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Appendix A: TCCS: 12 Month Effects

Treatment Groups and Sites	Enrolled	With 12m visit	Intervention Services						SMFA Dysfunction Index > 18.2				SMFA Bother Index > 23.7				Depression (PHQ-9) > 9				PTSD (PCL) > 35				Composite Outcome ^a			
			TSN Handbook	Peer Visit	Early Calls	RA	Post- RA Calls	Received all 5 services	n	Probability			n	Probability			n	Probability			n	Probability			n	Probability		
										<i>P_{unadj}</i>	<i>P_{ITT}</i>	<i>P_{full int}</i>		<i>P_{unadj}</i>	<i>P_{ITT}</i>	<i>P_{full int}</i>		<i>P_{unadj}</i>	<i>P_{ITT}</i>	<i>P_{full int}</i>		<i>P_{unadj}</i>	<i>P_{ITT}</i>	<i>P_{full int}</i>		<i>P_{unadj}</i>	<i>P_{ITT}</i>	<i>P_{full int}</i>
Control																												
Site A	41	27							27	0.81	0.73	0.73	24	0.67	0.61	0.61	26	0.54	0.44	0.44	26	0.62	0.54	0.54	23	0.78	0.74	0.74
Site B	84	70							70	0.60	0.59	0.59	70	0.50	0.47	0.47	70	0.29	0.26	0.26	70	0.37	0.34	0.34	70	0.63	0.62	0.62
Site C	119	92							92	0.59	0.67	0.67	89	0.45	0.56	0.56	92	0.25	0.32	0.32	92	0.36	0.39	0.39	89	0.65	0.72	0.72
Site D	34	29							29	0.59	0.72	0.72	28	0.36	0.50	0.51	29	0.07	0.14	0.15	29	0.24	0.41	0.41	28	0.61	0.73	0.74
Site E	79	69							69	0.65	0.62	0.62	67	0.58	0.54	0.54	69	0.30	0.26	0.26	69	0.39	0.36	0.36	67	0.66	0.63	0.63
Site F	62	57							57	0.60	0.65	0.66	56	0.46	0.55	0.55	57	0.25	0.28	0.28	57	0.28	0.36	0.36	56	0.62	0.68	0.68
Intervention																												
Site G	108	93	93 (100%)	76 (82%)	76 (82%)	91 (98%)	63 (68%)	45 (48%)	93	0.77	0.73	0.75	91	0.58	0.51	0.53	93	0.44	0.39	0.38	93	0.52	0.47	0.46	91	0.80	0.77	0.79
Site H	67	58	36 (62%)	29 (50%)	34 (59%)	50 (86%)	36 (62%)	16 (28%)	58	0.50	0.53	0.58	58	0.47	0.52	0.55	58	0.28	0.32	0.34	58	0.34	0.34	0.34	58	0.59	0.60	0.61
Site I	74	55	19 (35%)	24 (44%)	30 (55%)	44 (80%)	37 (67%)	7 (13%)	55	0.56	0.57	0.63	51	0.37	0.39	0.42	55	0.24	0.26	0.30	55	0.25	0.28	0.28	51	0.59	0.62	0.61
Site J	114	90	74 (82%)	38 (42%)	41 (46%)	81 (90%)	63 (70%)	12 (13%)	90	0.64	0.61	0.64	88	0.55	0.53	0.54	90	0.31	0.31	0.34	90	0.34	0.37	0.36	88	0.69	0.68	0.69
Site K	67	45	33 (73%)	16 (36%)	30 (67%)	43 (96%)	33 (73%)	8 (18%)	45	0.76	0.72	0.75	43	0.67	0.62	0.64	45	0.49	0.45	0.48	45	0.58	0.60	0.60	43	0.77	0.74	0.75
Site L	47	37	36 (97%)	28 (76%)	34 (92%)	36 (97%)	27 (73%)	20 (54%)	37	0.81	0.76	0.78	37	0.62	0.56	0.59	37	0.35	0.31	0.32	37	0.49	0.46	0.46	37	0.81	0.76	0.78
Control	419	344							344				334				343				343				333			
Intervention	477	378	291	211	245	345	259	108	378				368				378				378				368			
Total	896	722	291	211	245	345	259	108	722				702				721				721				701			

n = Number of patients with available 12-month outcome; unadj = unadjusted; ITT = intent to treat; full int = estimates had patients received all components of the intervention.

