

Supplementary Online Content

Yennurajalingam S, Arthur J, Reddy S, et al. Frequency of and factors associated with nonmedical opioid use behavior among patients with cancer receiving opioids for cancer pain. *JAMA Oncol*. Published online January 7, 2021. doi:10.1001/jamaoncol.2020.6789

eBox. Nonmedical Opioid Use Behaviors

eFigure. Recursive Partitioning Classification and Regression Tree of Patients With the Presence of NMOU Behavior

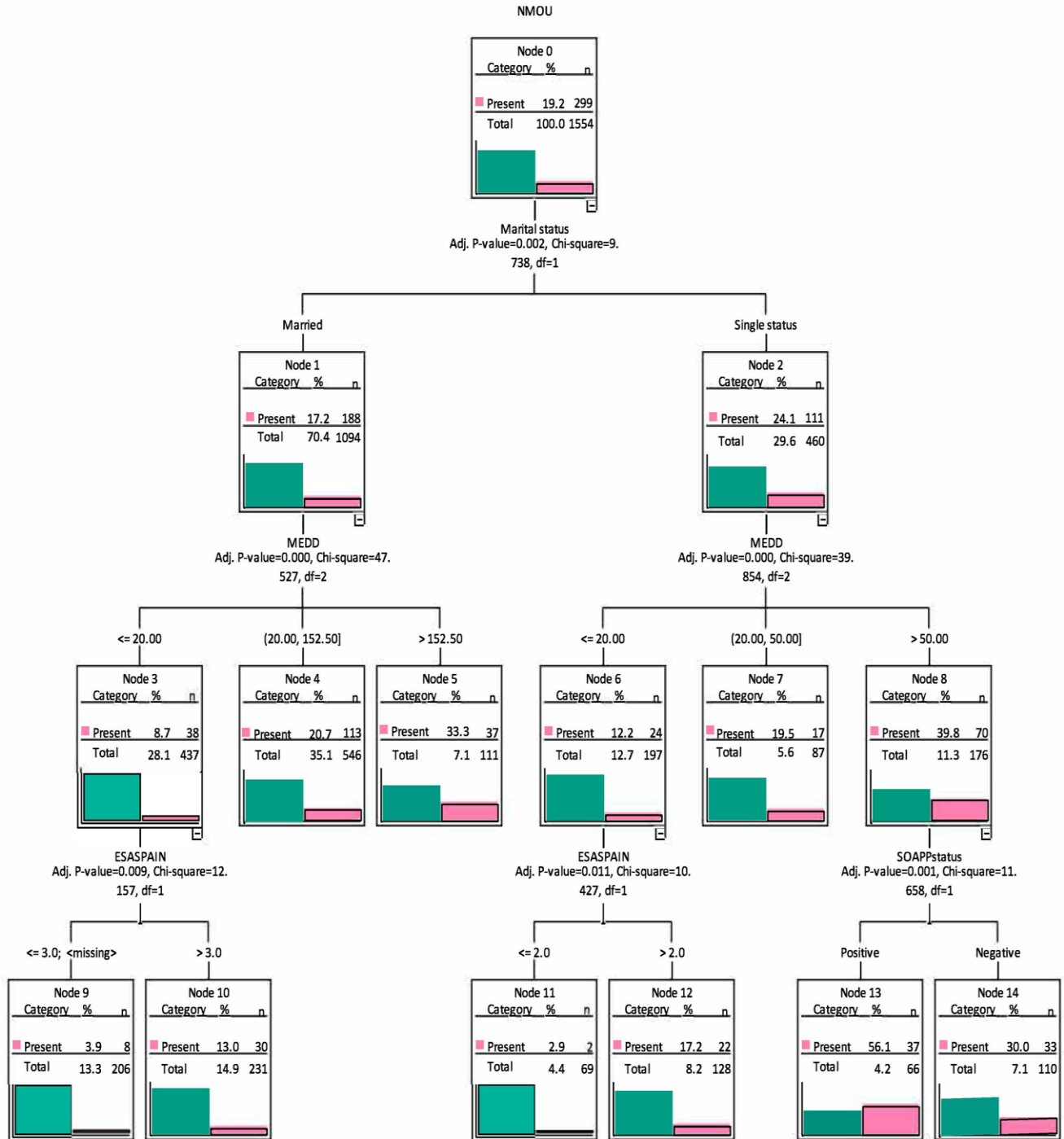
eTable. Demographic and Clinical Characteristics by NMOU Behavior Status

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

eBox. Nonmedical Opioid Use Behaviors

	Non-Medical Opioid Use behaviors
1	Frequent unscheduled clinic visits or phone calls for inappropriate refills
2	Self-escalation of opioid dose for excessive increase in the opioid dosage not consistent with patient's pain syndrome
3	Reports of lost or stolen opioid prescription/medication
4	Frequent emergency room visits for opioids
5	Seeking opioids from multiple physicians ("doctor shopping")
6	Request for specific opioid
7	Resistance to changes in the opioid regimen even when clinically indicated
8	Use of non-prescribed restricted medications or illicit drugs
9	Requesting opioids for their euphoric effects or for symptoms such as anxiety or insomnia
10	Reports of impaired functioning in daily activities due to opioid use
11	Family member expressing concern over the patient's opioid use
12	Reports of hoarding drugs
13	Reports of stealing or selling prescription drugs
14	Obtaining opioids from nonmedical sources, stealing, selling

eFigure. Recursive Partitioning Classification and Regression Tree of Patients With the Presence of NMOU Behavior



