**Supplementary material**

**Supplemental table 1.** MDR *A. baumannii,* ESBL *E. coli,* ESBL *K. pneumoniae,* CRE *E. coli,* MDR *P. aeruginosa* and other Gram-negative microorganisms at before standard terminal cleaning, after standard terminal cleaning in the pre-implementation period.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | No. room positive/No. room (%)  Median CFU/cm2 (range, min-max) | | | | | | |
|  | | MDR *A. baumannii* | ESBL  *E. coli* | ESBL *K. pneumoniae* | CRE  *E. coli* | *MDR P. aeruginosa* |  |
| Intervention arm (Units A and B)  (n = 345 rooms)  Before terminal cleaning      After terminal cleaning | | 98/345 (28.4)  90 (20-150)  13/345 (3.7)  80 (15-200) | 24/345 (6.9)  20 (10-50)  4/345 (1.1)  20 (10-40) | 14/345 (4)  30 (10-60)  3/345 (0.8)  40 (40-50) | 62/345 (17.9)  35 (10-90)  12/345 (3.5)  30 (10-70) | 12/345 (3.4)  40 (30-50)  1/345 (0.3)  50 |  |
| Control arm (Units C and D)  (n = 346 rooms)    Before terminal cleaning      After terminal cleaning | | 103/346 (29.7)  70 (10-300)  16/346 (4.6)  60 (20-200) | 17/346 (5)  25 (10-55)  3/346 (0.9)  20 (10-20) | 12/346 (3.4)  50 (10-85)  3/346 (0.9)  60 (40-60) | 52/346 (15)  40 (10-70)  8/346 (2.3)  40 (10-60) | 15/346 (4.3)  60 (30-90)  3/346 (0.9)  40 (30-40) |  |

CFU/cm2, colony-forming unit per cm2; MDR, multidrug-resistant; ESBL, extended-spectrum beta-lactamase producing *Enterobacterales*; CRE, carbapenem-resistant *Enterobacterales*

**Supplemental table 2.** MDR *A. baumannii,* ESBL *E. coli,* ESBL *K. pneumoniae,* CRE *E. coli,* MDR *P. aeruginosa* and other Gram-negative microorganisms at before standard terminal cleaning, after standard terminal cleaning and after Pulse Xenon Ultraviolet (PX-UV) Disinfection in the post-implementation period.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | No. room positive/No. room (%)  Median CFU/cm2 (range, min-max) | | | | | | |
|  | | MDR *A. baumannii* | ESBL  *E. coli* | ESBL *K. pneumoniae* | CRE  *E. coli* | *MDR P. aeruginosa* |  |
| Intervention arm (Units A and B)  (n = 350 rooms)  Before terminal cleaning      After terminal cleaning      After PX-UV | | 17/350 (4.8)  80 (10-200)  3/350 (0.8)  60 (20-100)  0/350 (0)  0 | 1/350 (0.3)  20  0/350 (0)  0  0/350 (0)  0 | 5/350 (1.4)  40 (10-70)  0/350 (0)  0  0/350 (0)  0 | 12/350 (3.4)  20 (10-30)  3/350 (0.8)  20 (10-20)  0/350 (0)  0 | 3/350 (0.8)  40 (30-50)  0/350  0  0/350 (0)  0 |  |
| Control arm (Units C and D)  (n = 349 rooms)    Before terminal cleaning      After terminal cleaning | | 75/349 (21.5)  60 (10-250)  11/349 (3)  30 (10-50) | 8/349 (2.3)  20 (10-30)  1/349 (0.3)  30 | 4/349 (1.1)  40 (10-70)  0/349 (0)  0 | 51/349 (14.6)  20 (10-30)  7/349 (2)  20 (10-40) | 10/349 (2.8)  60 (40-80)  4/349 (1.1)  60 (40-80) |  |

CFU/cm2, colony-forming unit per cm2; MDR, multidrug-resistant; ESBL, extended-spectrum beta-lactamase producing *Enterobacterales*; CRE, carbapenem-resistant *Enterobacterales*