^a Composite outcome is defined to be positive if SMFA Dysfunction Index > 18.2 or SMFA Bother Index > 23.7 or Depression (PHQ-9) > 9 or PTSD (PCL) > 35. Composite outcome would be missing if any of the four items is missing.

Appendix B: TCCS: Sensitivity Analysis

Table 1. Types of Intervention Patients Received

		Correct (on the scale 17-85)			
		17-20 few or no symptoms of PTSD	21-29 minimal symptoms of PTSD	30-49 many of the symptoms of PTSD, advised to see doctors	50+ consistent with a diagnosis of PTSD, need to see doctors
Wrong (on the scale 0-68)	0-20 (true scale:17-37) few or no symptoms of PTSD	A1 (score: 17-20) N = 72	B1 (score: 21-29) N = 143	C1 (score: 30-37) N = 69	0
	21-29 (true scale: 38-46) minimal symptoms of PTSD	0	0	B2 (score: 38-46) N = 43	0
	30-49 (true scale: 47-66) many of the symptoms of PTSD, advised to see doctors	0	0	A2 (score: 47-49) N = 12	C2 (score: 50-66) N = 43
	50+ (true scale: 67-85) consistent with a diagnosis of PTSD, need to see doctors	0	0	0	A3 (score: 67-85) N = 15

Table 2. Raw Outcomes by Types of Intervention Patients Received (assuming early intervention did not change PTSD score at 6 weeks)

