**Supplemental Digital Content 4. Regression Coefficients and Model Fit Characteristics for the Various Models Tested**

**Table e1. Logistic Regression for Postoperative Delirium (N = 1,113)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Coefficient** | **Odds Ratio (99.5% CI)** | **P value** |
| Intercept | -1.79 |  |  |
| Preoperative Abnormal Cognition | 0.793 | 2.21 (1.46 to 3.33) | <0.001 |
| EEG Suppression (per 5 min) | 0.043 | 1.04 (1.03 to 1.06) | <0.001 |

Hosmer-Lemeshow goodness of fit test: χ2(8) = 6.079, p = 0.638

C statistic: 0.679

**Table e2. Logistic Regression for Postoperative Delirium, with Interaction (N = 1,113)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Coefficient** | **Odds Ratio (99.5% CI)** | **P value** |
| Intercept | -1.75 |  |  |
| Preoperative Abnormal Cognition | 0.702 | 2.02 (1.23 to 3.30) | <0.001 |
| EEG Suppression (per 5 min) | 0.037 | 1.04 (1.01 to 1.06) | <0.001 |
| Preoperative Abnormal Cognition \*EEG Suppression | 0.012 | 1.01 (0.98 to 1.05) | 0.350 |

Hosmer-Lemeshow goodness of fit test: χ2(8) = 5.369, p = 0.718

C statistic: 0.679

**Table e3. Poisson Regression for Duration of EEG Suppression (N = 1,113)a**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Coefficient** | **Bootstrapped 99.5% Confidence Interval** |
| Intercept | -2.49 |  |
| Preoperative Abnormal Cognition | 0.430 | 0.142 to 0.717 |

a – Model used duration of anesthesia (minutes) as an offset.

Model R squared: 0.0837



**Figure e1. Residuals versus predicted values for the Poisson regression shown in Table e3.**The loess smoother (red curve) suggests a model violation; duration of EEG suppression is slightly less in higher predicted value (primarily longer) cases than one would expect based on a pure per-minute risk. Visual inspection suggests that the response may be somewhat zero-inflated either because of a true hurdle effect or because of technical difficulties causing EEG values to register as unsuppressed.

**Table e4. Logistic Regression for Postoperative Delirium, Adjusting for Baseline Patient Characteristics and Intraoperative Factors (N = 961)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Coefficient** | **Odds Ratio (99.5% CI)** | **P value** |
| Intercept | -4.764 |  |  |
| Preoperative Abnormal Cognition | 0.741 | 2.10 (1.31 to 3.35) | <0.001 |
| EEG Suppression (per 5 min) | 0.026 | 1.03 (1.01 to 1.05) | <0.001 |
| Age (per year) | 0.024 | 1.02 (0.99 to 1.06) | 0.050 |
| Male Sex | -0.413 | 0.66 (0.41 to 1.08) | 0.018 |
| White Race | -0.456 | 0.63 (0.30 to 1.32) | 0.081 |
| American Society of Anesthesiologists class > 3 | 0.267 | 1.31 (0.76 to 2.24) | 0.166 |
| Ever Smoked | 0.384 | 1.47 (0.89 to 2.41) | 0.030 |
| Number of Comorbid Conditions (per condition) | 0.125 | 1.13 (1.02 to 1.26) | 0.001 |
| Procedure Risk (per unit) | 0.216 | 1.24 (0.98 to 1.58) | 0.012 |
| Duration of Anesthesia (per hr) | 0.166 | 1.18 (1.04 to 1.34) | <0.001 |
| Packed Red Blood Cell (per unit) | 0.144 | 1.15 (1.01 to 1.32) | <0.001 |

Hosmer-Lemeshow goodness of fit test: χ2(8) = 13.103, p = 0.1084

C statistic: 0.773

**Table e5. Poisson Regression for Duration of EEG Suppression, Adjusting for Baseline Patient Characteristics and Intraoperative Factors (N = 961)a**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Coefficient** | **Bootstrapped 99.5% Confidence Interval** |
| Intercept | -7.429 |  |
| Preoperative Abnormal Cognition | 0.389 | 0.093 to 0.685 |
| Age (per year) | 0.032 | 0.008 to 0.056 |
| Male Sex | -0.200 | -0.495 to 0.094 |
| White Race | -0.261 | -0.699 to 0.178 |
| American Society of Anesthesiologists class > 3 | 0.346 | 0.002 to 0.690 |
| Ever Smoked | 0.008 | -0.303 to 0.319 |
| Number of Comorbid Conditions (per condition) | 0.055 | -0.016 to 0.127 |
| Procedure Risk (per unit) | -0.057 | -0.211 to 0.096 |
| Mean End-Tidal Anesthetic Concentration (per minimum alveolar concentration unit) | 3.188 | 2.184 to 4.191 |
| Total Opioid Dose (per morphine equivalent in mg) | 0.003 | -0.001 to 0.007 |
| Total Propofol Dose (per mg) | 0.001 | -0.001 to 0.002 |

a – Model used duration of anesthesia (minutes) as an offset.

