**Appendix with the manuscript titled: “Surgical Co-management by Hospitalists: Continued improvement over five years”**

**Appendix 1.** International Classification of disease (ICD) codes 9 and 10 for medical complications

|  |  |  |
| --- | --- | --- |
| **Medical complication** | **ICD-9 codes** | **ICD-10 codes** |
| Urinary tract infection | 590.80, 595.9, 599.0, 996.64 | T83.511A, T83.518A, N10, N12, N30.0, N30.00, N30.01, N30.8, N30.9 |
| Pneumonia | 481, 482, 483, 484, 485, 486  507.0 | J13, J14, J15, J16.8, J17, J18, J69.0 |
| Sepsis | 038, 785.52, 995.91, 995.92 | A40, A41, B37.7, R65.20, R65.21, R78.81 |
| Delirium | 293.0, 780.79, 780.1, 780.97, 780.09, 307.9, 348.3, 348.30, 348.39, 349.82, 348.31, 298.9, 294.11, 294.21, 294.9, 298, 297, 293.1, 780.02, 292.81, 290.41, 799.23, 799.51, 293.82, 293.81, 293.89, 293.9, 290.3, 290.20, 290.42, 290.11, 290.12 | F05, R41.0, F06.0, F06.2, F06.8, F09, F11.121, F11.122, F11.150, F11.151, F11.159, F11.221, F11.222, F11.129, F11.229, F11.23, F11.250, F11.251, F11.259, F11.920, F11.921, F11.922, F11.950, F11.951, F11.959, F11.929, F13.239, F13.230, F13.121, F13.150, F13.151, F13.159, F13.231, F13.232, F13.250, F13.251, F13.259, F13.921, F13.931, F13.932, F13.950, F13.951, F13.959, F13.939, F13.930, F13.929, F13.920, F13.129, F13.120, F29, F22, F23, F24, R40.0, R41.89, R41.82, R41.9, G93.4, G93.40, G93.41, G93.49,R40.4, R44, R44.0, R44.1, R44.2, R44.3, R44.8, R44.9, R45.1, R45.6, R45.87, R41.840 |
| Atrial fibrillation/flutter | 427.31, 427.32 | I48, excluding I48.2 |
| Acute Kidney Injury | 584, 586, 593.9 | N17, N28.9, R39.2, N99.0, N19 |
| Ileus | 560.1, 997.49 | K56.0, K56.7, K91.89 |

