**Appendix Table 1:** Multivariate Cox Model for NHSN CLABSI

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **All PICCs** | | **Non-ICU/Non-Oncology** | | **ICU** | | **Oncology\*** | |
|  |  | **n = 42,562** | | **n = 28,111** | | **n = 12,078** | | **n = 1,407** | |
| Variable |  | HR (95% CI) | P-value | HR (95% CI) | P-value | HR (95% CI) | P-value | HR (95% CI) | P-value |
| Antibacterial Coating | Yes vs. No | 0.99 (0.59, 1.67) | 0.9514 | 0.93 (0.45, 1.94) | 0.7992 | 1.01 (0.39, 2.61) | 0.9819 | 1.00 (0.24, 4.29) | 0.9964 |
| Lumens | Double vs. Single | 3.24 (2.15, 4.89) | <.0001 | 2.40 (1.43, 4.02) | 0.0057 | 1.02 (0.33, 3.09) | 0.9758 | 3.13 (1.22, 8.08) | 0.0023 |
|  | Triple/Quad vs. Single | 4.86 (2.66, 8.90) | 0.0038 | 4.53 (1.86, 11.00) | 0.015 | 1.05 (0.25, 4.30) | 0.9473 | 5.08 (1.60, 16.15) | 0.0003 |
| Active cancer | Yes vs. No | 4.81 (3.65, 6.34) | <.0001 | 2.77 (1.73, 4.42) | 0.0002 | 3.39 (1.71, 6.74) | 0.0004 |  |  |
| Existing CVC | Yes vs. No | 1.84 (1.37, 2.47) | 0.0031 | 3.66 (2.47, 5.41) | <.0001 | 1.20 (0.73, 1.98) | 0.4402 | 0.86 (0.36, 2.03) | 0.8125 |
| CHF | Yes vs. No | 1.27 (0.87, 1.84) | 0.0962 | 1.12 (0.64, 1.97) | 0.6228 | 1.40 (0.79, 2.47) | 0.1802 | 1.45 (0.44, 4.75) | 0.4682 |
| Peripheral vascular disorders | Yes vs. No | 0.72 (0.48, 1.08) | 0.1766 | 0.61 (0.36, 1.05) | 0.0971 | 0.75 (0.32, 1.74) | 0.4915 | 1.29 (0.50, 3.29) | 0.598 |
| Pneumonia | Yes vs. No | 0.90 (0.64, 1.25) | 0.5582 | 1.08 (0.67, 1.74) | 0.7369 | 0.85 (0.51, 1.42) | 0.6114 | 0.68 (0.21, 2.24) | 0.5108 |
| Gauge | Per unit increase | 0.90 (0.63, 1.29) | 0.6892 | 1.30 (0.79, 2.12) | 0.3603 | 1.05 (0.50, 2.17) | 0.9102 | 0.46 (0.25, 0.88) | 0.0158 |
| Insertion vein | Cephalic vs. Basilic | 1.03 (0.80, 1.34) | 0.8062 | 0.98 (0.69, 1.40) | 0.9175 | 1.05 (0.63, 1.77) | 0.844 | 1.21 (0.70, 2.07) | 0.3276 |
|  | Other vs. Basilic | 0.90 (0.49, 1.65) | 0.7424 | 0.82 (0.33, 2.03) | 0.6671 | 1.25 (0.49, 3.19) | 0.5601 | 0.84 (0.20, 3.51) | 0.7975 |
|  | Brachial vs. Basilic | 0.59 (0.26, 1.33) | 0.0761 | 0.16 (0.02, 1.18) | 0.074 | 1.23 (0.29, 5.14) | 0.7901 | 1.36 (0.41, 4.50) | 0.5847 |
| Life-threatening Illness | Yes vs. No | 0.48 (0.29, 0.78) | 0.0004 | 0.42 (0.10, 1.73) | 0.1757 | 0.28 (0.15, 0.50) | <.0001 | 0.32 (0.03, 3.35) | 0.3146 |
| Insertion in ICU | Yes vs. No | 0.94 (0.61, 1.47) | 0.8395 |  |  |  |  | 1.03 (0.26, 4.14) | 0.9682 |