Model R squared: 0.2088



**Figure e2. Residuals versus predicted values for the Poisson regression shown in Table e5.**The loess smoother (red curve) suggests a model violation; duration of EEG suppression is slightly less in higher predicted value (primarily longer) cases than one would expect based on a pure per-minute risk. Visual inspection suggests that the response may be somewhat zero-inflated either because of a true hurdle effect or because of technical difficulties causing EEG values to register as unsuppressed.

**Table e6. Linear Regression for Duration of EEG Suppression (N = 1,113)**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Coefficient** | **Bootstrapped 99.5% Confidence Interval** |
| Intercept | -11.424 |  |
| Preoperative Abnormal Cognition | 14.612 | 4.809 to 24.415 |
| Duration of Anesthesia (per min) | 0.118 | 0.092 to 0.144 |

Model R squared: 0.0844



**Figure e3. Residuals versus predicted values for the linear regression shown in Table e6.**The loess smoother (red curve) suggests a model violation; duration of EEG suppression is slightly less in higher predicted value (primarily longer) cases than one would expect based on a pure per-minute risk. Visual inspection suggests that the response may be somewhat zero-inflated either because of a true hurdle effect or because of technical difficulties causing EEG values to register as unsuppressed.

**Table e7. Logistic Regression for Postoperative Delirium (Alternative Definition of Duration of EEG Suppression), Adjusting for Baseline Patient Characteristics and Intraoperative Factors (N = 931)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Coefficient** | **Odds Ratio (99.5% CI)** | **P value** |
| Intercept | -4.707 |  |  |
| Preoperative Abnormal Cognition | 0.758 | 2.13 (1.32 to 3.45) | <0.001 |
| EEG Suppression (per 5 min)a | 0.102 | 1.11 (1.03 to 1.20) | <0.001 |
| Age (per year) | 0.021 | 1.02 (0.99 to 1.06) | 0.093 |
| Male Sex | -0.393 | 0.68 (0.41 to 1.12) | 0.029 |
| White Race | -0.529 | 0.59 (0.28 to 1.24) | 0.045 |
| American Society of Anesthesiologists class > 3 | 0.118 | 1.12 (0.64 to 1.98) | 0.560 |
| Ever Smoked | 0.409 | 1.50 (0.90 to 2.51) | 0.025 |
| Number of Comorbid Conditions (per condition) | 0.150 | 1.16 (1.04 to 1.30) | <0.001 |
| Procedure Risk (per unit) | 0.266 | 1.30 (1.02 to 1.67) | 0.003 |
| Duration of Anesthesia (per hr) | 0.182 | 1.20 (1.06 to 1.36) | <0.001 |
| Packed Red Blood Cell (per unit) | 0.148 | 1.16 (1.01 to 1.33) | 0.002 |

a – The alternative definition defines duration of EEG suppression as the number of seconds with an isoelectric EEG, rather than number of minutes with suppression ratio >1.

Hosmer-Lemeshow goodness of fit test: χ2(8) = 9.546, p = 0.298

C statistic: 0.782

**Table e8. Poisson Regression for Duration of EEG Suppression (Alternative Definition of Duration of EEG Suppression), Adjusting for Baseline Patient Characteristics and Intraoperative Factors (N = 931)a**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Coefficient** | **Bootstrapped 99.5% Confidence Interval** |
| Intercept | -6.416 |  |
| Preoperative Abnormal Cognition | 0.481 | 0.084 to 0.877 |
| Age (per year) | 0.034 | 0.004 to 0.064 |
| Male Sex | -0.342 | -0.779 to 0.095 |
| White Race | -0.267 | -0.980 to 0.447 |
| American Society of Anesthesiologists class > 3 | 0.726 | 0.229 to 1.224 |
| Ever Smoked | 0.079 | -0.378 to 0.536 |
| Number of Comorbid Conditions (per condition) | 0.018 | -0.091 to 0.127 |
| Procedure Risk (per unit) | -0.100 | -0.344 to 0.144 |
| Mean End-Tidal Anesthetic Concentration (per minimum alveolar concentration unit) | 4.670 | 3.215 to 6.124 |
| Total Opioid Dose (per morphine equivalent in mg) | 0.004 | -0.002 to 0.010 |
| Total Propofol Dose (per mg) | 0.001 | -0.001 to 0.002 |

a – Model used duration of anesthesia (minutes) as an offset.

