# SUPPLEMENTAL MATERIALS

**Karunakaran S, et al.** *Impact of discontinuation of contact precautions on surveillance- and whole genome sequencing-defined methicillin-resistant Staphylococcus aureus healthcare-associated infections*

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**Supplemental Table 1.** Infection prevention measures potentially related to methicillin-resistant *Staphylococcus aureus* at the study facility during the study period

| Infection prevention measure | Patient population | Pre-intervention | Post-intervention |
|---|---|---|---|
| Contact precautions | All patients with current or historical carriage. | Yes | No |
| Removing indicator of MRSA carrier status | Patients may be no longer identified as MRSA carriers following a standardized protocol with serial active surveillance (initiated at provider discretion). | Yes | Yes |
| MRSA active surveillance, admission | All inpatient admissions without prior MRSA carriage | Yes | Yes |
| MRSA active surveillance, pre-operative | Scheduled neurosurgical and orthopedic procedures | Yes | Yes |
| MRSA decolonization | Pre-operative *Staphylococcus aureus* carriers, neurosurgical and orthopedic procedures | Yes | Yes |
| Chlorhexidine skin treatment | All inpatients (without a contraindication) daily. All scheduled surgical procedures that use onsite pre-operative testing. | Yes | Yes |

**Supplemental Figure 1.** Adherence to methicillin-resistant *Staphylococcus aureus* active surveillance testing, during the study period
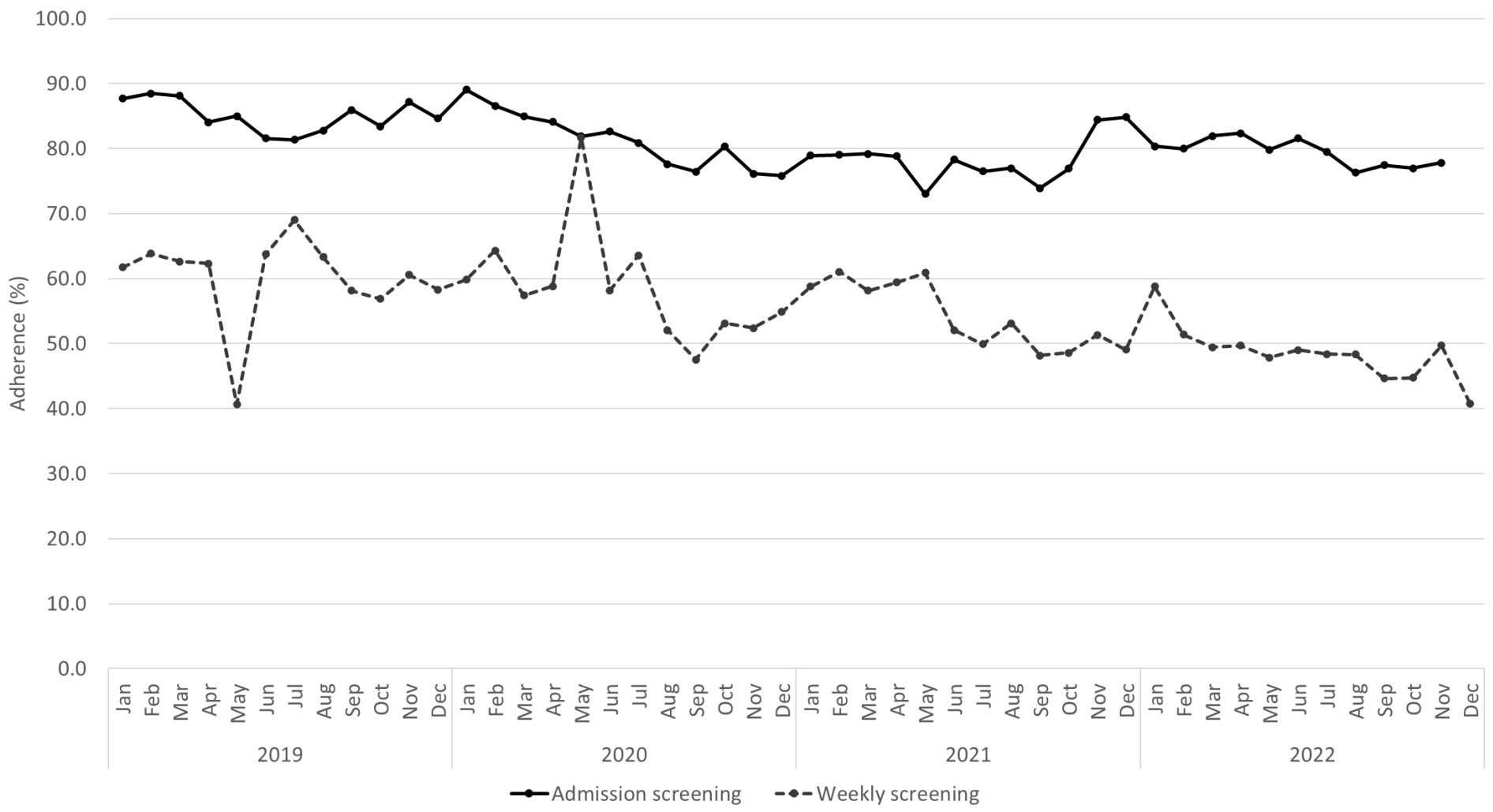
**Supplemental Table 2.** Healthcare-associated infection events, by month and infection type

