Appendix

Predictors of Transitioning to Incident Chronic Opioid Therapy Among Working-Aged Adults in the United States

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Supplemental Table 1. Logistic regression with adjusted odds ratio (AOR) and 95% confidence interval (95%CI) for patients with incident opioid use by transition to chronic opioid therapy after first opioid prescription, using IQVIA's Real World Data: Adjudicated Claims - US, 2006-2015

	Model 1 in Training/Validation subsample			Model 1 in Test subsample			Fully-adjusted model in Training/ Validation subsample			Fully-adjusted model in Test subsample		
	AOR	95% CI	Sig	AOR	95% CI	Sig	AOR	95%CI	Sig	AOR	95% CI	Sig
Age (continuous)	1.02	[1.02,1.02]	***	1.02	[1.02,1.03]	***	1.02	[1.01,1.02]	***	1.02	[1.01,1.03]	***
Male vs. Female	1.45	[1.37,1.53]	***	1.43	[1.27,1.60]	***	1.50	[1.41,1.59]	***	1.46	[1.30,1.65]	***
Highly likely chronic pain vs. None	5.98	[5.01,7.11]	***	5.91	[4.18,8.20]	***	5.59	[4.68,6.66]	***	5.47	[3.89,7.68]	***
Likely chronic pain vs. None	2.15	[2.02,2.27]	***	2.08	[1.84,2.34]	***	2.08	[1.96,2.21]	***	2.02	[1.79,2.28]	***
Arthritis vs. None	1.83	[1.68,1.98]	***	1.92	[1.63,2.25]	***	1.78	[1.64,1.93]	***	1.86	[1.58,2.20]	***
Hydrocodone vs. Codeine	2.19	[1.87,2.58]	***	2.04	[1.49,2.87]	***	2.15	[1.83,2.52]	***	1.97	[1.42,2.73]	***
Oxycodone vs. Codeine	2.52	[2.13,3.01]	***	2.70	[1.92,3.90]	***	2.53	[2.13,3.02]	***	2.67	[1.87,3.81]	***

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	Model 1 in Training/Validation subsample			Model 1 in Test subsample			Fully-adjusted model in Training/ Validation subsample			Fully-adjusted model in Test subsample		
	AOR	95% CI	Sig	AOR	95% CI	Sig	AOR	95%CI	Sig	AOR	95% CI	Sig
Tramadol vs. Codeine	7.03	[5.99,8.31]	***	7.59	[5.53,10.74]	***	6.79	[5.77,8.01]	***	7.26	[5.20,10.13]	***
All other opioids vs. Codeine	6.03	[4.68,7.75]	***	5.71	[3.38,9.59]	***	5.89	[4.57,7.60]	***	5.64	[3.34,9.53]	***
Long-acting vs. Immediate release	16.01	[13.17,19.42]	***	12.43	[8.13,18.83]	***	16.08	[13.21,19.57]	***	12.28	[8.06,18.72]	***
Moderate vs. Low dose†	0.52	[0.47,0.57]	***	0.45	[0.37,0.55]	***	0.52	[0.47,0.57]	***	0.45	[0.37,0.54]	***
High vs. Low dose†	0.52	[0.41,0.65]	***	0.71	[0.47,1.05]		0.52	[0.41,0.65]	***	0.68	[0.45,1.02]	
Very high vs. Low dose†	1.77	[1.40,2.22]	***	1.27	[0.73,2.08]		1.72	[1.36,2.17]	***	1.24	[0.74,2.08]	
Benzodiazepine prescription vs. None	2.06	[1.90,2.22]	***	1.99	[1.69,2.33]	***	1.82	[1.67,1.97]	***	1.82	[1.54,2.16]	***
Drug use disorder diagnosis vs. None	8.17	[6.75,9.83]	***	4.96	[3.13,7.58]	***	6.32	[5.17,7.73]	***	4.02	[2.53,6.40]	***
Self vs. Spouse	--			--			0.96	[0.88,1.05]		0.84	[0.71,1.01]	
Unknown vs. Spouse	--			--			1.30	[1.19,1.42]	***	1.19	[1.00,1.43]	
Other vs. Spouse	--			--			0.82	[0.70,0.97]	*	0.93	[0.67,1.28]	
PPO vs. HMO	--			--			1.06	[0.96,1.16]		1.20	[0.99,1.46]	
Other‡ vs. HMO	--			--			0.86	[0.77,0.96]	**	1.06	[0.84,1.34]	
Midwest vs. East	--			--			1.13	[1.03,1.24]	**	1.28	[1.06,1.55]	**
South vs. East	--			--			1.21	[1.11,1.32]	***	1.31	[1.08,1.58]	**