Type	Group	N	SMFA Dysfunction Index			SMFA Bother Index			Depression (PHQ-9)			PTSD (PCL)			Composite Outcome	
			n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	% Positive
A1	Control	57	51	18.1 (19.7)	35.3%	49	16.9 (21.9)	28.6%	51	3.5 (5.6)	13.7%	51	23.8 (11.6)	11.8%	49	34.7%
	Intervention	72	61	16.3 (14.9)	37.7%	61	14.6 (16.0)	21.3%	61	2.7 (4.2)	8.2%	61	22.8 (9.9)	13.1%	61	37.7%
B1	Control	125	115	21.4 (17.7)	49.6%	115	20.8 (20.0)	30.4%	115	4.3 (5.4)	11.3%	115	27.5 (11.9)	21.7%	115	53.9%
	Intervention	143	116	28.4 (18.8)	63.8%	111	27.8 (21.5)	50.5%	116	6.7 (6.0)	29.3%	116	30.6 (12.3)	26.7%	111	67.6%
C1	Control	57	47	30.4 (16.4)	80.9%	45	30.3 (17.0)	64.4%	47	5.7 (4.3)	23.4%	47	31.4 (10.9)	34.0%	45	84.4%
	Intervention	69	55	30.5 (16.7)	72.7%	53	32.1 (22.5)	60.4%	55	9.3 (7.0)	40.0%	55	36.5 (13.8)	38.2%	53	79.2%
B2	Control	42	37	28.9 (17.2)	70.3%	37	32.0 (22.8)	62.2%	37	7.3 (6.5)	29.7%	37	38.0 (15.6)	51.4%	37	73.0%
	Intervention	43	41	38.9 (16.2)	92.7%	40	42.9 (21.8)	75.0%	41	11.3 (6.3)	63.4%	41	46.7 (13.9)	78.0%	40	95.0%
A2	Control	12	10	35.9 (14.9)	90.0%	9	42.4 (22.8)	77.8%	10	12.6 (7.2)	70.0%	10	47.9 (17.9)	80.0%	9	88.9%
	Intervention	12	9	47.3 (19.2)	100.0%	9	53.9 (24.2)	100.0%	9	14.9 (7.8)	77.8%	9	54.7 (14.6)	100.0%	9	100.0%
C2	Control	43	34	45.5 (19.1)	88.2%	32	53.1 (25.3)	87.5%	34	14.1 (7.4)	64.7%	34	52.1 (17.2)	79.4%	32	90.6%
	Intervention	43	31	42.8 (17.9)	87.1%	31	50.7 (25.5)	77.4%	31	12.2 (7.5)	51.6%	31	52.2 (14.8)	83.9%	31	90.3%
A3	Control	16	16	55.5 (19.2)	93.8%	15	65.4 (26.3)	93.3%	16	17.9 (5.9)	87.5%	16	64.9 (13.3)	93.8%	15	93.3%
	Intervention	15	11	42.9 (24.6)	90.9%	10	41.0 (27.8)	70.0%	11	12.0 (7.9)	63.6%	11	50.0 (17.5)	81.8%	10	90.0%
N/A ^a	Control	67	34	27.3 (20.4)	61.8%	32	31.3 (28.3)	50.0%	33	6.1 (7.6)	27.3%	33	30.0 (16.0)	27.3%	31	67.7%
	Intervention	80	54	27.5 (18.2)	61.1%	53	30.1 (23.5)	52.8%	54	7.1 (6.5)	29.6%	54	35.4 (16.0)	38.9%	53	69.8%
A1+A2+A3	Control	85	77	28.2 (24.2)	54.5%	73	30.0 (30.2)	47.9%	77	7.7 (8.4)	36.4%	77	35.5 (21.4)	37.7%	73	53.4%
	Intervention	99	81	23.3 (20.9)	51.9%	80	22.3 (23.4)	36.2%	81	5.3 (7.0)	23.5%	81	30.0 (17.2)	32.1%	80	51.2%
B1+B2	Control	167	152	23.2 (17.8)	54.6%	152	23.5 (21.2)	38.2%	152	5.1 (5.8)	15.8%	152	30.1 (13.6)	28.9%	152	58.6%
	Intervention	186	157	31.1 (18.7)	71.3%	151	31.8 (22.5)	57.0%	157	7.9 (6.4)	38.2%	157	34.8 (14.5)	40.1%	151	74.8%
C1+C2	Control	100	81	36.8 (19.0)	84.0%	77	39.8 (23.6)	74.0%	81	9.2 (7.1)	40.7%	81	40.1 (17.2)	53.1%	77	87.0%
	Intervention	112	86	34.9 (18.0)	77.9%	84	38.9 (25.2)	66.7%	86	10.4 (7.3)	44.2%	86	42.1 (16.0)	54.7%	84	83.3%
PTSD: 17-29 A1+B1	Control	182	166	20.4 (18.3)	45.2%	164	19.6 (20.6)	29.9%	166	4.1 (5.5)	12.0%	166	26.4 (11.9)	18.7%	164	48.2%
	Intervention	215	177	24.2 (18.5)	54.8%	172	23.1 (20.7)	40.1%	177	5.3 (5.8)	22.0%	177	27.9 (12.1)	22.0%	172	57.0%
PTSD: 30-49 C1+B2+A2	Control	111	94	30.4 (16.5)	77.7%	91	32.2 (20.2)	64.8%	94	7.0 (5.9)	30.9%	94	35.8 (14.5)	45.7%	91	80.2%
	Intervention	124	105	35.2 (17.4)	82.9%	102	38.2 (23.2)	69.6%	105	10.6 (6.9)	52.4%	105	42.0 (15.1)	59.0%	102	87.3%
PTSD: 50+ C2+A3	Control	59	50	48.7 (19.5)	90.0%	47	57.0 (26.0)	89.4%	50	15.3 (7.1)	72.0%	50	56.2 (17.0)	84.0%	47	91.5%
	Intervention	58	42	42.8 (19.6)	88.1%	41	48.3 (26.1)	75.6%	42	12.1 (7.5)	54.8%	42	51.6 (15.4)	83.3%	41	90.2%

^a Patients with missing 6-week PTSD measures.

