allow individual hospitals and the country to better understand the burden of these infections and to identify needs and opportunities for their prevention. Timely and accurate data are needed to identify problems and shortcomings, to make timely refinement and optimization, and to improve the quality of medical care.

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Why is there a discrepancy between laboratory test results and real-world efficacy of continuously active quaternary ammonium disinfectants?

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To the Editor—Continuously active quaternary ammonium disinfectants containing polymer coatings that bind to surfaces have been developed to provide persistent antimicrobial activity between episodes of cleaning.[1,2] Environmental protection agency (EPA) registration as a disinfectant with 24-hour residual antimicrobial activity requires demonstration of a 5-log reduction in bacteria and/or a 3-log reduction in viruses within 10 minutes after 12 cycles of alternating wet and dry abrasions intended to simulate routine contacts that might occur between cleaning episodes.[1,3,4] A product registered with the EPA as Firebird F130 (Microban Products, Huntersville, NC) and previously marketed by Professional Disposables International as Sani-24 has demonstrated residual activity against several bacterial pathogens and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[1,5] However, real-world assessments of these products have yielded mixed results.[1] In a recent randomized trial, a continuously active disinfectant significantly reduced total bioburden and recovery of clinically important pathogens,[6] whereas no significant reductions occurred in another randomized trial.[7]

Why might there be a discrepancy between laboratory results and real-world efficacy of continuously active quaternary ammonium disinfectants? It is possible that the coatings may sometimes be removed in real-world settings as the products are easily removed by disinfectant or nondisinfectant wipes.[1,8] The artificial methods used for laboratory testing may also exaggerate the potential for efficacy in real-world settings (ie, organisms deposited in a liquid inoculum during laboratory testing may be reduced more than organisms deposited without moisture in clinical settings).[1,9]

Another factor that could affect real-world efficacy is variation in the amount of continuously active quaternary ammonium disinfectant applied to surfaces. For Firebird F130/Sani-24, the EPA registration (no. 42182-9) for residual disinfection indicates that sufficient product must be applied to ensure thorough wetness with 1 minute of wet contact time. It is plausible that insufficient product might be applied in real-world settings. The product may dry quickly on surfaces because it contains 68.6% ethanol and might require reapplication to achieve 1 minute of wet contact time. Therefore, we compared the amount of product applied using Sani-24 Germicidal Spray and presaturated Sani-24 Germicidal Wipes with different wiping methods and tested for activity against methicillin-resistant *Staphylococcus aureus* (MRSA). Sani-24 was applied to overbed tables using 5 methods: (1) spraying with Sani-24 Germicidal Spray following the manufacturer's recommendation (ie, 3 sprays at 15 cm) providing ~120 seconds of wet contact time, (2) wiping with 1 Sani-24 Germicidal Wipe with 2 passes over the surface providing ~60 seconds of contact time, (3) wiping with 1

