

Table S8: Estimated Hospital Level Usage of Multimodal Therapy Based on Mixed-Effects Models Divided for Patients Undergoing Below-Knee Amputations

Models	β_0 (SE) ^a	σ^2 (SE) ^b	Multimodal Therapy Usage Rate (%)		
			Average Hospital ^c	2.5 Percentile ^d	97.5 Percentile
One or More Non-Opioid Analgesics					
Unadjusted	1.65 (0.068)	1.29 (0.12)	83.91	36.07	97.97
Fully Adjusted*	1.69 (0.064)	1.12 (0.11)	84.42	40.56	97.73
Two or More Non-Opioid Analgesics					
Unadjusted	-0.61 (0.041)	0.46 (0.047)	35.16	12.58	67.15
Fully Adjusted*	-0.64 (0.038)	0.38 (0.040)	34.52	13.64	63.76

^a β_0 is the marginal (averaged across hospitals) odds of using multimodal therapy for a patient with the mean propensity score

^b Estimate of the between-hospital variation. The random intercept b_j for each hospital is assumed to be normally distributed with mean 0 and variance σ^2 . σ^2 represents the hospital-specific deviation from β_0 . With increasing levels of adjustment, there is less unexplained variation and σ^2 is expected to decrease.

^c Prescribing proportion for the “average” patient, defined as a patient with a mean propensity score. The average differs slightly between models since different factors are being adjusted for in the various models; it is estimated as $\exp(\beta_0)/[1 + \exp(\beta_0)]$.

^d Range determined from observed predicted values

* Adjusted for surgery type, demographics, year of hospitalization, medical comorbidities, pain related conditions, psychiatric comorbidities, medication usage and hospital characteristics

Table S9: Estimated Hospital Level Usage of Multimodal Therapy Based on Mixed-Effects Models Divided for Patients Undergoing Colectomies

Models	β_0 (SE) ^a	σ^2 (SE) ^b	Multimodal Therapy Usage Rate (%)		
			Average Hospital ^c	2.5 Percentile ^d	97.5 Percentile
One or More Non-Opioid Analgesics					
Unadjusted	0.99 (0.052)	0.84 (0.072)	73.00	31.01	94.21
Fully Adjusted*	1.00 (0.051)	0.79 (0.068)	73.12	32.38	93.92
Two or More Non-Opioid Analgesics					
Unadjusted	-1.20 (0.045)	0.63 (0.056)	23.12	5.99	58.69
Fully Adjusted*	-1.27 (0.044)	0.59 (0.053)	21.94	5.84	56.02

^a β_0 is the marginal (averaged across hospitals) odds of using multimodal therapy for a patient with the mean propensity score

^b Estimate of the between-hospital variation. The random intercept b_j for each hospital is assumed to be normally distributed with mean 0 and variance σ^2 . σ^2 represents the hospital-specific deviation from β_0 . With increasing levels of adjustment, there is less unexplained variation and σ^2 is expected to decrease.

^c Prescribing proportion for the “average” patient, defined as a patient with a mean propensity score. The average differs slightly between models since different factors are being adjusted for in the various models; it is estimated as $\exp(\beta_0)/[1 + \exp(\beta_0)]$.

^d Range determined from observed predicted values

* Adjusted for surgery type, demographics, year of hospitalization, medical comorbidities, pain related conditions, psychiatric comorbidities, medication usage and hospital characteristics

Table S10: Estimated Hospital Level Usage of Multimodal Therapy Based on Mixed-Effects Models Divided for Patients Undergoing Lobectomies

Models	β_0 (SE) ^a	σ^2 (SE) ^b	Multimodal Therapy Usage Rate (%)		
			Average Hospital ^c	2.5 Percentile ^d	97.5 Percentile
One or More Non-Opioid Analgesics					
Unadjusted	2.59 (0.10)	2.53 (0.26)	93.01	37.04	99.67
Fully Adjusted*	2.63 (0.099)	2.40 (0.25)	93.27	39.90	99.66
Two or More Non-Opioid Analgesics					
Unadjusted	0.10 (0.070)	1.41 (0.13)	52.38	9.73	91.82
Fully Adjusted*	0.18 (0.068)	1.30 (0.12)	54.56	11.35	91.85

^a β_0 is the marginal (averaged across hospitals) odds of using multimodal therapy for a patient with the mean propensity score

^b Estimate of the between-hospital variation. The random intercept b_j for each hospital is assumed to be normally distributed with mean 0 and variance σ^2 . σ^2 represents the hospital-specific deviation from β_0 . With increasing levels of adjustment, there is less unexplained variation and σ^2 is expected to decrease.

^c Prescribing proportion for the “average” patient, defined as a patient with a mean propensity score. The average differs slightly between models since different factors are being adjusted for in the various models; it is estimated as $\exp(\beta_0)/[1 + \exp(\beta_0)]$.

^d Range determined from observed predicted values

* Adjusted for surgery type, demographics, year of hospitalization, medical comorbidities, pain related conditions, psychiatric comorbidities, medication usage and hospital characteristics

Table S11: Estimated Hospital Level Usage of Multimodal Therapy Based on Mixed-Effects Models Divided for Patients Undergoing Total Knee Arthroplasties

Models	β_0 (SE) ^a	σ^2 (SE) ^b	Multimodal Therapy Usage Rate (%)		
			Average Hospital ^c	2.5 Percentile ^d	97.5 Percentile
<u>One or More Non-Opioid Analgesics</u>					
Unadjusted	3.04 (0.12)	4.27 (0.36)	95.43	26.72	99.92
Fully Adjusted*	-	-	-	-	-
<u>Two or More Non-Opioid Analgesics</u>					
Unadjusted	0.59 (0.089)	2.48 (0.21)	64.35	7.60	97.54
Fully Adjusted**	0.73 (0.087)	2.37 (0.20)	67.51	9.24	97.70

^a β_0 is the marginal (averaged across hospitals) odds of using multimodal therapy for a patient with the mean propensity score

^b Estimate of the between-hospital variation. The random intercept b_j for each hospital is assumed to be normally distributed with mean 0 and variance σ^2 . σ^2 represents the hospital-specific deviation from β_0 . With increasing levels of adjustment, there is less unexplained variation and σ^2 is expected to decrease.

^c Prescribing proportion for the “average” patient, defined as a patient with a mean propensity score. The average differs slightly between models since different factors are being adjusted for in the various models; it is estimated as $\exp(\beta_0)/[1 + \exp(\beta_0)]$.

^d Range determined from observed predicted values

* Mixed-effects regression model did not reach convergence

** Adjusted for surgery type, demographics, year of hospitalization, medical comorbidities, pain related conditions, psychiatric comorbidities, medication usage and hospital characteristics