Table 3. Raw Outcomes by Types of Intervention Patients Received (assuming early intervention would reduce PTSD score at 6 weeks by 1 point)

Type	Group	N	SMFA Dysfunction Index			SMFA Bother Index			Depression (PHQ-9)			PTSD (PCL)			Composite Outcome	
			n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	% Positive
A1	Control	66	61	17.9 (16.9)	39.3%	60	17.3 (19.3)	28.3%	61	3.8 (6.2)	13.1%	61	24.0 (11.9)	11.5%	60	40.0%
	Intervention	72	61	16.3 (14.9)	37.7%	61	14.6 (16.0)	21.3%	61	2.7 (4.2)	8.2%	61	22.8 (9.9)	13.1%	61	37.7%
B1	Control	113	103	20.7 (17.7)	47.6%	103	20.5 (20.0)	32.0%	103	4.3 (5.1)	10.7%	103	27.8 (11.6)	22.3%	103	53.4%
	Intervention	143	116	28.4 (18.8)	63.8%	111	27.8 (21.5)	50.5%	116	6.7 (6.0)	29.3%	116	30.6 (12.3)	26.7%	111	67.6%
C1	Control	56	46	31.9 (15.9)	82.6%	44	31.8 (18.0)	63.6%	46	5.5 (4.1)	21.7%	46	32.2 (10.9)	37.0%	44	84.1%
	Intervention	69	55	30.5 (16.7)	72.7%	53	32.1 (22.5)	60.4%	55	9.3 (7.0)	40.0%	55	36.5 (13.8)	38.2%	53	79.2%
B2	Control	39	35	29.8 (17.9)	71.4%	35	33.0 (24.1)	62.9%	35	8.7 (7.4)	40.0%	35	41.1 (17.5)	57.1%	35	74.3%
	Intervention	43	41	38.9 (16.2)	92.7%	40	42.9 (21.8)	75.0%	41	11.3 (6.3)	63.4%	41	46.7 (13.9)	78.0%	40	95.0%
A2	Control	10	7	38.1 (11.5)	100.0%	5	39.6 (11.6)	80.0%	7	12.6 (5.5)	71.4%	7	45.6 (11.7)	85.7%	5	100.0%
	Intervention	12	9	47.3 (19.2)	100.0%	9	53.9 (24.2)	100.0%	9	14.9 (7.8)	77.8%	9	54.7 (14.6)	100.0%	9	100.0%
C2	Control	43	35	45.8 (19.0)	88.6%	34	53.6 (25.0)	88.2%	35	14.3 (7.3)	65.7%	35	52.7 (17.2)	80.0%	34	91.2%
	Intervention	43	31	42.8 (17.9)	87.1%	31	50.7 (25.5)	77.4%	31	12.2 (7.5)	51.6%	31	52.2 (14.8)	83.9%	31	90.3%
A3	Control	14	14	55.8 (20.4)	92.9%	13	66.0 (27.5)	92.3%	14	17.8 (6.4)	85.7%	14	65.1 (14.3)	92.9%	13	92.3%
	Intervention	15	11	42.9 (24.6)	90.9%	10	41.0 (27.8)	70.0%	11	12.0 (7.9)	63.6%	11	50.0 (17.5)	81.8%	10	90.0%
N/A ^a	Control	78	43	28.6 (21.6)	62.8%	40	31.2 (28.5)	50.0%	42	5.7 (7.2)	26.2%	42	28.8 (15.2)	26.2%	39	66.7%
	Intervention	80	54	27.5 (18.2)	61.1%	53	30.1 (23.5)	52.8%	54	7.1 (6.5)	29.6%	54	35.4 (16.0)	38.9%	53	69.8%
A1+A2+A3	Control	90	82	26.1 (22.4)	53.7%	78	26.8 (27.4)	42.3%	82	6.9 (8.2)	30.5%	82	32.9 (20.0)	31.7%	78	52.6%
	Intervention	99	81	23.3 (20.9)	51.9%	80	22.3 (23.4)	36.2%	81	5.3 (7.0)	23.5%	81	30.0 (17.2)	32.1%	80	51.2%
B1+B2	Control	152	138	23.0 (18.2)	53.6%	138	23.7 (21.7)	39.9%	138	5.4 (6.0)	18.1%	138	31.2 (14.5)	31.2%	138	58.7%
	Intervention	186	157	31.1 (18.7)	71.3%	151	31.8 (22.5)	57.0%	157	7.9 (6.4)	38.2%	157	34.8 (14.5)	40.1%	151	74.8%
C1+C2	Control	99	81	37.9 (18.5)	85.2%	78	41.3 (23.8)	74.4%	81	9.3 (7.1)	40.7%	81	41.1 (17.2)	55.6%	78	87.2%
	Intervention	112	86	34.9 (18.0)	77.9%	84	38.9 (25.2)	66.7%	86	10.4 (7.3)	44.2%	86	42.1 (16.0)	54.7%	84	83.3%
PTSD: 17-29 A1+B1	Control	179	164	19.6 (17.4)	44.5%	163	19.3 (19.8)	30.7%	164	4.1 (5.5)	11.6%	164	26.4 (11.8)	18.3%	163	48.5%
	Intervention	215	177	24.2 (18.5)	54.8%	172	23.1 (20.7)	40.1%	177	5.3 (5.8)	22.0%	177	27.9 (12.1)	22.0%	172	57.0%
PTSD: 30-49 C1+B2+A2	Control	105	88	31.6 (16.4)	79.5%	84	32.8 (20.4)	64.3%	88	7.3 (6.1)	33.0%	88	36.8 (14.7)	48.9%	84	81.0%
	Intervention	124	105	35.2 (17.4)	82.9%	102	38.2 (23.2)	69.6%	105	10.6 (6.9)	52.4%	105	42.0 (15.1)	59.0%	102	87.3%
PTSD: 50+ C2+A3	Control	57	49	48.7 (19.7)	89.8%	47	57.0 (26.0)	89.4%	49	15.3 (7.2)	71.4%	49	56.3 (17.2)	83.7%	47	91.5%
	Intervention	58	42	42.8 (19.6)	88.1%	41	48.3 (26.1)	75.6%	42	12.1 (7.5)	54.8%	42	51.6 (15.4)	83.3%	41	90.2%