| | | NHSN-defined HAI type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Month | BJ | BSI | CNS | CVS | EENT | GI | LRI | PNEU | SSI | SST | UTI | VAE | Total |
| 2019 | Jan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 |
| | Feb | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 6 |
| | Mar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 5 |
| | Apr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 4 |
| | May | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | 6 |
| | Jun | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | 7 |
| | Jul | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 0 | 0 | 6 |
| | Aug | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 6 |
| | Sep | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 1 | 1 | 9 |
| | Oct | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 4 |
| | Nov | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 8 |
| | Dec | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 9 |
| 2020 | Jan | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 2 | 0 | 1 | 10 |
| | Feb | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 1 | 1 | 9 |
| | Mar | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 4 | 0 | 0 | 8 |
| | Apr | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 8 |
| | May | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 1 | 2 | 12 |
| | Jun | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 4 | 2 | 0 | 0 | 9 |
| | Jul | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 9 |
| | Aug | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 1 | 12 |
| | Sep | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 4 | 1 | 2 | 0 | 0 | 9 |
| | Oct | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 1 | 5 |
| | Nov | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 6 |
| | Dec | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 3 | 1 | 0 | 0 | 8 |
| 2021 | Jan | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 |
| | Feb | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 8 |
| | Mar | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 2 | 8 |
| | Apr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 4 |
| | May | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| | Jun | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 4 |
| | Jul | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 6 |
| | Aug | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Sep | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 4 |
| | Oct | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | Nov | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 4 |
| | Dec | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 0 | 6 |
| 2022 | Jan | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 1 | 8 |
| | Feb | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 5 |
| | Mar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 3 |
| | Apr | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 4 |
| | May | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 7 |
| | Jun | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 4 |
| | Jul | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 1 | 6 |
| | Aug | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 1 | 1 | 7 |
| | Sep | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 4 | 4 | 0 | 1 | 15 |
| | Oct | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 7 |
| | Nov | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 4 |
| | Dec | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 |
| Total | | 12 | 31 | 3 | 10 | 3 | 5 | 4 | 58 | 96 | 49 | 10 | 22 | 303 |
| Pre-intervention | | 8 | 21 | 2 | 3 | 3 | 3 | 3 | 29 | 55 | 25 | 8 | 10 | 170 |
| Post-intervention | | 4 | 10 | 1 | 7 | 0 | 2 | 1 | 29 | 41 | 24 | 2 | 12 | 133 |

