**Suppl 3**

**Table 3.** Multivariable Regression Model 2: Morbidity Subgroups

| **Characteristics** | **Prolonged LOS** | **Cardiovascular complication** | **Pulmonary complication** | **Post-operative infection** | **Wound complication** | **Renal complication** | **Gastrointestinal complication** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **OR (95% CI)** | **P value** | **OR (95% CI)** | **P value** | **OR (95% CI)** | **P value** | **OR (95% CI)** | **P value** | **OR (95% CI)** | **P value** | **OR (95% CI)** | **P value** | **OR (95% CI)** | **P value** |
| Age groups |  |  |  |  |  |  |  |  |  |  |  |  |   |  |
|  Under 65 | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - |
|  65 - 74 | 0.98 (0.95, 1.02) | 0.485 | 1.88 (1.77, 1.99) | < 0.001 | 1.54 (1.46, 1.62) | < 0.001 | 1.63 (1.56, 1.70) | < 0.001 | 1.00 (0.93, 1.07) | 0.998 | 1.81 (1.68, 1.95) | < 0.001 | 1.53 (1.48, 1.58) | < 0.001 |
|  75 - 84 | 1.02 (0.99, 1.06) | 0.091 | 2.57 (2.43, 2.73) | < 0.001 | 1.80 (1.71, 1.90) | < 0.001 | 2.06 (1.98, 2.15) | < 0.001 | 0.94 (0.88, 1.02) | 0.159 | 2.25 (2.08, 2.43) | 0.091 | 1.72 (1.66, 1.78) | < 0.001 |
|  85+ | 0.92 (0.89, 0.96) | < 0.001 | 2.94 (2.74, 3.16) | < 0.001 | 2.00 (1.88, 2.13) | < 0.001 | 2.27 (2.17, 2.39) | < 0.001 | 0.76 (0.69, 0.85) | < 0.001 | 2.60 (2.35, 2.88) | < 0.001 | 1.76 (1.68, 1.85) | < 0.001 |
| Gender |  |  |  |  |  |  |   |  |   |  |   |  |   |  |
|  Male | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - |
|  Female | 0.76 (0.74, 0.78) | < 0.001 | 1.13 (1.12, 1.34) | < 0.001 | 0.86 (0.82, 0.89) | < 0.001 | 1.47 (1.43, 1.52) | < 0.001 | 0.66 (0.63, 0.70) | < 0.001 | 0.54 (0.51, 0.58) | < 0.001 | 0.67 (0.66, 0.69) | < 0.001 |
| Race |  |  |   |  |   |  |   |  |   |  |   |  |   |  |
|  White | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - |
|  Black | 1.51 (1.44, 1.57) | < 0.001 | 1.00 (0.91, 1.10) | 0.946 | 0.86 (0.79, 0.94) | 0.001 | 1.34 (1.27, 1.43) | < 0.001 | 1.24 (1.13, 1.36) | < 0.001 | 1.16 (1.03, 1.30) | 0.011 | 1.13 (1.07, 1.18) | < 0.001 |
|  Hispanic | 1.13 (1.09, 1.16) | < 0.001 | 0.93 (0.88, 0.99) | 0.029 | 0.82 (0.78, 0.87) | < 0.001 | 1.13 (1.08, 1.17) | < 0.001 | 1.00 (0.94, 1.07) | 0.842 | 0.91 (0.85, 0.98) | 0.022 | 0.78 (0.76, 0.81) | < 0.001 |
|  Asian or Pacific Islander | 1.21 (1.16, 1.27) | < 0.001 | 1.02 (0.93, 1.11) | 0.647 | 0.88 (0.81, 0.95) | 0.001 | 1.28(1.20, 1.35) | < 0.001 | 1.00 (0.90, 1.11) | < 0.001 | 1.22 (1.10, 1.36) | < 0.001 | 1.01 (0.96, 1.05) | 0.683 |
|  Native American | 1.50 (1.08, 2.08) | 0.014 | 0.75 (0.31, 1.82) | 0.535 | 1.65 (0.99, 2.75) | 0.051 | 1.05 (0.62, 1.77) | 0.842 | 1.80 (0.95, 3.41) | 0.071 | 0.52 (0.13, 2.12) | 0.369 | 0.84 (0.54, 1.30) | 0.441 |
|  Other | 1.24 (1.13, 1.34) | < 0.001 | 0.91 (0.77, 1.08) | 0.301 | 1.19 (1.05, 1.35) | < 0.001 | 1.19 (1.07, 1.33) | 0.001 | 0.80 (0.64, 0.99) | 0.043 | 0.96 (0.78, 1.19) | 0.745 | 0.97 (0.88, 1.06) | 0.503 |
| Procedure |   |  |  |  |   |  |   |  |   |  |   |  |   |  |
|  Hemicolectomy | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - |
|  Appendectomy | 0.06 (0.05, 0.06) | < 0.001 | 0.36 (0.31, 0.41) | < 0.001 | 0.26 (0.23, 0.28) | < 0.001 | 0.17 (0.15, 0.19) | < 0.005 | 0.17 (0.15, 0.19) | < 0.001 | 0.78 (0.67, 0.91) | < 0.001 | 0.53 (0.33, 0.37) | < 0.001 |