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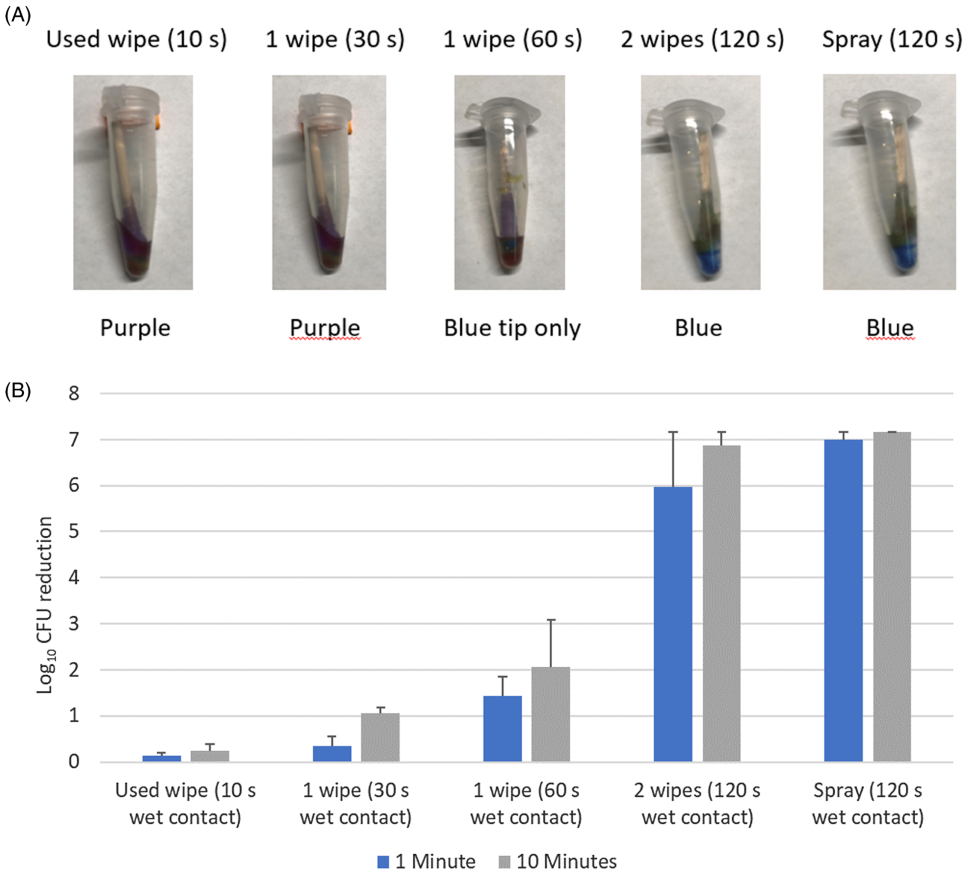

Figure 1. Detection of residual quaternary ammonium disinfectant on surfaces based on a bromophenol blue colorimetric assay (A) and reduction in methicillin-resistant *Staphylococcus aureus* (MRSA) inoculated onto the surface with 1 or 10 minutes of contact time (B). Seconds in parentheses indicate wet contact time of the disinfectants prior to drying. Change from purple to blue indicates detection of quaternary ammonium compound. s, second; CFU, colony-forming unit.

Sani-24 Germicidal Wipe with 1 pass over the surface providing ~30 seconds contact time, (4) wiping with 2 Sani-24 Germicidal Wipes to thoroughly wet the surface providing ~120-seconds contact time, and (5) and wiping with 1 Sani-24 Germicidal Wipe that had first been applied to a 1.2 m^2 surface area resulting in reduced product application providing ~10 seconds contact time. For each method, the product was allowed to dry overnight before testing. The spray and 2-wipe applications left a palpable sticky residue on the surface.

A bromophenol blue colorimetric assay was used to assess the presence of quaternary ammonium on the surfaces ~24 hours after application.[1,10] Bromophenol blue solutions turn from purple to blue when complexed with quaternary ammonium compounds. A color change has been correlated with a >99.9% reduction in *Staphylococcus aureus* and *Klebsiella aerogenes*.[10] The supplemental material shows a bromophenol blue standard curve.

To assess antimicrobial activity on the surfaces, 6 $\log_{10}$ of MRSA in 10 µL phosphate-buffered saline was inoculated onto treated surfaces. After 1 and 10 minutes of contact time, the surfaces were sampled with cotton swabs premoistened in Dey-Engley neutralizer and plated onto selective media for enumeration. Reductions were calculated in comparison to untreated control surfaces.

As shown in Figure 1.A, bromophenol blue solution turned from purple to blue with the spray and 2-wipe application, and the swab tip turned blue for the 1 wipe with 60 seconds contact time application. No blue color was detected for the 1 wipe with 30 second contact time and the used wipe applications. MRSA was reduced by ≥5.9 $\log_{10}$ with the spray and 2-wipe applications, but only by ~1–2 $\log_{10}$ when applied with a single wipe with 1–2 passes over the surface (Fig. 1B). No substantial reduction in MRSA occurred when a single wipe was applied after first wiping a 1.2 m^2 surface.