**Supplemental Table 3.** Study outcome events (primary and secondary) and event rate denominators, by month

| Year | Month | Admissions | PatientDays | Admissions_ICU | Admissions-NonICU | PatientDays_ICU | PatientDays_NonICU | HAI | HAI_ICU | WGSevents | HAIrateAdmit_ICU | HAI_VRE | Surveilance_tested | Surveillance_pos | Surveillance_acq |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | 3150 | 18358 | 564 | 2586 | 3650 | 14708 | 3 | 0 | 0 | 0.00 | 7 | 2466 | 57 | 13 |
| | Feb | 2908 | 16728 | 556 | 2352 | 3283 | 13445 | 6 | 2 | 0 | 3.60 | 6 | 2378 | 58 | 14 |
| | Mar | 3113 | 18655 | 573 | 2540 | 3913 | 14742 | 5 | 0 | 0 | 0.00 | 5 | 2588 | 55 | 24 |
| | Apr | 3037 | 17797 | 575 | 2462 | 3724 | 14073 | 4 | 1 | 0 | 1.74 | 7 | 2329 | 68 | 25 |
| | May | 3216 | 18514 | 591 | 2625 | 3655 | 14859 | 6 | 2 | 1 | 3.38 | 8 | 2492 | 71 | 21 |
| 2019 | Jun | 3086 | 18193 | 633 | 2453 | 3687 | 14506 | 7 | 2 | 3 | 3.16 | 4 | 2445 | 70 | 23 |
| | Jul | 3093 | 18957 | 581 | 2512 | 3777 | 15180 | 6 | 1 | 2 | 1.72 | 9 | 2389 | 60 | 23 |
| | Aug | 3236 | 18722 | 604 | 2632 | 3627 | 15095 | 6 | 2 | 1 | 3.31 | 9 | 2504 | 54 | 17 |
| | Sep | 3055 | 18489 | 629 | 2426 | 3708 | 14781 | 9 | 2 | | 3.18 | 8 | 2361 | 46 | 16 |
| | Oct | 3236 | 18462 | 623 | 2613 | 3687 | 14775 | 4 | 2 | | 3.21 | 8 | 2475 | 54 | 16 |
| | Nov | 2937 | 17701 | 552 | 2385 | 3532 | 14169 | 8 | 1 | | 1.81 | 10 | 2389 | 50 | 15 |
| | Dec | 3053 | 17883 | 580 | 2473 | 3513 | 14370 | 9 | 2 | | 3.45 | 5 | 2267 | 60 | 15 |
| | Jan | 3089 | 18223 | 556 | 2533 | 3552 | 14671 | 10 | 4 | | 7.19 | 4 | 2401 | 100 | 38 |
| | Feb | 2842 | 17005 | 540 | 2302 | 3282 | 13723 | 9 | 2 | | 3.70 | 3 | 2273 | 71 | 19 |
| | Mar | 2448 | 15541 | 478 | 1970 | 2881 | 12660 | 8 | 2 | | 4.18 | 6 | 1925 | 71 | 17 |
| | Apr | 1859 | 11283 | 455 | 1404 | 2293 | 8990 | 8 | 1 | | 2.20 | 5 | 1364 | 51 | 16 |
| | May | 2489 | 14501 | 485 | 2004 | 3076 | 11425 | 12 | 2 | | 4.12 | 8 | 1800 | 53 | 17 |
| 2020 | Jun | 2825 | 16817 | 511 | 2314 | 3467 | 13350 | 9 | 0 | | 0.00 | 5 | 2020 | 75 | 18 |
| | Jul | 2946 | 18211 | 554 | 2392 | 3515 | 14696 | 9 | 1 | | 1.81 | 9 | 2140 | 67 | 20 |
| | Aug | 2845 | 18039 | 514 | 2331 | 3611 | 14428 | 12 | 6 | | 11.67 | 4 | 2052 | 72 | 19 |
| | Sep | 2882 | 18516 | 588 | 2294 | 3646 | 14870 | 9 | 4 | | 6.80 | 10 | 1815 | 62 | 13 |
| | Oct | 2899 | 18670 | 546 | 2353 | 3744 | 14926 | 5 | 1 | | 1.83 | 9 | 2116 | 68 | 23 |