**Appendix 2.** Patient characteristics by discharge year

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Year 1 (N=4,308)** | **Year 2**  **(N=4,243)** | **Year 3**  **(N=4,487)** | **Year 4**  **(N=4,576)** | **Year 5**  **(N=4,754)** | **Year 6**  **(N=4,012)** | **P Value** |
| ***Sep 2012 - Aug 2013*** | ***Sep 2013 - Aug 2014*** | ***Sep 2014 - Aug 2015*** | ***Sep 2015 - Aug 2016*** | ***Sep 2016 – Aug 2017*** | ***Sep 2017 – June 2018*** |
| Age, median (IQR)a | 60 (48, 70) | 62 (49, 71) | 62 (49, 71) | 62 (50, 72) | 63 (50, 72) | 63 (51, 73) | <0.001 |
| Age ≥65 years, n (%)b | 1700 (39.5) | 1774 (41.8) | 1916 (42.7) | 2033 (44.4) | 2162 (45.5) | 1916 (47.7) | <0.001 |
| Male, n (%)b | 2102 (48.8) | 2004 (47.2) | 2129 (47.4) | 2174 (47.5) | 2263 (47.6) | 1907 (47.5) | 0.42 |
| Caucasian, n (%)b | 2717 (63.1) | 2777 (65.4) | 2996 (66.8) | 2927 (64) | 2980 (62.7) | 2542 (63.4) | 0.10 |
| Annual income, median (IQR)a | $76,773  ($55,019, $107,244) | $79,309  ($55,605, $106,462) | $77,767  ($55,112, $105,891) | $77,892  ($55,160,  $107,209) | $78,772  ($55,605,  $107,244) | $79,395  ($56,381,  $107,244) | 0.12 |
| Primary insurance, n (%)b |  |  |  |  |  |  |  |
| Private | 2171 (50.4) | 2079 (49) | 2221 (49.5) | 2238 (48.9) | 2345 (49.3) | 1943 (48.4) | 0.15 |
| Medicare | 1756 (40.8) | 1819 (42.9) | 1897 (42.3) | 1990 (43.5) | 2080 (43.8) | 1810 (45.1) | <0.001 |
| Medi-cal | 293 (6.8) | 308 (7.3) | 362 (8.1) | 335 (7.3) | 317 (6.7) | 243 (6.1) | 0.05 |
| Charlson comorbidity score, mean (SD)a | 1.07 (1.51) | 1.15 (1.58) | 1.26 (1.67) | 1.26 (1.70) | 1.29 (1.75) | 1.46 (1.87) | <0.001 |
| Charlson comorbidity score ≥ 2, n (%)b | 1194 (27.8) | 1278 (30.1) | 1479 (33) | 1454 (31.8) | 1501 (31.6) | 1471 (36.6) | <0.001 |
| Case mix index ((CMI), median (IQR)a | 2.10  (1.82, 2.96) | 2.15  (1.93, 3.10) | 2.15  (1.98, 3.39) | 2.27  (2.06, 3.29) | 2.37  (2.07, 3.44) | 2.36  (2.05, 3.48) | <0.001 |
| CMI ≥ 2.5, n (%)b | 1449 (33.6) | 1559 (36.7) | 1666 (37.1) | 1761 (38.5) | 1916 (40.3) | 1658 (41.3) | <0.001 |
| Surgical service, n (%)b |  |  |  |  |  |  | 0.004 |
| Orthopedic surgery | 2724 (63.2) | 2762 (65.1) | 2829 (63) | 2859 (62.5) | 2886 (60.7) | 2510 (62.6) |  |
| Neurosurgery | 1584 (36.8) | 1481 (34.9) | 1658 (37) | 1717 (37.5) | 1868 (39.3) | 1502 (37.4) |  |
| Elective surgery, n (%)b | 3080 (71.5) | 3017 (71.1) | 3265 (72.8) | 3352 (73.3) | 3532 (74.3) | 2881 (71.8) | 0.03 |
| General anesthesia, n (%)b | 3892 (90.3) | 3839 (90.5) | 4032 (89.9) | 3971 (86.8) | 4174 (87.8) | 3530 (88) | <0.001 |
| Duration of surgery, n (%)a | 131  (90, 206) | 139  (94, 220) | 140  (95, 219) | 135  (92, 212) | 130  (92, 199) | 131  (91, 199) | <0.001 |
| <120 minutes | 1814 (42.1) | 1665 (39.2) | 1767 (39.4) | 1849 (40.4) | 2044 (43) | 1686 (42) |  |
| ≥120 minutes | 2301 (53.4) | 2400 (56.6) | 2548 (56.8) | 2544 (55.6) | 2587 (54.4) | 2233 (55.7) |  |

Abbreviations: IQR: Interquartile range; SD: Standard deviation

aGamma regression with identity link for continuous variables

bLogistic regression was used for binary variables

**Appendix 3.** Unadjusted outcomes by discharge year

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Outcome** | **Total**  **(N=26,380)** | **Year 1 (N=4,308)** | **Year 2**  **(N=4,243)** | **Year 3**  **(N=4,487)** | **Year 4**  **(N=4,576)** | **Year 5**  **(N=4,754)** | **Year 6**  **(N=4,012)** |
| ***Sep 2012-June 2018*** | ***Sep 2012 - Aug 2013*** | ***Sep 2013 - Aug 2014*** | ***Sep 2014 - Aug 2015*** | ***Sep 2015 - Aug 2016*** | ***Sep 2016 – Aug 2017*** | ***Sep 2017 – June 2018*** |
| ≥1 medical complication, n (%) | 1607 (6.1) | 256 (5.9) | 282 (6.6) | 269 (6.0) | 295 (6.4) | 267 (5.6) | 239 (6.0) |
| Length of stay, mean (SD), *d* | 4.6 (5.8) | 4.7 (6.8) | 4.5 (4.3) | 4.7 (5.3) | 4.5 (5.4) | 4.6 (5.7) | 4.6 (6.8) |
| ≥2 medical consultations, n (%) | 2424 (9.2) | 340 (7.9) | 420 (9.9) | 434 (9.7) | 420 (9.2) | 436 (9.2) | 374 (9.3) |
| Rapid response team calls, n (%) | 239 (0.9) | 49 (1.1) | 42 (1.0) | 47 (1.0) | 41 (0.9) | 33 (0.7) | 27 (0.7) |
| Code blue, n (%) | 64 (0.2) | 10 (0.2) | 10 (0.2) | 12 (0.3) | 17 (0.4) | 11 (0.2) | 4 (0.1) |
| Top-box patient satisfaction score, n (%)a | 3898 (94.2) | 912 (93.9) | 871 (93.7) | 883 (94.2) | 851 (96.2) | 381 (92.5) | - |

Abbreviations: SD, Standard deviation

aResponse rate to patient satisfaction survey was 21.1% (Data was available till February 2017, so in the analysis, only years 1-4 were included)