)	
Targeted therapy				
No	66.67 (50-83.33)	0.42	28 (24-34)	0.11
Yes	66.67 (50-83.33)		26 (21-32)	
Lines of systemic therapy				
0	83.33 (58.33-83.33)	0.02	31 (27-37)	0.001
1+	66.67 (50-83.33)		27 (21-33)	
Active therapy				

No	66.67 (50-83.33)	0.73	29 (24-34)	0.02
Yes	66.67 (50-83.33)		26 (20-32)	
Time since last therapy (if no active therapy)				
< 1 year	66.67 (50-75)	0.03	29 (21-33)	0.34
1-2 years	75 (50-83.33)		28 (22.5-38.5)	
> 2 years	75 (58.33-83.33)		31 (27-36)	
Intent of last or active therapy				
Curative	75 (50-83.33)	0.09	28.5 (25-34)	0.02
Palliative	66.67 (50-83.33)		26 (20-32.5)	
Second primary malignancy				
No	66.67 (50-83.33)	0.72	27.75 (21.5-34)	0.52
Yes	66.67 (50-83.33)		28 (23.92-34)	
Type of second primary malignancy				
Lung only	70.83 (50-83.33)	0.88	32.82 (27.75-38)	0.09
Lung and/or other type	66.67 (50-83.33)		28 (21.5-33.5)	
Outpatient palliative care				
Yes	66.67 (41.67-83.33)	0.53	28 (22-34)	0.72
No	66.67 (50-83.33)		27 (21-33.5)	
Needs Assessment				
Total needs	-0.56287	< 0.0001	-0.41872	< 0.0001
Total physical needs	-0.44948	< 0.0001	-0.25964	< 0.0001
Total social needs	-0.44597	< 0.0001	-0.57606	< 0.0001
Total emotional needs	-0.3832	< 0.0001	-0.26786	< 0.0001
Total medical needs	-0.40987	< 0.0001	-0.31463	< 0.0001
Physical need				
Trouble breathing	-0.4173	< 0.0001	-0.15008	0.02
Fatigue	-0.56371	< 0.0001	-0.28287	< 0.0001
Sleep disturbance	-0.34882	< 0.0001	-0.2129	0.001
Pain	-0.43652	< 0.0001	-0.18102	0.006
Financial Toxicity (COST)	0.29099	< 0.0001		
EORTC				
Global Health Status/QoL Score			0.29099	< 0.0001
Physical Functioning			0.14483	0.03
Role Functioning			0.29056	< 0.0001
Emotional functioning			0.41071	< 0.0001
Cognitive functioning			0.20301	0.002
Social functioning			0.24362	0.0002

Fatigue			-0.27351	< 0.0001
Pain			-0.12484	0.06
Dyspnea			-0.16695	0.01

eTable 3. Multivariate Analysis of Quality of Life (QOL) and Total Needs

Parameter	Comparator vs Reference	Unadjusted		Adjusted	
		Beta (SE)	p	Beta (SE)	p
Age	>=65 vs < 65	2.07 (2.89)	0.47	-0.29 (2.54)	0.91
Sex	Female vs Male	-1.59 (2.87)	0.58	0.3 (2.45)	0.90
Race	African American vs Caucasian	2.75 (4.03)	0.44	4.96 (3.3)	0.25
	Other vs Caucasian	-4.24 (4.39)		-2.04 (3.73)	
Income	< \$30,000 vs \$75,000+	-8.14 (5.26)	0.27	1.67 (4.58)	0.46
	\$30,000-\$75,000 vs \$75,000+	-2.37 (3.25)		3.44 (2.74)	
Smoking status	Current/Former vs Never	-5.71 (2.85)	0.05	-4.79 (2.62)	0.07
ECOG PS	1 vs 0	-11.85 (2.7)	<.001	-8.76 (2.53)	<.001
	2+ vs 0	-25.79 (4.9)		-18.54 (4.45)	
Lines of systemic therapy	1+ vs 0	-7.28 (3.49)	0.04	3.26 (3.71)	0.38
Active therapy	Yes vs No	-0.71 (2.79)	0.80	1.73 (3.02)	0.57
Intent of active/last therapy	Palliative vs Curative	4.09 (2.84)	0.15	0.73 (3.08)	0.81
Any radiation	Yes vs No	-6.2 (2.79)	0.03	0.53 (2.48)	0.83
Financial Toxicity Score		0.69 (0.15)	<.0001	0.25 (0.15)	0.09
Total needs		-1.59 (0.15)	<0.0001	-1.37 (0.18)	<.001