Model R squared: 0.2142



**Figure e4. Residuals versus predicted values for the Poisson regression shown in Table e8.**The loess smoother (red curve) suggests a model violation; duration of EEG suppression is slightly less in higher predicted value (primarily longer) cases than one would expect based on a pure per-minute risk. Visual inspection suggests that the response may be somewhat zero-inflated either because of a true hurdle effect or because of technical difficulties causing EEG values to register as unsuppressed.

**Table e9. Logistic Regression for Postoperative Delirium (Using Duration of Bispectral Index < 40), Adjusting for Baseline Patient Characteristics and Intraoperative Factors (N = 931)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Coefficient** | **Odds Ratio (99.5% CI)** | **P value** |
| Intercept | -5.229 |  |  |
| Preoperative Abnormal Cognition | 0.787 | 2.20 (1.38 to 3.50) | <0.001 |
| Bispectral Index < 40 (per 5 min)a | 0.012 | 1.01 (1.00 to 1.01) | 0.015 |
| Age (per year) | 0.030 | 1.03 (1.00 to 1.07) | 0.012 |
| Male Sex | -0.369 | 0.69 (0.42 to 1.12) | 0.033 |
| White Race | -0.515 | 0.60 (0.29 to 1.24) | 0.047 |
| American Society of Anesthesiologists class > 3 | 0.314 | 1.37 (0.80 to 2.34) | 0.101 |
| Ever Smoked | 0.393 | 1.48 (0.91 to 2.43) | 0.025 |
| Number of Comorbid Conditions (per condition) | 0.133 | 1.14 (1.03 to 1.27) | <0.001 |
| Procedure Risk (per unit) | 0.188 | 1.21 (0.95 to 1.54) | 0.028 |
| Duration of Anesthesia (per hr) | 0.160 | 1.17 (1.04 to 1.33) | <0.001 |
| Packed Red Blood Cell (per unit) | 0.160 | 1.17 (1.02 to 1.34) | 0.001 |

a – The alternative definition defines duration of EEG suppression as the number of seconds with an isoelectric EEG, rather than number of minutes with suppression ratio >1.

Hosmer-Lemeshow goodness of fit test: χ2(8) = 15.472, p = 0.051

C statistic: 0.768

**Table e10. Poisson Regression for Duration of Bispectral Index < 40, Adjusting for Baseline Patient Characteristics and Intraoperative Factors (N = 931)a**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Coefficient** | **Bootstrapped 99.5% Confidence Interval** |
| Intercept | -1.231 |  |
| Preoperative Abnormal Cognition | 0.135 | -0.063 to 0.333 |
| Age (per year) | -0.021 | -0.036 to -0.005 |
| Male Sex | -0.321 | -0.516 to -0.126 |
| White Race | 0.008 | -0.319 to 0.335 |
| American Society of Anesthesiologists class > 3 | 0.049 | -0.179 to 0.277 |
| Ever Smoked | -0.071 | -0.268 to 0.126 |
| Number of Comorbid Conditions (per condition) | -0.006 | -0.053 to 0.041 |
| Procedure Risk (per unit) | 0.072 | -0.020 to 0.165 |
| Mean End-Tidal Anesthetic Concentration (per minimum alveolar concentration unit) | 1.565 | 0.808 to 2.321 |
| Total Opioid Dose (per morphine equivalent in mg) | 0.001 | -0.002 to 0.004 |
| Total Propofol Dose (per mg) | <0.001 | -0.001 to 0.001 |

a – Model used duration of anesthesia (minutes) as an offset.

Model R squared: 0.1770



**Figure e5. Residuals versus predicted values for the Poisson regression shown in Table e10.**The loess smoother (red curve) suggests a model violation; duration of EEG suppression is slightly less in higher predicted value (primarily longer) cases than one would expect based on a pure per-minute risk. Visual inspection suggests that the response may be somewhat zero-inflated either because of a true hurdle effect or because of technical difficulties causing EEG values to register as unsuppressed.