

Appendix

Appendix Table 1: Summary Statistics by Terciles of Opioid Problem Severity, Unadjusted for Population Size

	All Counties		Low-Severity Counties		Moderate-Severity Counties		High-Severity Counties		ANOVA Results
	<i>N</i> =28270		<i>N</i> =9422		<i>N</i> =9422		<i>N</i> =9426		<i>Low-Mod./</i>
	mean	sd	mean	sd	mean	sd	mean	sd	<i>Low-High/</i>
	<i>Mod.-High</i>								
<i>Dependent Variables:</i>									
Progs./100,000 Pop.	4.27	6.81	3.90	8.58	4.22	5.68	4.68	5.76	**/**/**
Miles to Nearest Prog.	10.59	16.89	17.21	20.34	7.82	13.91	6.73	13.49	**/**/**
Progs./100,000 Pop., Meth./Bup.	.59	1.96	.39	2.28	.59	1.49	.78	2.02	**/**/**
Miles to Nearest Prog., Meth./Bup.	35.07	45.55	47.33	56.09	30.05	40.57	27.84	34.72	**/**/**
Progs./100,000 Pop., Medicaid	3.09	6.11	2.92	7.84	3.03	5.08	3.30	4.98	-/**/**
Miles to Nearest Prog., Medicaid	13.66	19.19	20.68	22.10	10.61	16.71	9.69	16.22	**/**/**
Progs./100,000 Pop., Meth/Bup. & Medicaid	.40	1.74	.30	2.15	.40	1.30	.50	1.64	**/**/**
Miles to Nearest Prog., Meth./Bup. & Medicaid	45.30	49.76	58.44	59.87	39.68	45.20	37.79	39.25	**/**/**
<i>Opioid Problem Controls:</i>									
Drug-Related Mortality, per 10,000 pop.	1.18	1.13	.65	.92	1.09	.84	1.82	1.26	**/**/**
Opioid Prescribing, per 100 pop.	86.61	43.85	51.74	24.87	83.86	26.23	124.60	42.66	**/**/**
Drug Arrests, per 10,000 pop.	40.24	29.87	33.53	29.12	41.16	27.86	46.09	31.24	**/**/**
<i>State Policy Controls:</i>									
Expanded Medicaid	.21	.40	.19	.39	.21	.41	.22	.41	**/**/-
Optional PDMP	.78	.41	.73	.43	.76	.41	.84	.36	**/**/**
Mandatory PDMP	.09	.28	.05	.20	.08	.25	.15	.35	**/**/**
Pain Clinic Law	.19	.38	.17	.37	.17	.37	.22	.40	-/**/**
Parity Law	.83	.37	.81	.39	.83	.38	.86	.34	**/**/**
Naloxone Standing Order	.29	.43	.26	.41	.28	.43	.33	.44	**/**/**
SABG Funds Per Capita (2017\$)	5.57	1.04	5.66	1.19	5.56	.98	5.48	.91	**/**/**
<i>Demographic Controls:</i>									
Population, in 100,000s	1.01	3.23	.75	4.06	1.34	3.35	.93	1.82	**/**/**
Percent Rural	58.64	31.50	71.45	30.54	51.64	30.54	52.82	29.40	**/**/**
Percent White	77.45	19.98	76.74	23.31	75.67	19.26	79.93	16.55	**/**/**

Percent Black	8.87	14.38	7.48	14.91	10.23	15.06	8.90	12.93	**/**/**
Percent Hispanic	8.83	13.46	10.40	16.80	9.20	12.43	6.90	10.00	**/**/**
Percent Asian	1.29	2.65	1.26	3.35	1.58	2.76	1.03	1.44	**/**/**
Percent Other Race	3.56	8.13	4.13	11.04	3.31	6.70	3.25	5.57	**/**/-
Less Than High School	15.51	7.05	15.20	7.98	14.87	6.65	16.48	6.29	**/**/**
High School Graduate/GED	35.03	7.02	35.19	7.22	34.18	7.47	35.72	6.23	**/**/**
Some College/Associate's Deg.	29.60	5.35	29.86	5.61	29.70	5.01	29.24	5.38	+/**/**
Bachelor's Deg. or Higher	19.86	8.91	19.76	9.42	21.25	9.69	18.57	7.19	**/**/**
<i>Economic Controls:</i>									
Median Income, 1,000s (2017\$)	49.02	12.85	50.70	14.21	51.01	13.29	45.35	9.82	-/**/**
Unemployment Rate	7.12	3.08	6.36	3.10	7.22	3.02	7.77	2.95	**/**/**
Poverty Rate	16.57	6.46	15.50	7.19	16.09	6.18	18.11	5.61	**/**/**
Physicians per 1,000 Pop.	1.36	1.69	.94	1.39	1.51	1.60	1.62	1.96	**/**/**