| Year | 2015 vs. pre-2015 | 1.00 (0.59, 1.68) | 0.9902 | 0.76 (0.38, 1.54) | 0.2492 | 1.05 (0.42, 2.62) | 0.883 |  |  |
|  | 2016 vs. pre-2015 | 1.09 (0.65, 1.84) | 0.7048 | 0.99 (0.51, 1.95) | 0.984 | 0.90 (0.35, 2.35) | 0.7831 | 0.82 (0.39, 1.70) | 0.6258 |
|  | 2017 vs. pre-2015 | 0.68 (0.39, 1.18) | 0.1091 | 0.57 (0.27, 1.18) | 0.1947 | 0.55 (0.19, 1.56) | 0.0996 | 0.63 (0.30, 1.32) | 0.0367 |
|  | 2018 vs. pre-2015 | 0.69 (0.38, 1.23) | 0.153 | 0.63 (0.29, 1.35) | 0.2097 | 0.26 (0.08, 0.82) | 0.0006 | 0.85 (0.41, 1.74) | 0.5778 |
|  | 2019 vs. pre-2015 | 0.57 (0.29, 1.11) | 0.0635 | 0.43 (0.16, 1.13) | 0.0611 | 0.18 (0.04, 0.80) | 0.0151 | 0.76 (0.34, 1.72) | 0.3922 |
| \* Baseline year for oncology model is 2015. | | | | | | | | | |

**Appendix Table 2.** Multivariate Cox Model for CLABSI with year effects

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **All PICCs** | | **Non-ICU/Non-Oncology** | | **ICU** | | **Oncology\*** | |
|  |  | **n = 42,562** | | **n = 28,111** | | **n = 12,078** | | **n = 1,407** | |
| Variable |  | HR (95% CI) | P-value | HR (95% CI) | P-value | HR (95% CI) | P-value | HR (95% CI) | P-value |
| Antibacterial Coating | Yes vs. No | 0.97 (0.72, 1.30) | 0.798 | 1.04 (0.69, 1.56) | 0.787 | 0.85 (0.50, 1.43) | 0.537 | 1.47 (0.57, 3.79) | 0.600 |
| Lumens | Double vs. Single | 2.53 (1.98, 3.22) | <.0001 | 1.64 (1.22, 2.20) | 0.009 | 3.90 (1.61, 9.41) | 0.009 | 3.63 (1.55, 8.51) | 0.000 |
|  | Triple/Quad vs. Single | 3.50 (2.43, 5.04) | 0.005 | 3.42 (2.03, 5.76) | 0.006 | 4.13 (1.55, 11.03) | 0.014 | 6.19 (2.28, 16.84) | <.0001 |
| Active cancer | Yes vs. No | 2.92 (2.42, 3.52) | <.0001 | 2.00 (1.45, 2.75) | <.0001 | 2.05 (1.32, 3.17) | 0.004 |  |  |
| Existing CVC | Yes vs. No | 2.10 (1.77, 2.49) | <.0001 | 2.95 (2.30, 3.79) | <.0001 | 1.88 (1.46, 2.43) | <.0001 | 1.27 (0.70, 2.31) | 0.343 |
| CHF | Yes vs. No | 1.27 (1.03, 1.57) | 0.027 | 1.22 (0.88, 1.69) | 0.113 | 1.35 (1.00, 1.82) | 0.061 | 1.38 (0.49, 3.83) | 0.484 |
| Peripheral vascular disorders | Yes vs. No | 0.69 (0.54, 0.87) | 0.001 | 0.68 (0.50, 0.91) | 0.003 | 0.72 (0.46, 1.13) | 0.078 | 0.98 (0.42, 2.28) | 0.963 |
| Pneumonia | Yes vs. No | 1.18 (0.99, 1.41) | 0.037 | 1.19 (0.90, 1.56) | 0.230 | 1.31 (1.01, 1.69) | 0.050 | 0.74 (0.29, 1.90) | 0.581 |
| Gauge | Per unit increase | 0.92 (0.75, 1.14) | 0.678 | 1.28 (0.97, 1.69) | 0.216 | 0.77 (0.52, 1.13) | 0.227 | 0.55 (0.32, 0.93) | 0.022 |
