Measures

Demographic predictors included race/ethnicity (non-White is reference), unemployment status (employed as reference), insurance status (no insurance as reference), age group (three levels: adolescent, young adult, older adult), and age of onset of OUD before 15 years old. Victimization history was measured using the general victimization scale which assessed multiple aspects of recent victimization experiences such as sexual abuse, physical abuse, and emotional abuse. Psychological health problems were rated based on Diagnostic Manual of Mental Disorders -IV criteria for post-traumatic stress disorder symptoms, depressive symptoms, emotional problems, attention deficit hyperactivity disorder, and conduct disorder scale. Dual diagnosis and poly-substance use disorder variables were derived from items assessing presence of both psychological health and substance use diagnoses as well as multiple substance use diagnoses. Stress was rated using the personal sources of stress scale which assesses major life events (e.g., death of a loved one, change in relationships). Homelessness experienced was assessed by asking if participants had experienced some form of homelessness in the past 90 days. Suicidality was assessed via items measuring suicide thoughts, plans, and attempts. Withdrawal was rated using the current withdrawal scale that assessed severity of withdrawal from opioids. Criminal justice involvement was rated using the criminal justice system index, which asked participants questions about being in jail, on probation, on parole, or house arrest. The living risk index was used to assess current illegal activity, drug use, arguing, and employment of individuals with whom the participant resides. The low and medium groups in this measure were combined because the 'low' category

had very few persons ($n = 14$) with this value. A similar measure was used to assess social risk which includes the same items, but with respect to close friends and peers. Finally, treatment level predictors included prior substance use treatment, total number of treatment planning needs endorsed, treatment resistance index (i.e., patient resistance to receiving treatment), pressure to be in treatment, and attendance in self-help meeting in past 90 days.

Supplemental Table 1. Interaction of top 5 most important variables by male and female random survival forests.					
	Var 1	Var 2	Paired	Additive	Difference
A. Male Forest Variables					
age_grp_cd:cdsg_0_cd	0.020	0.010	0.031	0.030	0.001
age_grp_cd:srprobg_cd	0.020	0.009	0.027	0.029	-0.002
age_grp_cd:S9y10_cd	0.020	0.009	0.026	0.029	-0.003
age_grp_cd:cjsig_0_cd	0.020	0.006	0.025	0.026	-0.001
cdsg_0_cd:srprobg_cd	0.011	0.009	0.018	0.019	-0.001
cdsg_0_cd:S9y10_cd	0.011	0.009	0.019	0.019	0.000
cdsg_0_cd:cjsig_0_cd	0.011	0.006	0.016	0.017	0.000
srprobg_cd:S9y10_cd	0.010	0.009	0.017	0.019	-0.001
srprobg_cd:cjsig_0_cd	0.010	0.006	0.014	0.016	-0.002
S9y10_cd:cjsig_0_cd	0.009	0.006	0.015	0.015	0.000
B. Female Forest Variables					
cjsig_0_cd:srprobg_cd	0.007	0.008	0.014	0.015	-0.001
cjsig_0_cd:age_grp_cd	0.007	0.006	0.012	0.014	-0.002
cjsig_0_cd:unemplmt_cd	0.007	0.005	0.010	0.013	-0.003
cjsig_0_cd:CWSg_0_cd	0.007	0.005	0.014	0.013	0.001
srprobg_cd:age_grp_cd	0.008	0.006	0.013	0.014	-0.001
srprobg_cd:unemplmt_cd	0.008	0.005	0.013	0.013	0.000
srprobg_cd:CWSg_0_cd	0.008	0.005	0.013	0.013	0.000
age_grp_cd:unemplmt_cd	0.006	0.005	0.010	0.011	-0.001
age_grp_cd:CWSg_0_cd	0.006	0.005	0.012	0.011	0.001
unemplmt_cd:CWSg_0_cd	0.006	0.005	0.011	0.012	0.000

Supplemental Table 2. Variables retained by each method and level of influence within final model						
	HR (LASSO-M)	VARIMP (RF-M)	MINDEPTH (RF-M)	HR (LASSO-F)	VARIMP (RF-F)	MINDEPTH (RF-F)
Age group	**0.749**	**1.904**	**1.93**	**0.876**	**0.560**	**2.55**
Criminal justice involvement	**0.986**	**0.612**	**3.00**	**0.872**	**0.850**	**2.74**
Conduct disorder	**1.369**	**0.968**	**2.20**	**1.032**	**0.357**	**3.04**
Depression symptoms				**1.109**	**0.316**	**3.05**
Dual diagnosis	**1.296**	**0.784**	**3.16**			
Substance use problems	**1.063**	**0.904**	**2.97**		0.809	2.43
Current withdrawal symptoms				**1.301**	**0.394**	**2.62**
PTSD				**1.019**	**0.272**	**4.21**
General victimization					0.001	3.05
Treatment resistance index				**1.06**	**0.140**	**2.95**
Prior substance use treatment				1.088		
Unemployment					0.590	4.03
*threshold			5.31			6.07

Notes. Bold items highlight variables where different metrics agree across methods in terms of impacting survival. Items removed in earlier iterations or do not meet threshold values are omitted.