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Meth. = Methadone; Bup. = Buprenorphine; Pop. = Population; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Deg. = Degree

Standard deviations to the right

Statistical significance determined using ANOVA and Tukey's Multiple Comparison Test: Low-to-Moderate/Low-to-High/Moderate-to-High - . p, \hat{a} •0.1, + p<0.1,

* p<0.05, ** p<0.01

Appendix 2: Coefficients from Logistic Regressions Estimating the Relationship between County Opioid Problem Severity and Any Substance Use Disorder Treatment Programs Available in the County

	All Progs.			Meth./Bup.			Medicaid			Meth./Bup. & Medicaid		
	b	se	p	b	se	p	b	se	p	b	se	p
<i>Opioid Severity:</i>												
Low	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Moderate	.17**	.06	<.01	.48**	.10	<.01	.34**	.06	<.01	.56**	.11	<.01
High	.18*	.08	.02	.79**	.13	<.01	.29**	.07	<.01	.78**	.13	<.01
<i>Year Fixed Effects:</i>												
2009	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
2010	-.07*	.03	.04	.13**	.05	.01	-.02	.03	.49	.13*	.05	.01
2011	-.15	.09	.11	.00	.12	.99	.12	.08	.16	-.05	.13	.71
2012	-.03	.10	.80	.23+	.13	.08	.31**	.09	<.01	.26+	.14	.05
2013	-.06	.12	.60	.40**	.15	.01	.33**	.11	<.01	.50**	.15	<.01
2014	.13	.13	.32	.51**	.17	<.01	.71**	.13	<.01	.67**	.18	<.01
2015	.14	.15	.34	.61**	.19	<.01	.81**	.14	<.01	.83**	.20	<.01
2016	.13	.16	.43	.62**	.21	<.01	.83**	.15	<.01	.88**	.21	<.01
2017	.13	.17	.47	.36	.23	.13	.79**	.16	<.01	.53*	.24	.03
<i>State Policy Controls:</i>												
Expanded Medicaid	.45**	.08	<.01	.07	.10	.49	.05	.08	.52	.01	.10	.92
Optional PDMP	.22**	.08	.01	-.29**	.11	.01	.13+	.08	.09	-.19+	.11	.07
Mandatory PDMP	.62**	.15	<.01	.26+	.13	.06	.74**	.13	<.01	.48**	.13	<.01
Pain Clinic Law	-.75**	.11	<.01	-.53**	.13	<.01	-.93**	.10	<.01	-1.35**	.15	<.01
Parity Law	.14	.10	.18	.34*	.14	.01	-.16+	.09	.08	.52**	.14	<.01
Naloxone Standing Order	.30**	.09	<.01	.31**	.11	<.01	.22*	.09	.01	.33**	.11	<.01
SABG Funds Per Capita (2017\$)	-.03	.04	.44	.22**	.05	<.01	.00	.04	1<.01	.28**	.05	<.01
<i>Demographic Controls:</i>												
Population, in 100,000s	3.47**	.32	<.01	1.70**	.15	<.01	1.76**	.21	<.01	.88**	.08	<.01
Percent Rural	-.02**	.00	<.01	-.01**	.00	<.01	-.02**	.00	<.01	-.02**	.00	<.01
Percent White	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Percent Black	-.02**	.00	<.01	-.00	.00	.36	-.02**	.00	<.01	-.01*	.01	.01
Percent Hispanic	-.01	.00	.13	-.01	.01	.34	-.00	.00	.33	-.00	.01	.70
Percent Asian	.06*	.03	.03	-.03	.05	.53	.01	.05	.86	-.07	.05	.15
Percent Other Race	.01+	.01	.07	-.01	.01	.12	.00	.00	.78	-.01*	.01	.04
Less Than High School	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
High School Graduate/GED	.05**	.01	<.01	.03+	.02	.06	.07**	.01	<.01	.07**	.02	<.01
Some College/Associate's Deg.	.06**	.01	<.01	.03+	.01	.05	.06**	.01	<.01	.04**	.01	.01
Bachelor's Deg. or Higher	.03**	.01	.01	.03	.02	.14	.04**	.01	<.01	.05**	.02	<.01
<i>Economic Controls:</i>												

