**Supplemental Methods**

*Duke Perioperative Optimization of Senior Health Clinic***:** This clinic provides multidisciplinary preoperative assessment and postoperative geriatrician follow-up to improve outcomes for older adults undergoing elective surgery. The preoperative assessment team at this clinic includes a geriatrician, geriatric resource nurse, social worker, program administrator, and nurse practitioner from the Preoperative Anesthesia Testing clinic, and includes a comprehensive preoperative geriatric evaluation. The team actively engages patients and their families in preoperative risk assessment and modification, focusing on specific “care points” considered crucial for optimizing care: cognition, medications, comorbidities, mobility, functional status, nutrition, hydration, pain, and advanced care planning. To facilitate implementation of preoperative clinic recommendations, the inpatient geriatrics team follows these patients after surgery and assists with managing medications, chronic conditions, pain, and common complications including delirium.

*Intraoperative Pharmacology*

Since the two main intravenous medium and long acting opioids administered in both patient cohorts were fentanyl and hydromorphone, the intravenous doses of these two drugs were converted into oral morphine equivalents and combined to give a total dose of medium and long acting intraoperative opioid administered (in oral morphine equivalents).

Supplemental Table 1. Cohort description by Low DARS status, where Low DARS is defined at the average cut point. Factors summarized as count (%) for categorical variables and mean (SD) or median [Q1, Q3] for numeric variables.

|  | Non-Low DARS (N=96) | Low DARS (N=43) | P values |
| --- | --- | --- | --- |
| **Site** |   |   | 0.0151 |
|     Duke | 41 (42.7%) | 28 (65.1%) |  |
|     Mt Sinai | 55 (57.3%) | 15 (34.9%) |  |
| **Age** | 73 (6) | 74 (7) | 0.2552 |
| **Gender (Male)** | 46 (47.9%) | 14 (32.6%) | 0.0911 |
| **BMI (kg/m2)** | 29.2 (7.7) | 28.9 (8.0) | 0.8632 |
| **ACB Score\*** |  0 [0, 1] | 1 [0, 1] | 0.0753 |
| **ASA Status** |  |  | 0.1873 |
|  2 | 23 (24.0%) | 5 (11.6%) |  |
|  3 | 69 (71.9%) | 37 (86.0%) |  |
|  4 | 4 (4.2%) | 1 (2.3%) |  |
| **Surgery Category** |   |   | 0.1831 |
|     General | 41 (42.7%) | 18 (41.9%) |  |
|     Orthopedic | 30 (31.3%) | 20 (46.5%) |  |
|     Thoracic | 13 (13.5%) | 3 (7.0%) |  |
|     Urologic | 12 (12.5%) | 2 (4.7%) |  |
| **Procedure Length (min)** | 154 [111, 213]  | 149 [108, 212] | 0.7993 |
| **Primary Gas Used** |   |   | 0.4891 |
|     Desflurane | 32 (33.3%) | 10 (23.3%) |  |
|     Isoflurane | 37 (38.5%) | 19 (44.2%) |  |
|     Sevoflurane | 27 (28.1%) | 14 (32.6%) |  |
| **Case Average aaMAC** | 1.11 (0.36) | 0.80 (0.17) | <0.0012 |
| **aaMAC Hours** | 3.05 (1.81) | 2.10 (1.10) | <0.0012 |
| **Case Average BIS** | 51.28 (8.29) | 41.76 (6.00) | <0.0012 |
| **Case Average BIS <45** | 22 (22.9%) | 28 (65.1%) | <0.0011 |
| **DARS** |  35.512 [31.488, 41.895] |  25.528 [22.234, 26.614] | <0.0013 |

p-value key: 1 Chi-square test, 2 t-test, 3 Wilcoxon rank sum test

 \*ACB score not available for 2 patients with Low DARS.

Supplemental table 2. Full Model details for results presented in Table 2 of the main paper. Cell values are OR (95% CI) and p-values from logistic regression models, row section headers for each model list the model fit statistics for comparison.