|  Cholecystectomy | 0.14 (0.14, 0.15) | < 0.001 | 0.45 (0.41, 0.50) | < 0.001 | 0.36 (0.33, 0.38) | < 0.001 | 0.31 (0.29, 0.33) | < 0.001 | 0.12 (0.11, 0.13) | < 0.001 | 0.67 (0.59, 0.76) | < 0.001 | 0.20 (0.19, 0.21) | < 0.001 |
|  Hip replacement | 0.11 (0.11, 0.12) | < 0.001 | 0.56 (0.52, 0.61) | < 0.001 | 0.22 (0.21, 0.24) | < 0.001 | 0.69 (0.65, 0.73) | < 0.001 | 0.05 (0.05, 0.06) | < 0.001 | 0.51 (0.45, 0.58) | < 0.001 | 0.03 (0.03, 0.04) | < 0.001 |
|  Knee replacement | 0.07 (0.06, 0.07) | < 0.001 | 0.56 (0.51, 0.61) | < 0.001 | 0.27 (0.225, 0.29) | < 0.001 | 0.54 (0.50, 0.58) | < 0.001 | 0.07 (0.06, 0.08) | < 0.001 | 0.45 (0.39, 0.51) | < 0.001 | 0.02 (0.21, 0.03) | < 0.001 |
|  Treatment of fracture of lower extremity | 0.12 (0.12, 0.13) | < 0.001 | 0.44 (0.40, 0.48) | < 0.001 | 0.21 (0.19, 0.22) | < 0.001 | 0.61 (0.58, 0.65) | < 0.001 | 0.05 (0.04, 0.05) | < 0.001 | 0.35 (0.30, 0.41) | < 0.001 | 0.03 (0.03, 0.04) | < 0.001 |
|  Amputation of lower extremity | 0.87 (0.83, 0.90) | < 0.001 | 0.35 (0.31, 0.40) | < 0.001 | 0.15 (0.13, 0.17) | < 0.001 | 0.69 (0.64, 0.75) | < 0.001 | 0.15 (0.13, 0.17) | < 0.001 | 0.27 (0.22, 0.33) | < 0.001 | 0.05 (0.05, 0.06) | < 0.001 |
|  Laminectomy | 0.31 (0.29, 0.32) | < 0.001 | 0.71 (0.65, 0.78) | < 0.001 | 0.23 (0.21, 0.26) | < 0.001 | 0.54 (0.50, 0.59) | < 0.001 | 0.06 (0.05, 0.07) | < 0.001 | 0.76 (0.66, 0.88) | < 0.001 | 0.04 (0.04, 0.05) | < 0.001 |
|  Spine fusion | 0.49 (0.47, 0.51) | < 0.001 | 0.49 (0.44, 0.54) | < 0.001 | 0.92 (0.86, 0.99) | < 0.001 | 0.98 (0.91, 1.05) | 0.607 | 0.13 (0.12, 0.15) | < 0.001 | 0.82 (0.73, 0.94) | < 0.001 | 0.16 (0.16, 0.17) | < 0.001 |
|  Hysterectomy | 0.14 (0.13, 0.15) | < 0.001 | 0.49 (0.44, 0.54) | < 0.001 | 0.39 (0.36, 0.43) | < 0.001 | 0.37 (0.34, 0.40) | < 0.001 | 0.21 (0.19, 0.23) | < 0.001 | 1.33 (1.16, 1.51) | < 0.001 | 0.23 (0.21, 0.24) | < 0.001 |
| Admission type |  |  |  |  |  |  |   |  |   |  |   |  |   |  |
|  Elective | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - |
|  Emergency | 4.50 (4.36, 4.64) | < 0.001 | 0.91 (0.86, 0.96) | 0.003 | 1.88 (1.78, 1.98) | < 0.001 | 2.05 (1.96, 2.13) | < 0.001 | 1.47 (1.38, 1.57) | < 0.001 | 0.85 (0.78, 0.92) | < 0.001 | 1.17 (1.13, 1.21) | < 0.001 |
| Van Walraven groups |  |  |   |  |   |  |   |  |   |  |   |  |   |  |
|  < 5 | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - | REF | - |
|  5 - 14 | 3.64 (3.55, 3.74) | < 0.001 | 2.42 (2.30, 2.54) | < 0.001 | 3.65 (3.50, 3.81) | < 0.001 | 2.33 (2.25, 2.41) | < 0.001 | 2.64 (2.48, 2.80) | < 0.001 | 1.82 (1.70, 1.94) | < 0.001 | 2.10 (2.04, 2.16) | < 0.001 |
|  14+ | 10.20 (9.85, 10.57) | < 0.001 | 3.86 (3.59, 4.16) | < 0.001 | 7.45 (7.04, 7.90) | < 0.001 | 4.09 (3.90, 4.30) | < 0.001 | 4.26 (3.92, 4.63) | < 0.001 | 2.58 (2.31, 2.89) | < 0.001 | 3.17 (3.03, 3.32) | < 0.001 |
| Perioperative stroke | 7.59 (6.73, 8.57) | < 0.001 | 3.40 (2.80, 4.12) | < 0.001 | 3.1 (2.68, 3.73) | < 0.001 | 2.81 (2.43, 3.25) | < 0.001 | 2.28 (1.73, 3.00) | < 0.001 | 1.72 (1.16, 2.56) | < 0.001 | 1.99 (1.67, 2.38) | < 0.001 |

OR: odds ratio; CI: confidence interval; LOS: length of stay; REF: reference.