Median Income, 1,000s (2017)\$	-.01+	.01	.08	.01	.01	.54	-.01	.01	.35	.02*	.01	.04
Unemployment Rate	.09**	.02	<.01	.04*	.02	.02	.09**	.02	<.01	.09**	.02	<.01
Poverty Rate	.04**	.01	<.01	.03*	.01	.02	.04**	.01	<.01	.04**	.01	<.01
Physicians per 1,000 Pop.	.37**	.11	<.01	.20	.15	.18	.31**	.08	<.01	.16	.10	.12
Constant	-4.90**	.99	<.01	-7.52**	1.46	<.01	-6.31**	.95	<.01	-11.21**	1.48	<.01
Observations	28,270			28,270			28,270			28,270		
Pseudo R-Squared	.348			.433			.295			.394		
Model Chi-Square	887.696			950.756			1011.261			1227.212		
Degrees of Freedom	30			30			30			30		

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Meth. = Methadone; Bup. = Buprenorphine; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Pop. = Population

All models conducted in Stata 15 using the logit command with standard errors clustered at the county-level.

+ p<0.1, * p<0.05, ** p<0.01

Appendix 3: Marginal Effects from Logistic Regressions Estimating the Relationship between County Opioid Problem Severity and Any Substance Use Disorder Treatment Programs Available in the County

	All Progs.			Meth./Bup.			Medicaid			Meth./Bup. & Medicaid		
	b	se	p	b	se	p	b	se	p	b	se	p
<i>Opioid Severity:</i>												
Low	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Moderate	.03**	.01	.01	.04**	.01	<.01	.06**	.01	<.01	.04**	.01	<.01
High	.03*	.01	.02	.07**	.01	<.01	.05**	.01	<.01	.07**	.01	<.01
<i>Year Fixed Effects:</i>												
2009	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
2010	-.01*	.00	.03	.01**	.00	.01	-.00	.01	.50	.01*	.00	.01
2011	-.02	.01	.10	.00	.01	.99	.02	.01	.16	-.00	.01	.71
2012	-.00	.01	.80	.02+	.01	.06	.05**	.01	<.01	.02*	.01	.04
2013	-.01	.02	.60	.04**	.01	<.01	.05**	.02	<.01	.04**	.01	<.01
2014	.02	.02	.33	.05**	.02	<.01	.12**	.02	<.01	.06**	.01	<.01
2015	.02	.02	.34	.06**	.02	<.01	.13**	.02	<.01	.07**	.02	<.01
2016	.02	.02	.43	.06**	.02	<.01	.14**	.02	<.01	.08**	.02	<.01
2017	.02	.02	.47	.03	.02	.13	.13**	.03	<.01	.04*	.02	.03
<i>State Policy Controls:</i>												
Expanded Medicaid	.06**	.01	<.01	.01	.01	.49	.01	.01	.52	.00	.01	.92
Optional PDMP	.03**	.01	.01	-.03**	.01	.01	.02+	.01	.09	-.02+	.01	.07
Mandatory PDMP	.09**	.02	<.01	.02+	.01	.06	.12**	.02	<.01	.04**	.01	<.01
Pain Clinic Law	-.11**	.02	<.01	-.05**	.01	<.01	-.15**	.02	<.01	-.12**	.01	<.01
Parity Law	.02	.01	.17	.03*	.01	.01	-.03+	.01	.08	.05**	.01	<.01
Naloxone Standing Order	.04**	.01	<.01	.03**	.01	<.01	.04*	.01	.01	.03**	.01	<.01
SABG Funds Per Capita (2017\$)	-.00	.01	.44	.02**	.00	<.01	.00	.01	1.00	.02**	.00	<.01
<i>Demographic Controls:</i>												
Population, in 100,000s	.50**	.04	<.01	.16**	.01	<.01	.29**	.03	<.01	.08**	.01	<.01
Percent Rural	-.00**	.00	<.01	-.00**	.00	<.01	-.00**	.00	<.01	-.00**	.00	<.01
Percent White	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Percent Black	-.00**	.00	<.01	-.00	.00	.36	-.00**	.00	<.01	-.00*	.00	.01
Percent Hispanic	-.00	.00	.13	-.00	.00	.34	-.00	.00	.33	-.00	.00	.70
Percent Asian	.01*	.00	.03	-.00	.01	.53	.00	.01	.86	-.01	.00	.15
Percent Other Race	.00+	.00	.07	-.00	.00	.12	.00	.00	.78	-.00*	.00	.04
Less Than High School	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
High School Graduate/GED	.01**	.00	<.01	.00+	.00	.06	.01**	.00	<.01	.01**	.00	<.01
Some College/Associate's Deg.	.01**	.00	<.01	.00+	.00	.05	.01**	.00	<.01	.00**	.00	.01
Bachelor's Deg. or Higher	.00**	.00	.01	.00	.00	.14	.01**	.00	<.01	.00**	.00	<.01