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Conservative DARS | Average DARS | Liberal DARS |
|  | OR (95% CI) | p-value | OR (95% CI) | p-value | OR (95% CI) | p-value |
| 1. DARS + Site (R2/C-Index) | 0.150/0.701 | 0.156/0.702 | 0.119/0.683 |
| DARS | 4.64 (1.92, 11.39) | 0.001 | 4.30 (1.89, 10.01) | 0.001 | 3.24 (1.46, 7.40) | 0.004 |
| Site (Duke vs Mt S) | 1.91 (0.85, 4.45) | 0.123 | 1.59 (0.69, 3.72) | 0.276 | 1.71 (0.76, 3.94) | 0.199 |
| 2. DARS + Site + Risk Factors (R2/C-Index) | 0.245/0.734 | 0.259/0.746 | 0.235/0.732 |
| DARS | 3.74 (1.52, 9.32) | 0.005 | 3.79 (1.63, 9.10) | 0.003 | 3.16 (1.37, 7.55) | 0.009 |
| Age | 1.04 (0.97, 1.11) | 0.258 | 1.04 (0.97, 1.11) | 0.278 | 1.04 (0.97, 1.11) | 0.298 |
| ACB Score | 1.30 (0.99, 1.73) | 0.074 | 1.25 (0.95, 1.69) | 0.130 | 1.29 (0.98, 1.73) | 0.089 |
| Procedure Duration | 1.01 (1.00, 1.01) | 0.027 | 1.01 (1.00, 1.01) | 0.021 | 1.01 (1.00, 1.01) | 0.013 |
| Gender (M v F) | 0.82 (0.34, 1.93) | 0.657 | 0.88 (0.36, 2.09) | 0.772 | 0.88 (0.37, 2.08) | 0.777 |
| ASA | 0.75 (0.28, 2.00) | 0.571 | 0.73 (0.27, 1.98) | 0.538 | 0.73 (0.27, 1.98) | 0.540 |
| Site (Duke vs Mt S) | 1.76 (0.74, 4.32) | 0.217 | 1.58 (0.65, 3.88) | 0.324 | 1.66 (0.70, 4.05) | 0.265 |
| 3. DARS + Site + Medications (R2/C-Index) | 0.295/0.754 | 0.300/0.764 | 0.267/0.746 |
| DARS | 4.57 (1.84, 11.58) | 0.002 | 4.21 (1.80, 10.16) | 0.002 | 3.44 (1.47, 8.34) | 0.006 |
| Opioids | 1.00 (0.98, 1.02) | 0.917 | 1.00 (0.98, 1.03) | 0.735 | 1.00 (0.98, 1.03) | 0.716 |
| Midazolam | 0.71 (0.38, 1.24) | 0.262 | 0.68 (0.35, 1.21) | 0.216 | 0.66 (0.35, 1.16) | 0.178 |
| Propofol | 1.00 (1.00, 1.00) | 0.813 | 1.00 (1.00, 1.00) | 0.942 | 1.00 (1.00, 1.00) | 0.984 |
| Ketamine | 1.00 (0.99, 1.02) | 0.723 | 1.00 (0.99, 1.02) | 0.738 | 1.00 (0.99, 1.02) | 0.675 |
| Phenylephrine | 1.15 (1.03, 1.31) | 0.026 | 1.14 (1.03, 1.30) | 0.028 | 1.15 (1.03, 1.30) | 0.025 |
| Dexmedetomidine | 1.03 (0.97, 1.14) | 0.420 | 1.04 (0.98, 1.15) | 0.355 | 1.04 (0.98, 1.15) | 0.313 |
| N2O use | 0.23 (0.00, 3.43) | 0.446 | 0.31 (0.00, 4.30) | 0.531 | 0.31 (0.00, 4.35) | 0.528 |
| Site (Duke vs. Mt S) | 1.58 (0.50, 5.03) | 0.444 | 1.43 (0.45, 4.62) | 0.550 | 1.50 (0.49, 4.71) | 0.485 |

Supplemental Table 3. Log-linear models of the relationship between Low DARS and postoperative delirium at the three different cut point locations for a low DARS.

|  |  |  |  |
| --- | --- | --- | --- |
| Model | Conservative DARS | Average DARS | Liberal DARS |
|  | RR (95% CI) | P-value | RR (95% CI) | P-value | RR (95% CI) | P-value |
| 1. DARS +Site  | 2.64 (1.54, 4.53) | <0.001 | 2.77 (1.55, 4.96) | 0.006 | 2.32 (1.28, 4.21) | 0.006 |
| 2. DARS + Site +Risk Factors | 1.78 (1.08, 2.95) | 0.024 | 1.89 (1.15, 3.09) | 0.012 | 1.74 (1.05, 2.90) | 0.032 |
| 3. DARS + Site +Medications | 1.89 (1.18, 3.03) | 0.008 | 1.80 (1.13, 2.86) | 0.014 | 1.70 (1.04, 2.75) | 0.033 |