| Insertion vein | Cephalic vs. Basilic | 1.04 (0.89, 1.21) | 0.656 | 1.13 (0.92, 1.40) | 0.286 | 0.90 (0.68, 1.19) | 0.496 | 1.13 (0.73, 1.76) | 0.523 |
|  | Other vs. Basilic | 0.77 (0.52, 1.12) | 0.192 | 0.74 (0.42, 1.30) | 0.257 | 0.90 (0.52, 1.56) | 0.704 | 0.57 (0.14, 2.34) | 0.380 |
|  | Brachial vs. Basilic | 1.04 (0.71, 1.53) | 0.880 | 0.74 (0.40, 1.36) | 0.492 | 1.58 (0.83, 3.01) | 0.148 | 1.79 (0.77, 4.21) | 0.023 |
| Life-threatening Illness | Yes vs. No | 0.77 (0.58, 1.03) | 0.043 | 0.66 (0.32, 1.36) | 0.162 | 0.57 (0.39, 0.84) | 0.001 | 0.66 (0.13, 3.23) | 0.606 |
| Insertion in ICU | Yes vs. No | 0.93 (0.70, 1.23) | 0.622 |  |  |  |  | 0.79 (0.23, 2.78) | 0.696 |
| Year | 2015 vs. pre-2015 | 0.82 (0.63, 1.06) | 0.348 | 0.73 (0.50, 1.08) | 0.189 | 0.80 (0.53, 1.21) | 0.442 |  |  |
|  | 2016 vs. pre-2015 | 0.72 (0.55, 0.95) | 0.073 | 0.72 (0.49, 1.05) | 0.138 | 0.57 (0.36, 0.90) | 0.018 | 0.88 (0.50, 1.54) | 0.589 |
|  | 2017 vs. pre-2015 | 0.51 (0.38, 0.68) | 0.000 | 0.51 (0.34, 0.76) | 0.011 | 0.34 (0.21, 0.57) | 0.000 | 0.73 (0.41, 1.27) | 0.185 |
|  | 2018 vs. pre-2015 | 0.38 (0.27, 0.53) | <.0001 | 0.38 (0.24, 0.60) | <.0001 | 0.18 (0.09, 0.34) | <.0001 | 0.70 (0.38, 1.27) | 0.091 |
|  | 2019 vs. pre-2015 | 0.32 (0.22, 0.48) | <.0001 | 0.32 (0.18, 0.56) | 0.002 | 0.14 (0.06, 0.33) | 0.000 | 0.55 (0.27, 1.14) | 0.031 |
| \* Baseline year for oncology model is 2015. | | | | | | | | | |

**Appendix Table 3.** Multivariate Cox Model for VTE and Occlusion with year effects

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **All PICCs** | | **Non-ICU/Non-Oncology** | | **ICU** | | **Oncology\*** | |
|  |  | **n = 42,562** | | **n = 28,111** | | **n = 12,078** | | **n = 1,407** | |
| Variable |  | HR (95% CI) | P-value | HR (95% CI) | P-value | HR (95% CI) | P-value |  |  |
| Antithrombotic Coating | Yes vs. No | 1.33 (1.07, 1.66) | 0.238 | 1.50 (1.11, 2.01) | 0.121 | 1.04 (0.71, 1.52) | 0.884 | 1.41 (0.54, 3.65) | 0.614 |
| DVT History | Positive history vs. No history | 1.17 (1.05, 1.30) | 0.011 | 1.36 (1.17, 1.57) | <.0001 | 1.05 (0.89, 1.25) | 0.616 | 0.53 (0.23, 1.21) | 0.114 |
|  | Within previous 30 days vs. No history | 1.24 (1.04, 1.47) | 0.085 | 1.28 (0.97, 1.69) | 0.115 | 1.21 (0.95, 1.54) | 0.209 | 0.89 (0.36, 2.23) | 0.847 |
| Lumens | Double vs. Single | 4.72 (4.17, 5.34) | <.0001 | 3.80 (3.25, 4.45) | <.0001 | 4.49 (3.12, 6.47) | <.0001 | 2.23 (1.06, 4.70) | 0.049 |
|  | Triple/Quad vs. Single | 6.22 (5.20, 7.44) | <.0001 | 5.81 (4.38, 7.72) | <.0001 | 6.17 (4.14, 9.18) | <.0001 | 3.60 (1.48, 8.75) | 0.015 |