All patient demographic and clinical characteristics (Table 1) were evaluated. Nodes were pruned to 3 subgroups using a multivariate model [married status, daily opioid dose (MEDD), and cancer pain severity (ESAS Pain)] with the main outcome being the presence of NMOU behavior. In the figure, Pink Bar = % of patients with presence of NMOU Behavior; Green Bar = % of patients with absence of NMOU Behavior

Abbreviations: NMOU: Non-medical opioid use; ESAS, Edmonton Symptom Assessment System. MEDDs, Morphine Equivalent Daily Doses (mg/day); SOAP, Screener and Opioid Assessment for Patients with Pain tool.

eTable. Demographic and Clinical Characteristics by NMOU Behavior Status				
Covariates	No. of Patients (%)			
	NMOU Behavior Status			
	Total	NMOU Behavior Absent	NMOU Behavior Present	P^a
All patients, N (%)	1554(100%)	1255(80.6%)	299(19.4%)	<.001^b
Age in years, median (IQR)	61(52, 69)	61(53, 69)	60(49, 68)	.009^b
Outpatient SCC follow-up visits; Median (IQR)	2(1, 3)	2(1, 3)	3(2, 4)	<.001^b
Sex: Female, N (%)	816(52.5%)	663(81.3%)	153(18.8%)	.61
Race, N (%)				
Asian	99(6.4%)	79(79.8%)	20(20.2%)	.21
Black or African American	171(11%)	138(80.7%)	33(19.3%)	
Hispanic or Latino	114(7.3%)	91(79.8%)	23(20.2%)	
Other/Declined to Answer/Unknown	46(3%)	31(67.4%)	15(32.6%)	
White or Caucasian	1124(72.3%)	916(81.5%)	208(18.5%)	
Marital Status, N (%)				
Married	1094(70.9%)	906(82.8%)	188(17.2%)	.009^b
Single	183(11.9%)	135(73.8%)	48(26.2%)	
Smoking Status, N (%)				
Current Smoker	120(7.7%)	82(68.3%)	38(31.7%)	<.001^b
Former Smoker	633(40.9%)	504(79.6%)	129(20.4%)	
Never Smoker	796(51.4%)	665(83.5%)	131(16.5%)	
Cancer Diagnosis, N (%)				
Breast	222(14.3%)	176(79.3%)	46(20.7%)	.67
Gastrointestinal	257(16.6%)	214(83.3%)	43(16.7%)	
Genitourinary	183(11.8%)	146(79.8%)	37(20.2%)	
Gynecologic	122(7.9%)	99(81.1%)	23(18.9%)	
Head & Neck	263(17%)	213(81%)	50(19%)	
Leukemia/Lymphoma	66(4.3%)	56(84.8%)	10(15.2%)	
Melanoma	71(4.6%)	62(87.3%)	9(12.7%)	

Other	29(1.9%)	21(72.4%)	8(27.6%)	
Sarcoma	77(5%)	59(76.6%)	18(23.4%)	
Thoracic	260(16.8%)	206(79.2%)	54(20.8%)	
ECOG Performance Status, N (%)				
0-2	1072(69.1%)	864(80.6%)	208(19.4%)	.85
3-4	479(30.9%)	388(81.0%)	91(19.0%)	
CAGE, N (%)				
Positive (≥2)	179(11.5%)	131(73.2%)	48(26.8%)	.007 ^b
SOAPP Total, N (%)				
Positive (≥7)	328(21.1%)	240(73.2%)	88(26.8%)	<.001 ^b
	Total	NMOU Behavior Absent	NMOU Behavior Present	P^a
MEDDs in mg/day, median (IQR)	30(0 , 90)	30(0 , 75)	75(30 , 135)	<.001 ^b
ESAS Scores, median (IQR)				
Pain	6(3 , 8)	6(3 , 8)	7(5 , 8)	<.001 ^b
Fatigue	6(3 , 8)	6(3 , 8)	6(4 , 8)	.09
Nausea	0(0 , 4)	0(0 , 4)	0(0 , 4)	.79
Depression	1(0 , 4)	1(0 , 4)	1(0 , 4)	.76
Anxiety	2(0 , 5)	2(0 , 5)	3(0 , 6)	.40
Drowsiness	3(0 , 5)	3(0 , 5)	3(1 , 6)	.10
Dyspnea	1(0 , 4)	1(0 , 4)	1(0 , 4)	.74
Appetite	5(2 , 7)	5(2 , 7)	5(2 , 7)	.79
Well Being	5(3 , 7)	5(3 , 7)	5(3 , 7)	.26
Sleep	5(3 , 7)	5(3 , 7)	5(3 , 8)	.037 ^b
Financial Distress	2(0 , 5)	1(0 , 5)	2(0 , 5)	.013 ^b
Spiritual Pain	0(0 , 2)	0(0 , 2)	0(0 , 2)	.49
<p>Abbreviations: SCC: supportive care clinic; NMOU: Non-medical opioid use; ECOG Performance Status, Eastern Cooperative Oncology Group performance status; CAGE-AID, Cut Down-Annoyed-Guilty-Eye Opener assessment; ESAS, Edmonton Symptom Assessment System. MEDDs, Morphine Equivalent Daily Doses (mg/day); IQR, interquartile range; SOAPP, Screener and Opioid Assessment for Patients with Pain tool.</p> <p>a. P-value is testing the differences between frequencies in NMOU behaviors group present vs. absent. The chi-square test or the Fisher's exact test was used for categorical variables, and the Wilcoxon rank-sum test was used for continuous variables.</p> <p>b. These P values indicate a statistically significant difference.</p>				