^a Patients with missing 6-week PTSD measures or control patients with a 6-week PTSD score of 17 (can't be matched to intervention group).

Table 4. Raw Outcomes by Types of Intervention Patients Received (assuming early intervention would reduce PTSD score at 6 weeks by 2 points)

Type	Group	N	SMFA Dysfunction Index			SMFA Bother Index			Depression (PHQ-9)			PTSD (PCL)			Composite Outcome	
			n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	Mean (SD)	% Positive	n	% Positive
A1	Control	65	62	16.0 (16.1)	35.5%	61	15.1 (17.8)	21.3%	62	3.4 (6.1)	9.7%	62	23.4 (11.1)	9.7%	61	36.1%
		72	61	16.3 (14.9)	37.7%	61	14.6 (16.0)	21.3%	61	2.7 (4.2)	8.2%	61	22.8 (9.9)	13.1%	61	37.7%
B1	Control	104	94	22.7 (18.0)	53.2%	93	22.2 (20.4)	36.6%	94	4.7 (5.2)	12.8%	94	28.6 (11.7)	24.5%	93	58.1%
		143	116	28.4 (18.8)	63.8%	111	27.8 (21.5)	50.5%	116	6.7 (6.0)	29.3%	116	30.6 (12.3)	26.7%	111	67.6%
C1	Control	55	46	32.1 (16.0)	82.6%	45	33.5 (19.4)	64.4%	46	6.3 (5.4)	26.1%	46	34.1 (13.1)	41.3%	45	84.4%
		69	55	30.5 (16.7)	72.7%	53	32.1 (22.5)	60.4%	55	9.3 (7.0)	40.0%	55	36.5 (13.8)	38.2%	53	79.2%
B2	Control	40	35	30.4 (17.9)	71.4%	34	32.5 (23.0)	64.7%	35	8.5 (6.6)	40.0%	35	40.7 (16.7)	60.0%	34	73.5%
		43	41	38.9 (16.2)	92.7%	40	42.9 (21.8)	75.0%	41	11.3 (6.3)	63.4%	41	46.7 (13.9)	78.0%	40	95.0%
A2	Control	5	4	36.8 (13.5)	100.0%	3	40.3 (18.9)	66.7%	4	14.8 (8.3)	75.0%	4	49.5 (15.2)	75.0%	3	100.0%
		12	9	47.3 (19.2)	100.0%	9	53.9 (24.2)	100.0%	9	14.9 (7.8)	77.8%	9	54.7 (14.6)	100.0%	9	100.0%
C2	Control	44	36	46.9 (19.3)	88.9%	34	54.4 (25.7)	88.2%	36	14.4 (7.3)	66.7%	36	53.2 (17.2)	80.6%	34	91.2%
		43	31	42.8 (17.9)	87.1%	31	50.7 (25.5)	77.4%	31	12.2 (7.5)	51.6%	31	52.2 (14.8)	83.9%	31	90.3%
A3	Control	12	12	54.2 (21.7)	91.7%	12	64.2 (27.9)	91.7%	12	17.4 (6.6)	83.3%	12	64.6 (15.0)	91.7%	12	91.7%