Economic Controls:

Median Income, 1,000s (2017)\$	-.00+	.00	.08	.00	.00	.54	-.00	.00	.35	.00*	.00	.04
Unemployment Rate	.01**	.00	<.01	.00*	.00	.02	.01**	.00	<.01	.01**	.00	<.01
Poverty Rate	.01**	.00	<.01	.00*	.00	.02	.01**	.00	<.01	.00**	.00	<.01
Physicians per 1,000 Pop.	.05**	.02	<.01	.02	.01	.18	.05**	.01	<.01	.01	.01	.12
Observations	28,270			28,270			28,270			28,270		

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Meth. = Methadone; Bup. = Buprenorphine; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Pop. = Population

All models conducted in Stata 15 using the margins command following logistic regression with standard errors clustered at the county-level.

+ p<0.1, * p<0.05, ** p<0.01

Appendix 4: Coefficients from OLS Regressions Estimating the Relationship between County Opioid Problem Severity and the Log Number of Substance Use Disorder Treatment Programs Available per 100,000 Population (Conditional on Any)

	All Progs.			Meth./Bup.			Medicaid			Meth./Bup. & Medicaid		
	b	se	p	b	se	p	b	se	p	b	se	p
<i>Opioid Severity:</i>												
Low	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Moderate	-.08**	.03	<.01	-.15**	.05	<.01	-.13**	.03	<.01	-.18**	.06	<.01
High	-.07*	.03	.03	-.06	.06	.26	-.13**	.03	<.01	-.11	.07	.11
<i>Year Fixed Effects:</i>												
2009	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
2010	-.03**	.01	<.01	.10**	.02	<.01	-.01	.01	.52	.12**	.03	<.01
2011	-.18**	.03	<.01	-.01	.05	.79	-.08*	.03	.02	.05	.05	.34
2012	-.18**	.03	<.01	.01	.05	.79	-.08*	.04	.04	.09	.06	.13
2013	-.17**	.03	<.01	.08	.05	.14	-.04	.04	.32	.13*	.07	.05
2014	-.25**	.04	<.01	.11	.07	.10	-.07	.05	.13	.20*	.08	.02
2015	-.27**	.05	<.01	.13+	.08	.08	-.06	.05	.27	.23*	.10	.02
2016	-.29**	.05	<.01	.17+	.09	.05	-.03	.06	.67	.32**	.11	<.01
2017	-.34**	.06	<.01	.08	.09	.40	-.08	.07	.24	.25*	.11	.03
<i>State Policy Controls:</i>												
Expanded Medicaid	.18**	.03	<.01	.03	.04	.50	.11**	.03	<.01	.02	.05	.73
Optional PDMP	-.06*	.03	.02	-.04	.04	.39	-.10**	.03	<.01	-.01	.05	.85
Mandatory PDMP	-.09*	.04	.02	.02	.05	.74	-.02	.04	.65	.08	.06	.17
Pain Clinic Law	-.21**	.04	<.01	-.38**	.05	<.01	-.39**	.04	<.01	-.56**	.06	<.01
Parity Law	.16**	.03	<.01	.20**	.05	<.01	.07+	.04	.06	.13*	.06	.04
Naloxone Standing Order	.02	.03	.46	-.04	.05	.39	-.07+	.03	.06	-.14*	.06	.02
SABG Funds Per Capita (2017\$)	.05**	.02	<.01	.08**	.02	<.01	.04*	.02	.01	.07**	.02	<.01
<i>Demographic Controls:</i>												
Population, in 100,000s	-.01*	.01	.02	-.01*	.00	.01	-.02**	.01	<.01	-.02**	.01	.01
Percent Rural	.01**	.00	<.01	.02**	.00	<.01	.02**	.00	<.01	.02**	.00	<.01
Percent White	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Percent Black	-.01**	.00	<.01	.00	.00	.94	-.01**	.00	<.01	-.00	.00	.60
Percent Hispanic	.01**	.00	<.01	.00	.00	.88	.01**	.00	<.01	.00	.00	.79
Percent Asian	.02**	.01	<.01	-.00	.01	.94	.00	.01	.83	-.01+	.01	.10
Percent Other Race	.01**	.00	<.01	.00	.00	.82	.01**	.00	<.01	.00	.00	.61
Less Than High School	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
High School Graduate/GED	.02**	.00	<.01	.00	.01	.96	.02**	.01	<.01	.01	.01	.57
Some College/Associate's Deg.	.03**	.00	<.01	-.00	.01	.73	.03**	.00	<.01	-.01	.01	.43