Our findings demonstrate that the amount of continuously active quaternary ammonium disinfectant detected on surfaces can vary considerably with different methods of application. Application as a spray or wipe with sufficient product to provide ~120 seconds of wet contact time provided optimal activity but may not be practical in some settings if a residue is left on surfaces. Quaternary ammonium disinfectant was only detected on surfaces with 60 seconds or longer contact time. A single wipe passed over the surface twice to provide ~60 seconds wet contact time resulted in a 2 $\log_{10}$ reduction in MRSA, but ≤1 $\log_{10}$ reductions occurred on surfaces with wet contact time of ≤30 seconds.

In summary, the method of application of continuously active quaternary ammonium disinfectants could substantially impact results in real-world settings. Our findings reinforce the manufacturer's recommendation that sufficient product must be applied to provide at least 60 seconds of wet contact time. Bromophenol blue testing could be a useful tool to assess the adequacy of product application.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/ice.2024.15

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Off-site facilities: Friend or foe of outpatient parenteral antimicrobial therapy (OPAT)?

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To the Editor—In a recent publication by Kaul et al,[1] outpatient parenteral antimicrobial therapy (OPAT) patient characteristics associated with increased risk of loss to follow-up with infectious diseases (ID) staff were described. In this retrospective cohort study, loss to follow-up with ID in patients receiving OPAT was strongly associated with discharge to an off-site facility, including subacute rehabilitation center (OR, 3.24; 95% CI, 2.35–4.47; $P < .001$) or a long-term care facility (LTCF) (OR, 5.91; 95% CI, 2.89–12.03; $P < .001$). A similar association was not observed for patients discharged to a hospital-based acute rehabilitation center.[1]

We applaud these researchers for highlighting the opportunity for optimizing healthcare delivery at transitions of care, specifically the need to improve ID follow-up in patients receiving OPAT. Multiple studies have outlined worse outcomes or increased risk of complications or readmission in patients lost to ID follow-up.[1,2] Although these researchers hypothesized that communication challenges and possible staffing issues were contributory to loss to follow-up, external validity of the findings could be improved if further characteristics of the acute rehabilitation center, subacute rehabilitation center, and LTCF were shared and existing methods of communication with these facilities described. Herein, we describe our institutional experience with off-site facilities.

Our institution has a well-established central OPAT program for patients discharged on IV antibiotics following ID consultation. For patients discharged to a health-system acute rehabilitation center, closed-loop communication is utilized, whereby the local health-system pharmacist(s) (ie, staff who are operationally distinct from the discharging facility despite being "internal") are leveraged to assume responsibility for OPAT monitoring at healthcare transition.

On the day of transfer to an acute rehabilitation center, a "handoff" is completed between the central OPAT team and the regional pharmacist confirming antimicrobial orders as well as laboratory monitoring orders. This process is completed via an electronic health record (EHR) message but could also be completed with outside facilities via phone. Following this handoff, the local pharmacist assumes responsibility for antimicrobial monitoring. Abnormal laboratory results, potential adverse drug events (ADRs), and other concerns regarding antimicrobial therapy are triaged to the regional OPAT pharmacist for review during the stay in the acute rehabilitation center, as applicable.

Upon discharge from an acute rehabilitation center, communication is sent to the central OPAT team. If the antibiotics are continued, OPAT monitoring is reassumed by the central OPAT team at the next level of care (typically home infusion or outpatient infusion center). If the antibiotic course has been completed, the local pharmacist ensures PICC line removal and notifies the central OPAT team of antibiotic completion.

For OPAT patients discharged to external facilities (subacute rehabilitation center or LTCF), a similar albeit less structured approach occurs, with OPAT outreach to the nonaffiliated facility care team for care coordination including ensuring laboratory orders are received and followed, comanagement of emergent adverse events, follow-up appointment coordination, finalizing therapy completion, etc. External outreach level of structure can be tailored to facility type and relationship.

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