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	Model 1 in Training/Validation subsample			Model 1 in Test subsample			Fully-adjusted model in Training/ Validation subsample			Fully-adjusted model in Test subsample		
	AOR	95% CI	Sig	AOR	95% CI	Sig	AOR	95%CI	Sig	AOR	95% CI	Sig
West vs. East	--			--			1.02	[0.90,1.15]		1.28	[0.99,1.64]	
Continued												
Cardio-metabolic condition vs. None	--			--			1.17	[1.10,1.25]	***	0.90	[0.79,1.03]	
Mental illness vs. None	--			--			1.34	[1.25,1.45]	***	0.78	[0.67,0.91]	**
Asthma vs. None	--			--			0.87	[0.76,1.00]	*	0.85	[0.64,1.13]	
COPD vs. None	--			--			1.24	[0.92,1.67]		1.66	[0.92,3.02]	
Dementia vs. None	--			--			1.33	[0.84,2.11]		1.75	[0.73,4.17]	
Hepatitis vs. None	--			--			1.55	[1.18,2.04]	**	1.94	[1.19,3.15]	**
Osteoporosis vs. None	--			--			1.44	[1.14,1.83]	**	1.04	[0.59,1.83]	
Tobacco vs. None	--			--			1.45	[1.29,1.64]	***	1.34	[1.04,1.73]	*
Any alcohol abuse vs. None	--			--			0.93	[0.73,1.18]		0.78	[0.45,1.34]	
Acute pain condition vs. None	--			--			0.86	[0.67,1.10]		0.95	[0.59,1.53]	
Stimulant prescription vs. None	--			--			1.65	[1.40,1.95]	***	1.33	[0.93,1.91]	
Non-opioid analgesic vs. None	--			--			1.06	[0.99,1.13]		1.14	[1.00,1.29]	*

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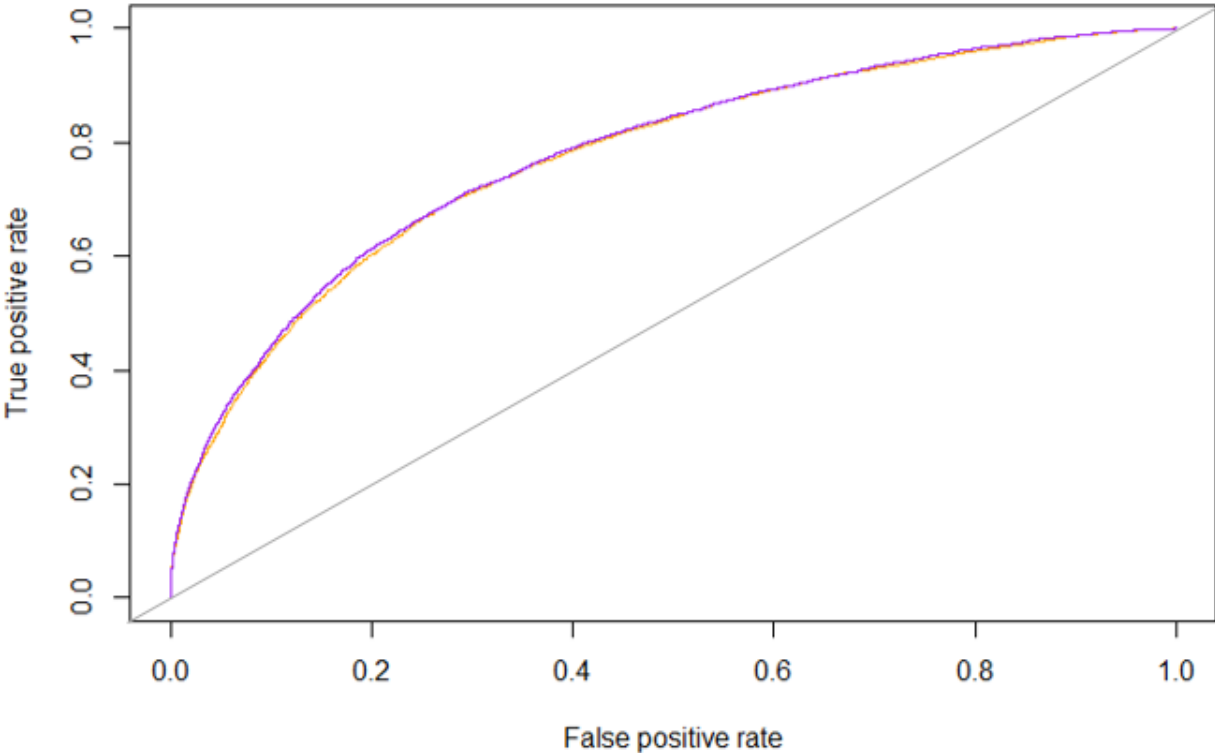|	Model 1 in Training/Validation subsample			Model 1 in Test subsample			Fully-adjusted model in Training/ Validation subsample			Fully-adjusted model in Test subsample		
	AOR	95% CI	Sig	AOR	95% CI	Sig	AOR	95%CI	Sig	AOR	95% CI	Sig
Polypharmacy vs. None	--			--			1.09	[1.02,1.17]	*	1.03	[0.90,1.19]	

Note: This sample includes patients from IQVIA's Real World Data: Adjudicated Claims - US, which were identified between 2007 and 2015 and had enrollment between 2006-2015. These patients were between 28-63 years old, without cancer, had complete demographic information available, and had only one opioid prescription on the index date. Due to data use requirements, some categories were collapsed. These include insurance plan type and other opioids.

†: Doses of opioids were converted to a standardized dose (milligrams of morphine equivalent) using the Centers for Medicare and Medicaid Services conversion table.

‡: Other insurance types included fee-for-service, health savings account, and indemnity.

Significance: $0 < p < 0.001 = ***, 0.001 \leq p\ 0.01 = **, 0.01 \leq p < 0.05 = *$

Supplemental Figure 1: Receiver operator characteristic (ROC) curves for Model 1 (orange, AUC = 0.767) and Fully Adjusted Model 2 (purple, AUC = 0.778) using the training/validation subsamples

Supplemental Figure 2. Receiver operator characteristic (ROC) curves for Model 1 using the training/validation subsample (black, AUC = 0.767) and Model 1 using the test subsample (green, AUC = 0.776).