| | Nov | 2643 | 17734 | 490 | 2153 | 3591 | 14143 | 6 | 0 | | 0.00 | 5 | 1834 | 65 | 18 |
| | Dec | 2581 | 18065 | 520 | 2061 | 3693 | 14372 | 8 | 2 | | 3.85 | 9 | 1762 | 81 | 30 |
| | Jan | 2526 | 18542 | 475 | 2051 | 3552 | 14990 | 3 | 1 | | 2.11 | 10 | 1784 | 48 | 13 |
| | Feb | 2387 | 15941 | 433 | 1954 | 3319 | 12622 | 8 | 2 | | 4.62 | 6 | 1625 | 42 | 14 |
| | Mar | 2932 | 18464 | 540 | 2392 | 3417 | 15047 | 8 | 2 | | 3.70 | 9 | 1956 | 57 | 16 |
| | Apr | 2845 | 18439 | 550 | 2295 | 3716 | 14723 | 4 | 0 | | 0.00 | 13 | 1923 | 63 | 12 |
| | May | 2860 | 19141 | 573 | 2287 | 3812 | 15329 | 2 | 0 | | 0.00 | 5 | 2012 | 49 | 17 |
| 2021 | Jun | 2858 | 18502 | 575 | 2283 | 3530 | 14972 | 4 | 1 | | 1.74 | 4 | 1977 | 65 | 21 |
| | Jul | 2921 | 19154 | 579 | 2342 | 3698 | 15456 | 6 | 3 | | 5.18 | 5 | 2089 | 85 | 27 |
| | Aug | 2738 | 19667 | 557 | 2181 | 3882 | 15785 | 1 | 0 | | 0.00 | 5 | 1860 | 76 | 30 |
| | Sep | 2619 | 18831 | 565 | 2054 | 3725 | 15106 | 4 | 1 | | 1.77 | 10 | 1766 | 81 | 26 |
| | Oct | 2559 | 19283 | 563 | 1996 | 3851 | 15432 | 1 | 0 | | 0.00 | 4 | 1769 | 62 | 20 |
| | Nov | 2454 | 18176 | 532 | 1922 | 3529 | 14647 | 4 | 0 | | 0.00 | 8 | 1590 | 74 | 31 |
| | Dec | 2403 | 17271 | 496 | 1907 | 3435 | 13836 | 6 | 0 | | 0.00 | 7 | 1715 | 59 | 24 |
| | Jan | 2222 | 17688 | 483 | 1739 | 3598 | 14090 | 8 | 3 | 3 | 6.21 | 4 | 1473 | 41 | 20 |
| | Feb | 2086 | 15282 | 425 | 1661 | 3168 | 12114 | 5 | 3 | 0 | 7.06 | 5 | 1389 | 35 | 18 |
| | Mar | 2356 | 16800 | 472 | 1884 | 3433 | 13367 | 3 | 0 | 0 | 0.00 | 5 | 1435 | 51 | 7 |
| | Apr | 2393 | 16229 | 527 | 1866 | 3382 | 12847 | 4 | 1 | 1 | 1.90 | 9 | 1635 | 61 | 21 |
| | May | 2475 | 16856 | 518 | 1957 | 3496 | 13360 | 7 | 3 | 0 | 5.79 | 7 | 1553 | 49 | 22 |
| 2022 | Jun | 2339 | 17230 | 528 | 1811 | 3605 | 13625 | 4 | 0 | 1 | 0.00 | 10 | 1435 | 44 | 21 |
| | Jul | 2362 | 17912 | 557 | 1805 | 3755 | 14157 | 6 | 2 | 1 | 3.59 | 5 | 1462 | 57 | 32 |
| | Aug | 2421 | 17485 | 565 | 1856 | 3623 | 13862 | 7 | 2 | 2 | 3.54 | 2 | 1425 | 60 | 22 |
| | Sep | 2335 | 17662 | 569 | 1766 | 3755 | 13907 | 15 | 4 | 0 | 7.03 | 3 | 1492 | 69 | 28 |
| | Oct | 2336 | 18497 | 586 | 1750 | 4022 | 14475 | 7 | 5 | 1 | 8.53 | 3 | 1380 | 75 | 33 |
| | Nov | 2373 | 17658 | 561 | 1812 | 3897 | 13761 | 4 | 4 | 2 | 7.13 | 6 | 1364 | 41 | 17 |
| | Dec | 2321 | 17971 | 556 | 1765 | 3935 | 14036 | 4 | 1 | 0 | 1.80 | 9 | 1303 | 54 | 21 |