Bachelor's Deg. or Higher	.01**	.00	<.01	-.01	.01	.22	.02**	.00	<.01	-.01+	.01	.09
<i>Economic Controls:</i>	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Median Income, 1,000s (2017)\$	-.01**	.00	<.01	.00	.00	.93	-.01**	.00	<.01	.01	.00	.21
Unemployment Rate	-.03**	.01	<.01	-.03**	.01	<.01	-.04**	.01	<.01	-.03**	.01	.01
Poverty Rate	.02**	.00	<.01	.02*	.01	.03	.01*	.01	.01	.02*	.01	.02
Physicians per 1,000 Pop.	.03**	.01	.01	.06**	.02	<.01	.03**	.01	.01	.07**	.02	<.01
Constant	-.40	.40	.32	-.56	.85	.51	-.67	.47	.16	-1.07	.88	.22
Observations	18,001			7,030			15,880			5,332		
R-Squared	.307			.442			.440			.548		
F-Statistic	38.171			43.744			63.323			49.119		
Degrees of Freedom	2,369			1,128			2,218			955		

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Meth. = Methadone; Bup. = Buprenorphine; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Pop. = Population

All models conducted in Stata 15 using the reg command with standard errors clustered at the county-level.

+ p<0.1, * p<0.05, ** p<0.01

Appendix 5: Coefficients from OLS Regressions Estimating the Relationship between County Opioid Problem Severity and the Log Distance (in Miles) to the Nearest Substance Use Disorder Treatment Program (Conditional on None)

	All Progs.			Meth./Bup.			Medicaid			Meth./Bup. & Medicaid		
	b	se	p	b	se	p	b	se	p	b	se	p
<i>Opioid Severity:</i>												
Low	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Moderate	-.00	.01	.92	-.00	.01	.87	.01	.01	.42	-.02	.01	.12
High	.03+	.02	.09	.01	.02	.51	.03	.02	.11	-.01	.02	.72
<i>Year Fixed Effects:</i>												
2009	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
2010	-.00	.01	.66	-.04**	.01	<.01	-.02*	.01	.03	-.08**	.01	<.01
2011	-.04+	.02	.08	-.10**	.02	<.01	-.10**	.02	<.01	-.16**	.02	<.01
2012	-.05*	.02	.04	-.16**	.02	<.01	-.13**	.02	<.01	-.24**	.02	<.01
2013	-.01	.03	.62	-.16**	.02	<.01	-.09**	.03	<.01	-.24**	.03	<.01
2014	-.07*	.03	.03	-.24**	.03	<.01	-.19**	.03	<.01	-.37**	.03	<.01
2015	-.02	.04	.56	-.25**	.03	<.01	-.14**	.04	<.01	-.40**	.03	<.01
2016	.01	.04	.81	-.22**	.04	<.01	-.11**	.04	<.01	-.41**	.04	<.01
2017	-.08*	.04	.05	-.39**	.04	<.01	-.21**	.04	<.01	-.57**	.04	<.01
<i>State Policy Controls:</i>												
Expanded Medicaid	.08**	.02	<.01	.06**	.02	<.01	.14**	.02	<.01	.09**	.02	<.01
Optional PDMP	-.08**	.02	<.01	-.06**	.02	<.01	-.07**	.02	<.01	-.14**	.02	<.01
Mandatory PDMP	-.20**	.03	<.01	-.10**	.02	<.01	-.21**	.03	<.01	-.16**	.02	<.01
Pain Clinic Law	.08**	.03	<.01	-.03	.02	.20	.06*	.02	.01	.14**	.02	<.01
Parity Law	.04*	.02	.04	.05*	.02	.02	.10**	.02	<.01	.03	.02	.17
Naloxone Standing Order	-.18**	.02	<.01	-.20**	.02	<.01	-.19**	.02	<.01	-.15**	.02	<.01
SABG Funds Per Capita (2017\$)	.10**	.01	<.01	.12**	.01	<.01	.10**	.01	<.01	.10**	.01	<.01
<i>Demographic Controls:</i>												
Population, in 100,000s	-.14+	.08	.06	-.26**	.04	<.01	-.09+	.04	.06	-.14**	.02	<.01
Percent Rural	.00*	.00	.04	.00**	.00	<.01	.00*	.00	.03	.00**	.00	<.01
Percent White	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Percent Black	.00+	.00	.07	.00**	.00	<.01	.00**	.00	<.01	.00**	.00	<.01
Percent Hispanic	.01**	.00	<.01	.01**	.00	<.01	.01**	.00	<.01	.01**	.00	<.01
Percent Asian	-.04	.04	.26	.04**	.02	.01	-.01	.02	.55	.03**	.01	.01
Percent Other Race	.01**	.00	<.01	.02**	.00	<.01	.01**	.00	<.01	.02**	.00	<.01
Less Than High School	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
High School Graduate/GED	.01**	.00	<.01	.01**	.00	<.01	.01**	.00	<.01	.01**	.00	.01
Some College/Associate's Deg.	.02**	.00	<.01	.03**	.00	<.01	.02**	.00	<.01	.03**	.00	<.01