		15	11	42.9 (24.6)	90.9%	10	41.0 (27.8)	70.0%	11	12.0 (7.9)	63.6%	11	50.0 (17.5)	81.8%	10	90.0%
N/A ^a	Control	94	55	26.4 (20.9)	58.2%	52	28.7 (27.0)	48.1%	54	5.2 (6.6)	24.1%	54	28.1 (14.5)	24.1%	51	62.7%
		80	54	27.5 (18.2)	61.1%	53	30.1 (23.5)	52.8%	54	7.1 (6.5)	29.6%	54	35.4 (16.0)	38.9%	53	69.8%
A1+A2+A3	Control	82	78	22.9 (21.9)	47.4%	76	23.8 (26.7)	34.2%	78	6.1 (8.2)	24.4%	78	31.1 (19.5)	25.6%	76	47.4%
		99	81	23.3 (20.9)	51.9%	80	22.3 (23.4)	36.2%	81	5.3 (7.0)	23.5%	81	30.0 (17.2)	32.1%	80	51.2%
B1+B2	Control	144	129	24.8 (18.2)	58.1%	127	24.9 (21.6)	44.1%	129	5.7 (5.9)	20.2%	129	31.9 (14.2)	34.1%	127	62.2%
		186	157	31.1 (18.7)	71.3%	151	31.8 (22.5)	57.0%	157	7.9 (6.4)	38.2%	157	34.8 (14.5)	40.1%	151	74.8%
C1+C2	Control	99	82	38.6 (18.9)	85.4%	79	42.5 (24.5)	74.7%	82	9.8 (7.4)	43.9%	82	42.5 (17.7)	58.5%	79	87.3%
		112	86	34.9 (18.0)	77.9%	84	38.9 (25.2)	66.7%	86	10.4 (7.3)	44.2%	86	42.1 (16.0)	54.7%	84	83.3%
PTSD: 17-29 A1+B1	Control	169	156	20.1 (17.5)	46.2%	154	19.4 (19.7)	30.5%	156	4.2 (5.6)	11.5%	156	26.6 (11.7)	18.6%	154	49.4%
		215	177	24.2 (18.5)	54.8%	172	23.1 (20.7)	40.1%	177	5.3 (5.8)	22.0%	177	27.9 (12.1)	22.0%	172	57.0%
PTSD: 30-49 C1+B2+A2	Control	100	85	31.6 (16.6)	78.8%	82	33.3 (20.7)	64.6%	85	7.6 (6.3)	34.1%	85	37.5 (15.2)	50.6%	82	80.5%
		124	105	35.2 (17.4)	82.9%	102	38.2 (23.2)	69.6%	105	10.6 (6.9)	52.4%	105	42.0 (15.1)	59.0%	102	87.3%
PTSD: 50+ C2+A3	Control	56	48	48.7 (19.9)	89.6%	46	57.0 (26.3)	89.1%	48	15.1 (7.2)	70.8%	48	56.0 (17.3)	83.3%	46	91.3%
		58	42	42.8 (19.6)	88.1%	41	48.3 (26.1)	75.6%	42	12.1 (7.5)	54.8%	42	51.6 (15.4)	83.3%	41	90.2%

^a Patients with missing 6-week PTSD measures or control patients with a 6-week PTSD score of 17 or 18 (can’t be matched to intervention group).