**Supplemental table 3.** Change in rates of multidrug-resistant gram-negative infection and colonization in intensive care units comparing PX-UV and control group.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Organisms in ICU | PX-UV | | | | Control | | | |
| Change in level | | Change in trend | | Change in level | | Change in trend | |
| Mean (95% CI) | P | Mean (95% CI) | P | Mean (95% CI) | P | Mean (95% CI) | P |
| MDR *A. baumannii* | | | | | | | | |
| Total | -10.9 (-16.7 to -5.16) | 0.001 | -0.29 (-1.12 to 0.54) | 0.478 | -2.32 (-10.8 to 6.16) | 0.574 | 1.61 (0.39 to 2.84) | 0.012 |
| MICU | -16.3 (-25.4 to -7.17) | 0.001 | -0.74 (-2.06 to 0.57) | 0.254 | -3.80 (-14.4 to 6.78) | 0.462 | 0.43 (-1.09 to 1.96) | 0.561 |
| SICU | -4.42 (-10.4 to 1.60) | 0.141 | 0.31 (-0.56 to 1.17) | 0.471 | -1.38 (-15.7 to 12.9) | 0.843 | 3.12 (1.05 to 5.18) | 0.005 |
| ESBL *E. coli* | | | | | | | | |
| Total | -1.26 (-3.48 to 0.96) | 0.249 | -0.46 (-0.78 to -0.14) | 0.007 | -0.04 (-3.38 to 3.31) | 0.981 | 0.25 (-0.24 to 0.73) | 0.301 |
| MICU | -1.75 (-3.96 to 0.45) | 0.113 | -0.28 (-0.60 to 0.03) | 0.076 | -1.16 (-4.15 to 1.82) | 0.426 | 0.15 (-0.28 to 0.58) | 0.479 |
| SICU | -0.94 (-5.29 to 3.41) | 0.656 | -0.26 (-0.89 to 0.37) | 0.395 | 1.73 (-4.59 to 8.05) | 0.575 | 0.54 (-0.37 to 1.45) | 0.232 |
| ESBL *K. pneumoniae* | | | | | | | | |
| Total | 0.15 (-2.12 to 2.43) | 0.889 | -0.01 (-0.32 to 0.34) | 0.938 | 0.27 (-3.74 to 4.28) | 0.890 | -0.01 (-0.58 to 0.57) | 0.983 |
| MICU | 0.49 (-2.05 to 3.03) | 0.690 | 0.12 (-0.24 to 0.49) | 0.497 | -0.72 (-4.23 to 2.79) | 0.674 | -0.12 (-0.52 to 0.49) | 0.947 |
| SICU | -1.48 (-5.19 to 2.24) | 0.416 | -0.10 (-0.64 to 0.43) | 0.692 | 1.98 (-4.54 to 8.49) | 0.534 | 0.16 (0.78 to 1.10) | 0.724 |
| CRE *E. coli* | | | | | | | | |
| Total | -6.91 (-16.8 to 3.02) | 0.162 | -0.25 (-1.68 to 1.18) | 0.717 | -4.81 (-15.7 to 6.09) | 0.368 | 0.97 (-0.60 to 2.55) | 0.211 |
| MICU | -8.84 (-25.3 to 7.62) | 0.276 | -0.60 (-2.98 to 1.77) | 0.602 | -8.46 (-21.9 to 5.01) | 0.205 | 0.59 (-1.35 to 2.53) | 0.533 |
| SICU | -2.57 (-5.73 to 0.60) | 0.106 | 0.26 (-0.23 to 0.68) | 0.313 | 0.91 (-10.8 to 12.6) | 0.872 | 1.26 (-0.43 to 2.94) | 0.136 |
| MDR *P. aeruginosa* | | | | | | | | |
| Total | -0.62 (-3.28 to 2.05) | 0.634 | 0.07 (-0.31 to 0.46) | 0.694 | 2.70 (-4.11 to 9.50) | 0.418 | -0.18 (-1.16 to 0.80) | 0.709 |
| MICU | -0.11 (-4.33 to 4.10) | 0.955 | 0.12 (-0.49 to 7.26) | 0.689 | 2.21 (-5.08 to 9.50) | 0.534 | 0.23 (-0.82 to 1.28) | 0.647 |
| SICU | -0.98 (-3.43 to 1.47) | 0.413 | 0.04 (-0.31 to 0.39) | 0.807 | 1.86 (-7.46 to 11.2) | 0.682 | -0.67 (-2.01 to 0.68) | 0.314 |
| Overall MDR-GNBs | | | | | | | | |
| Total | -19.5 (-33.9 to -5.20) | 0.010 | -0.91 (-2.98 to 1.15) | 0.367 | -4.18 (-22.2 to 13.9) | 0.634 | 2.45 (-0.15 to 5.06) | 0.063 |
| MICU | -27.0 (-51.4 to -2.56) | 0.032 | -1.32 (-4.84 to 2.19) | 0.032 | -12.3 (-29.6 to 4.94) | 0.152 | 1.05 (-1.44 to 3.54) | 0.390 |
| SICU | -10.1 (-19.2 to -0.86) | 0.034 | -0.19 (-1.51 to 1.14) | 0.769 | 7.04 (-22.5 to 36.6) | 0.625 | 4.39 (0.12 to 8.65) | 0.044 |

CI, confidence interval; ESBL, extended spectrum beta-lactamase; CRE, carbapenem-resistant *Enterobacterales*; GNB, Gram-negative bacilli; ICU, intensive care unit; MDR, multidrug-resistant; MICU, medical ICU; SICU, surgical ICU

Infection rate displays in event per 1,000 patient-days