Bachelor's Deg. or Higher	.02**	.00	<.01	.02**	.00	<.01	.02**	.00	<.01	.01**	.00	<.01
<i>Economic Controls:</i>												
Median Income, 1,000s (2017)\$	-.01**	.00	<.01	-.02**	.00	<.01	-.01**	.00	<.01	-.02**	.00	<.01
Unemployment Rate	-.01	.00	.13	-.03**	.00	<.01	-.01**	.00	<.01	-.04**	.00	<.01
Poverty Rate	-.00	.00	.44	-.01+	.00	.05	-.00	.00	.35	-.01*	.00	.02
Physicians per 1,000 Pop.	-.07*	.03	.05	-.03+	.02	.09	-.05	.03	.10	-.01	.01	.26
Constant	1.74**	.25	<.01	2.36**	.23	<.01	2.05**	.24	<.01	3.34**	.23	<.01
Observations	10,269			21,240			12,390			22,938		
R-Squared	.368			.374			.330			.328		
F-Statistic	32.459			69.433			38.817			88.352		
Degrees of Freedom	1,597			2,649			1,910			2,824		

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Meth. = Methadone; Bup. = Buprenorphine; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Pop. = Population

All models conducted in Stata 15 using the reg command with standard errors clustered at the county-level.

+ p<0.1, * p<0.05, ** p<0.01

Appendix Table 6: Logistic Regressions and Marginal Effects Estimating the Relationship between County Opioid Problem Severity and Any Substance Use Disorder Treatment Programs Offering Methadone and Buprenorphine in the County