Statistical Appendix

The intention-to-treat effect (ITT) of TCC on the composite outcome at 12 months as well as its binary components was evaluated using a 2-stage statistical procedure, aimed at accounting for clustering within sites and for differences in baseline characteristics between sites:

- **Stage 1:** We computed standardized estimates of the probability of outcome at each site, so that any differences in probabilities across sites are not attributable to differences in the baseline patient characteristics. Our approach to standardization¹ involves two steps: in the first, we fit a logistic regression model with the following baseline covariates: site, age, gender, race-ethnicity, education, marital status, health insurance, tobacco use, pre-injury VR-12 (mental component scores [MCS] and physical component scores [PCS]), history of psychiatric disorder, co-morbidities including obesity, pain-limited activity, Patient Activation Measure,² Multidimensional Scale Perceived Social Support,³ generalized self-efficacy, and social support. Age, MCS and PCS were modeled using natural cubic splines. For each outcome model, the sample size was based on the set of patients with 12-month

outcomes measured (sample sizes ranged from 701 to 722, see Appendix A). In the second step, we estimated the site-specific standardized probabilities marginalized with respect to a common distribution of baseline covariates for all enrolled patients. Site-specific log odds and associated variance-covariance matrix were computed.

- **Stage 2:** We put these summaries and variance-covariance matrix into a Bayesian hierarchical model.⁴ In the first level of the hierarchical model, the vector of 12 site-specific summaries was assumed to be a realization of a multivariate normal distribution with site-specific means and variance-covariance equal to the estimated variance-covariance matrix from Stage 1. In the second level of the hierarchical model, the means for the 6 control (intervention) sites are assumed be independent and normally distributed with an overall control (intervention) mean and control (intervention) variance. The treatment effect (on a log odds ratio scale) is the difference between the overall treatment and the overall control means. This effect is exponentiated to report an effect on the odds ratio scale. At the last level of the hierarchical model, relatively non-informative priors were imposed on the model parameters.

An overall estimate (posterior median) of the effect of TCC was reported along with a 95% credible interval (highest posterior density interval [HPD]) and posterior probability of beneficial treatment effect. A Bayesian analysis combines prior beliefs (in our case minimally informative) with data (i.e., site-specific standardized estimates and associated variance-covariance matrix) to yield a posterior (i.e., updated) summary of knowledge about the treatment effect (i.e., posterior median) along with a quantification of uncertainty (i.e., HPD⁵). Our approach is similar to a cluster-level summary approach to analyzing cluster-randomized studies⁶ with two exceptions: (a) the cluster-level summaries were standardized and (b) the overall treatment effect was computed using a Bayesian hierarchical model rather weighted linear regression.

A modification of this approach was used to estimate the effect under full receipt of five intervention components (TSN handbook education, peer visits, pre-recovery assessment (RA) calls, RA and post-RA calls). Specifically, in Step 1 of Stage 1, the model was augmented to include indicators for the use of each of five intervention components interacted with a TCC site indicator. In Step 2 of Stage 1, the augmented model was used to obtain standardized site-specific estimates (and associated variance-covariance matrix) with TCC sites providing all intervention components.

Missing values for the baseline covariates were imputed using multivariate imputation by chained equations (MICE) with random forest imputation method. Ten imputed datasets were created. In the Step 2 of Stage 1, the site-specific estimates and associated variance-covariance matrix were computed using Rubin's multiple imputation combining rules.⁷ Statistical analyses were performed using R, version 3.4.2 (R Project for Statistical Computing).

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