**Supplemental Table 4.** Clinical isolates available for sequencing and completed sequencing in the pre- and post-intervention periods.

| Study period (Dates) | Clinical isolates collected/eligible | Isolates sequenced | WGS results included in analysis* |
|---|---|---|---|
| Pre-intervention (January 2019 – August 2019) | 151 | 125 | 111 |
| Post-intervention (January 2022 – December 2022) | 289 | 289 | 276 |

* WGS, whole genome sequencing; sequenced isolates may not have passed quality control or had sufficient data for sequence analysis.

**Supplemental Figure 2.** Methicillin-resistant Staphylococcus aureus healthcare-associated infections in intensive care units (ICU), before and after discontinuation of contact precautions
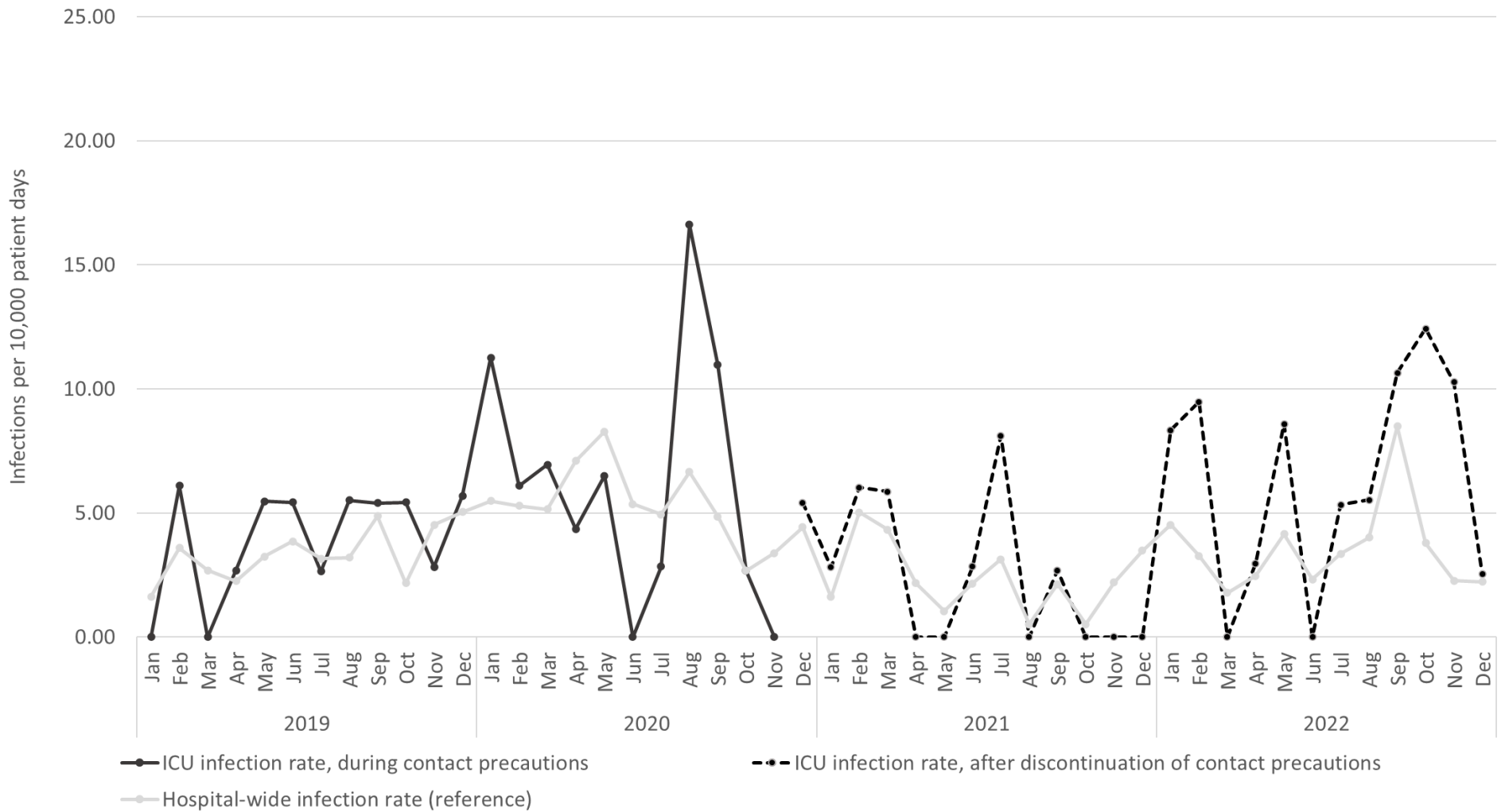
**Supplemental Figure 3.** Methicillin-resistant Staphylococcus aureus acquisition by active surveillance, before and after discontinuation of contact precautions
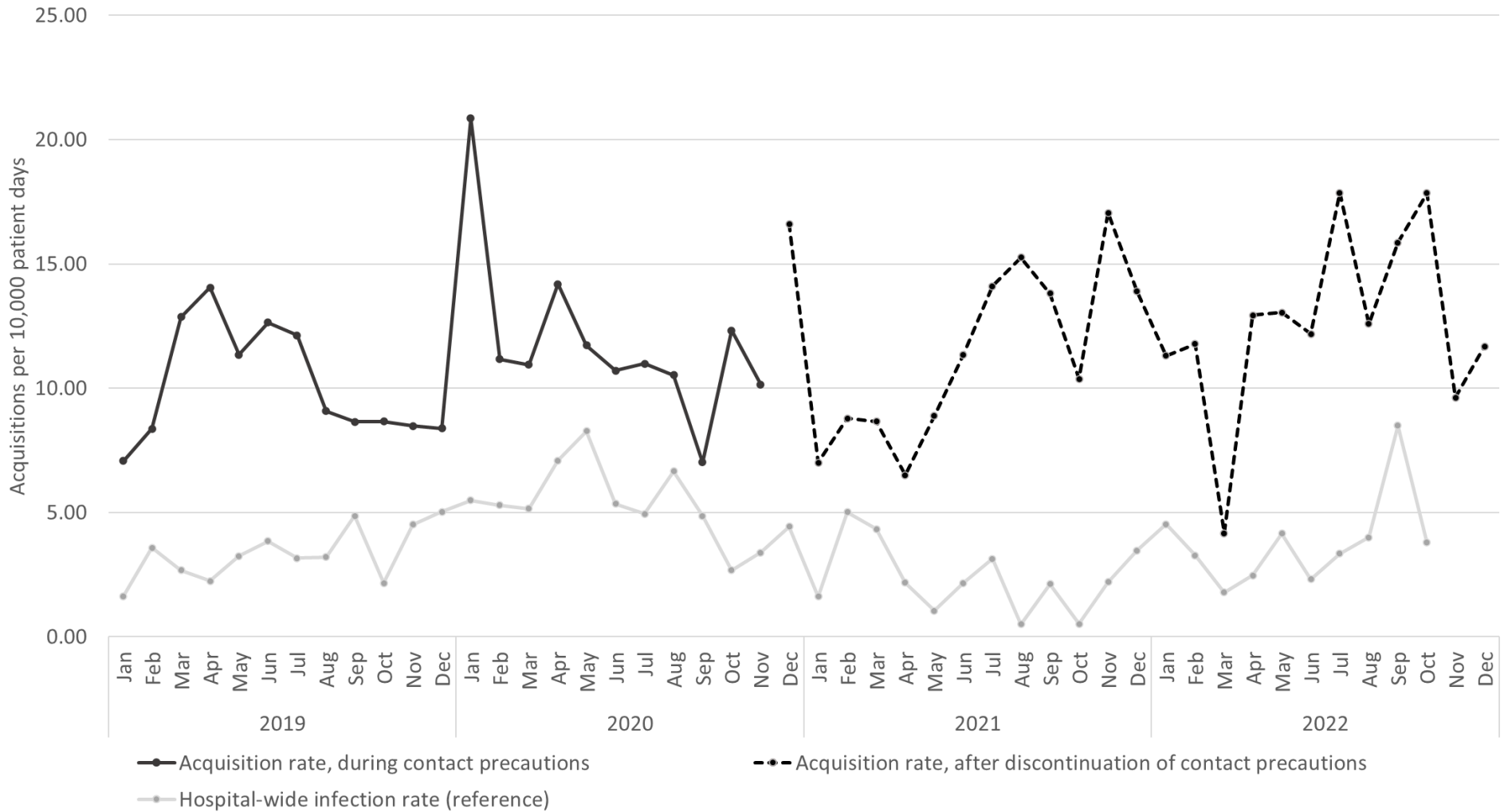
**Supplemental Figure 4.** Vancomycin-resistant *Enterococcus sp* healthcare-associated infections during the study period