	Coef. Meth.			ME Meth.			Coef. Bup.			ME Bup.		
	b	se	p	me	se	p	b	se	p	me	se	p
<i>Opioid Severity:</i>												
Low	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Moderate	1.05**	.19	<.01	.04**	.01	<.01	.42**	.10	<.01	.04**	.01	<.01
High	1.51**	.21	<.01	.07**	.01	<.01	.71**	.12	<.01	.07**	.01	<.01
<i>Year Fixed Effects:</i>												
2009	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
2010	.07	.05	.13	.00	.00	.12	.17**	.05	<.01	.02**	.00	<.01
2011	-.13	.15	.39	-.01	.01	.41	-.04	.12	.72	-.00	.01	.72
2012	.09	.16	.57	.01	.01	.56	.14	.13	.29	.01	.01	.27
2013	.17	.19	.36	.01	.01	.35	.33*	.15	.03	.03*	.01	.02
2014	.07	.23	.78	.00	.01	.78	.45**	.17	.01	.04**	.02	<.01
2015	.04	.27	.89	.00	.01	.89	.59**	.19	<.01	.06**	.02	<.01
2016	-.10	.30	.73	-.01	.02	.73	.65**	.20	<.01	.06**	.02	<.01
2017	-.34	.34	.32	-.02	.02	.32	.41+	.23	.07	.04+	.02	.07
<i>State Policy Controls:</i>												
Expanded Medicaid	.19	.14	.19	.01	.01	.19	.07	.10	.46	.01	.01	.46
Optional PDMP	-.31*	.14	.03	-.02*	.01	.03	-.14	.10	.17	-.01	.01	.17
Mandatory PDMP	-.87**	.19	<.01	-.05**	.01	<.01	.41**	.13	<.01	.04**	.01	<.01
Pain Clinic Law	-.02	.17	.89	-.00	.01	.89	-.62**	.13	<.01	-.06**	.01	<.01
Parity Law	.40*	.18	.02	.02*	.01	.02	.43**	.13	<.01	.04**	.01	<.01
Naloxone Standing Order	.67**	.16	<.01	.04**	.01	<.01	.20+	.11	.06	.02+	.01	.06
SABG Funds Per Capita (2017\$)	.22*	.09	.01	.01*	.00	.01	.20**	.05	<.01	.02**	.00	<.01
<i>Demographic Controls:</i>												
Population, in 100,000s	1.26**	.11	<.01	.07**	.01	<.01	1.08**	.12	<.01	.10**	.01	<.01
Percent Rural	-.02**	.00	<.01	-.00**	.00	<.01	-.02**	.00	<.01	-.00**	.00	<.01
Percent White	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Percent Black	.02*	.01	.02	.00*	.00	.02	-.01	.00	.11	-.00	.00	.11
Percent Hispanic	-.00	.01	.87	-.00	.00	.87	-.01*	.01	.02	-.00*	.00	.02
Percent Asian	-.06	.05	.31	-.00	.00	.31	-.03	.05	.55	-.00	.00	.55
Percent Other Race	.01	.01	.45	.00	.00	.45	-.01*	.01	.01	-.00*	.00	.01
Less Than High School	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
High School Graduate/GED	.03	.03	.33	.00	.00	.32	.04*	.02	.03	.00*	.00	.03
Some College/Associate's Deg.	-.02	.02	.26	-.00	.00	.26	.04**	.01	<.01	.00**	.00	<.01
Bachelor's Deg. or Higher	.03	.02	.22	.00	.00	.22	.04*	.02	.04	.00*	.00	.04
<i>Economic Controls:</i>												

Median Income, 1,000s (2017)\$	-.01	.01	.30	-.00	.00	.30	.01	.01	.13	.00	.00	.13
Unemployment Rate	.04	.03	.20	.00	.00	.20	.04*	.02	.01	.00*	.00	.01
Poverty Rate	.00	.02	.82	.00	.00	.82	.04**	.01	<.01	.00**	.00	<.01
Physicians per 1,000 Pop.	.14	.09	.15	.01	.01	.14	.19	.13	.14	.02	.01	.14
Constant	-5.73**	2.10	.01				-8.31**	1.47	<.01			
Observations	28,270			28,270			28,270			28,270		
Pseudo R-Squared	.528						.397					
Model Chi-Square	724.032						961.033					
Degrees of Freedom	30						30					

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Coef. = Coefficients; ME - Marginal Effects; Meth. = Methadone; Bup. = Buprenorphine; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Pop. = Population

All models conducted in Stata 15 using the logit and margins commands with standard errors clustered at the county-level.

+ p<0.1, * p<0.05, ** p<0.01

Appendix Table 7: Coefficients from OLS Regressions Estimating the Relationship between County Opioid Problem Severity and the Log Number of Substance Use Disorder Treatment Programs Available per 100,000 Population (Conditional on Any) and the Log Distance (in Miles) to the Nearest Substance Use Disorder Treatment Program (Conditional on None)