eTable 4. Multivariate Analysis of Comprehensive Score for Financial Toxicity (COST) and Needs

eTable 4a. Multivariate analysis of COST and Specific Needs

Parameter	Comparator vs Reference	Unadjusted		Adjusted	
		Beta (SE)	p	Beta (SE)	p
Age	>=65 vs < 65	3.27 (1.19)	0.01	1.45 (1.09)	0.19
Sex	Female vs Male	0.2 (1.2)	0.87	0.48 (1.08)	0.65
Race	African American vs Caucasian	-0.76 (1.68)	0.28	-0.61 (1.48)	0.92
	Other vs Caucasian	-2.9 (1.83)		-0.02 (1.6)	
Income	< \$30,000 vs \$75,000+	-8.82 (2.13)	<.001	-4.69 (1.99)	0.05
	\$30,000-\$75,000 vs \$75,000+	-2.51 (1.32)		-1.39 (1.19)	
Smoking status	Current/Former vs Never	-0.26 (1.2)	0.83	-0.6 (1.14)	0.60
ECOG PS	1 vs 0	-0.16 (1.22)	0.71	1.73 (1.12)	0.30
	2+ vs 0	-1.84 (2.21)		1.34 (2.02)	
Lines of systemic therapy	1+ vs 0	-4.76 (1.44)	<0.01	-1.07 (1.59)	0.50
Active therapy	Yes vs No	-2.42 (1.16)	0.04	-1.94 (1.29)	0.13
Intent of active/last therapy	Palliative vs Curative	2.57 (1.18)	0.03	-0.1 (1.32)	0.94
Any radiation	Yes vs No	-4.03 (1.15)	<.001	-2.23 (1.06)	0.04
Global QOL Score		0.12 (0.03)	<.001	0.03 (0.03)	0.32
Total physical needs		-0.84 (0.2)	<.001	0.07 (0.23)	0.77

Total social needs		-4.14 (0.39)	<.001	-3.4 (0.53)	<.001
Total emotional needs		-1.61 (0.38)	<.001	0.09 (0.43)	0.84
Total medical needs		-1.9 (0.38)	<.0001	-0.11 (0.42)	0.79

eTable 4b. Multivariate analysis of COST and Total Needs

Parameter	Comparator vs Reference	Unadjusted		Adjusted	
		Beta (SE)	p	Beta (SE)	p
Age	>=65 vs < 65	3.27 (1.19)	0.01	2.3 (2.58)	0.05
Sex	Female vs Male	0.2 (1.2)	0.87	1.72 (2.54)	0.13
Race	African American vs Caucasian	-0.76 (1.68)	0.28	-0.81 (3.47)	0.34
	Other vs Caucasian	-2.9 (1.83)		-0.08 (3.78)	
Income	< \$30,000 vs \$75,000+	-8.82 (2.13)	<.001	-8.23 (4.75)	<.001
	\$30,000-\$75,000 vs \$75,000+	-2.51 (1.32)		-2.6 (2.79)	
Smoking status	Current/Former vs Never	-0.26 (1.2)	0.83	0.28 (2.68)	0.82
ECOG PS	1 vs 0	-0.16 (1.22)	0.71	2.1 (2.56)	0.67
	2+ vs 0	-1.84 (2.21)		2.61 (4.55)	
Lines of systemic therapy	1+ vs 0	-4.76 (1.44)	<0.01	-0.71 (3.76)	0.68
Active therapy	Yes vs No	-2.42 (1.16)	0.04	-1.73 (3.06)	0.21
Intent of active/last therapy	Palliative vs Curative	2.57 (1.18)	0.03	0.16 (3.11)	0.91

Any radiation	Yes vs No	-4.03 (1.15)	<.001	-2.57 (2.52)	0.02
Global QOL Score		0.12 (0.03)	<.001	0.05 (0.16)	0.09
Total needs		-0.5 (0.07)	<.001	-0.33 (0.45)	<0.01

eFigure. Lung Cancer Survivorship Care Framework

Cancer survivorship care quality framework for survivors of lung cancer (Framework adapted from Nekhlyudov et al. This work is written by US Government employees and is in the public domain in the US. Permission to adapt figure for survivors of lung cancer obtained from Dr. Nekhlyudov. Findings from our cross-sectional survey are included in italics.)