| Active cancer | Yes vs. No | 1.23 (1.09, 1.38) | 0.001 | 1.06 (0.85, 1.30) | 0.655 | 0.99 (0.77, 1.27) | 0.943 |  |  |
| Existing CVC | Yes vs. No | 1.09 (1.00, 1.19) | 0.143 | 1.06 (0.90, 1.25) | 0.422 | 1.09 (0.98, 1.21) | 0.293 | 0.80 (0.47, 1.36) | 0.425 |
| CHF | Yes vs. No | 1.01 (0.92, 1.11) | 0.925 | 1.11 (0.96, 1.29) | 0.209 | 0.96 (0.84, 1.08) | 0.502 | 0.78 (0.31, 1.98) | 0.663 |
| Peripheral vascular disorders | Yes vs. No | 1.01 (0.92, 1.11) | 0.849 | 1.02 (0.90, 1.16) | 0.767 | 1.04 (0.90, 1.22) | 0.689 | 1.07 (0.59, 1.95) | 0.776 |
| Pneumonia | Yes vs. No | 1.15 (1.07, 1.25) | 0.002 | 1.26 (1.11, 1.43) | 0.000 | 1.08 (0.97, 1.20) | 0.242 | 1.03 (0.57, 1.85) | 0.927 |
| Aspirin or statin | Yes vs. No | 1.24 (1.16, 1.34) | <.0001 | 1.35 (1.21, 1.49) | <.0001 | 1.13 (1.02, 1.25) | 0.055 | 1.35 (0.96, 1.88) | 0.065 |
| Gauge | Per unit increase | 0.82 (0.74, 0.90) | 0.092 | 1.01 (0.87, 1.17) | 0.925 | 0.66 (0.58, 0.77) | 0.029 | 1.37 (0.80, 2.33) | 0.258 |
| Insertion vein | Cephalic vs. Basilic | 0.90 (0.83, 0.97) | 0.158 | 0.98 (0.88, 1.09) | 0.791 | 0.83 (0.74, 0.93) | 0.032 | 0.61 (0.41, 0.90) | 0.007 |
|  | Other vs. Basilic | 1.01 (0.87, 1.17) | 0.894 | 1.03 (0.82, 1.30) | 0.794 | 1.01 (0.82, 1.23) | 0.958 | 0.63 (0.27, 1.45) | 0.313 |
|  | Brachial vs. Basilic | 0.85 (0.70, 1.04) | 0.304 | 0.75 (0.56, 1.01) | 0.215 | 0.70 (0.48, 1.02) | 0.019 | 1.43 (0.75, 2.72) | 0.198 |
| Life-threatening Illness | Yes vs. No | 0.98 (0.85, 1.13) | 0.841 | 0.91 (0.68, 1.23) | 0.514 | 0.98 (0.82, 1.17) | 0.851 | 1.13 (0.61, 2.11) | 0.693 |
| Insertion in ICU | Yes vs. No | 1.23 (1.07, 1.42) | 0.021 |  |  |  |  |  |  |
| Year | 2015 vs. pre-2015 | 0.77 (0.69, 0.85) | 0.111 | 0.77 (0.65, 0.90) | 0.346 | 0.74 (0.63, 0.86) | 0.053 |  |  |
|  | 2016 vs. pre-2015 | 0.73 (0.66, 0.81) | 0.069 | 0.70 (0.60, 0.83) | 0.206 | 0.72 (0.61, 0.84) | 0.053 | 0.94 (0.67, 1.32) | 0.677 |
|  | 2017 vs. pre-2015 | 0.29 (0.25, 0.33) | <.0001 | 0.25 (0.20, 0.31) | <.0001 | 0.31 (0.26, 0.38) | <.0001 | 0.49 (0.31, 0.75) | 0.000 |
|  | 2018 vs. pre-2015 | 0.03 (0.02, 0.04) | <.0001 | 0.04 (0.02, 0.06) | <.0001 | 0.02 (0.01, 0.05) | <.0001 | 0.04 (0.01, 0.16) | <.0001 |
|  | 2019 vs. pre-2015 | 0.02 (0.01, 0.04) | <.0001 | 0.03 (0.01, 0.06) | <.0001 | 0.02 (0.01, 0.05) | <.0001 | 0.03 (0.00, 0.19) | 0.000 |
| \* Baseline year for oncology model is 2015. | | | | | | | | | |