	Log Number Meth.			Log Miles Meth.			Log Number Bup.			Log Miles Bup.		
	b	se	p	b	se	p	b	se	p	b	se	p
<i>Opioid Severity:</i>												
Low	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Moderate	.01	.07	.88	-.07**	.02	<.01	-.17**	.05	<.01	-.01	.01	.53
High	.08	.08	.33	-.07**	.02	<.01	-.10+	.06	.09	.00	.02	.81
<i>Year Fixed Effects:</i>												
2009	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
2010	.03	.02	.15	.01**	.00	.01	.10**	.02	<.01	-.07**	.01	<.01
2011	-.06	.06	.26	.02	.02	.26	.02	.05	.63	-.12**	.02	<.01
2012	-.04	.06	.48	-.03	.02	.12	.06	.05	.26	-.18**	.02	<.01
2013	.02	.07	.81	.03	.03	.23	.10+	.06	.08	-.17**	.03	<.01
2014	-.01	.08	.89	-.03	.03	.40	.13+	.07	.08	-.28**	.03	<.01
2015	-.02	.09	.84	-.01	.04	.76	.16+	.09	.07	-.28**	.03	<.01
2016	-.02	.10	.83	.06	.04	.14	.20*	.10	.04	-.26**	.04	<.01
2017	-.14	.11	.21	-.27**	.05	<.01	.12	.10	.24	-.43**	.04	<.01
<i>State Policy Controls:</i>												
Expanded Medicaid	-.00	.05	.96	-.01	.02	.52	.03	.04	.47	.07**	.02	<.01
Optional PDMP	.01	.05	.79	-.15**	.02	<.01	-.03	.05	.50	-.09**	.02	<.01
Mandatory PDMP	-.13+	.07	.06	.00	.03	.93	.05	.05	.36	-.13**	.02	<.01
Pain Clinic Law	-.21**	.07	<.01	-.16**	.02	<.01	-.37**	.06	<.01	.01	.02	.52
Parity Law	.17**	.06	<.01	-.01	.02	.52	.15**	.06	.01	.02	.02	.27
Naloxone Standing Order	.12*	.06	.04	-.27**	.02	<.01	-.07	.05	.17	-.20**	.02	<.01
SABG Funds Per Capita (2017\$)	.08**	.02	<.01	.22**	.02	<.01	.08**	.02	<.01	.12**	.01	<.01
<i>Demographic Controls:</i>												
Population, in 100,000s	-.01+	.01	.07	-.22**	.03	<.01	-.02**	.01	<.01	-.15**	.03	<.01
Percent Rural	.02**	.00	<.01	.00**	.00	<.01	.02**	.00	<.01	.00**	.00	<.01
Percent White	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
Percent Black	.00	.00	.98	-.00**	.00	.01	-.00	.00	.34	.00**	.00	.01
Percent Hispanic	-.01*	.00	.02	.01**	.00	<.01	-.00	.00	.88	.01**	.00	<.01
Percent Asian	-.01	.01	.12	.03*	.01	.04	-.01	.01	.45	.04*	.02	.01
Percent Other Race	.01	.01	.39	.02**	.00	<.01	.00	.00	.75	.02**	.00	<.01
Less Than High School	<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>			<i>Ref. Cat.</i>		
High School Graduate/GED	-.03+	.02	.07	.00	.00	.22	-.01	.01	.60	.01**	.00	<.01
Some College/Associate's Deg.	-.04**	.01	<.01	.04**	.00	<.01	-.00	.01	.66	.03**	.00	<.01
Bachelor's Deg. or Higher	-.03**	.01	.01	.01**	.00	<.01	-.01+	.01	.10	.02**	.00	<.01

Economic Controls:

Median Income, 1,000s (2017)\$	.00	.00	.64	-.02**	.00	<.01	-.00	.00	.87	-.02**	.00	<.01
Unemployment Rate	-.02	.01	.27	-.05**	.00	<.01	-.05**	.01	<.01	-.03**	.00	<.01
Poverty Rate	.02*	.01	.02	-.01+	.00	.07	.02*	.01	.04	-.00	.00	.12
Physicians per 1,000 Pop.	.02+	.01	.09	-.02	.02	.30	.06**	.02	<.01	-.03+	.02	.08
Constant	1.21	1.44	.40	2.79**	.27	<.01	-.11	.91	.90	2.51**	.23	<.01
Observations	4,099			24,171			6,397			21,873		
R-Squared	.544			.446			.487			.368		
F-Statistic	38.916			101.298			45.122			78.925		
Degrees of Freedom	564			2,827			1,088			2,733		

Source: Authors' analysis of all substance use disorder treatment programs listed in the U.S. Substance Abuse and Mental Health Services Administration's (SAMHSA) National Directory of Drug and Alcohol Abuse Treatment Facilities (derived from the National Survey of Substance Abuse Treatment Services (NSSATS)), 2009-2017.

Notes: Progs. = Programs; Meth. = Methadone; Bup. = Buprenorphine; PDMP = Prescription Drug Monitoring Program; SABG = Substance Abuse Prevention and Treatment Block Grant; Pop. = Population

All models conducted in Stata 15 using the regress command with standard errors clustered at the county-level.

+ p<0.1, * p<0.05, ** p<0.01