

Increased Risk of HAIs and the Case for Patient Decolonization in the COVID-19 Era

For Healthcare Professionals



The COVID-19 pandemic has led to the increased adoption of innovative technology in many hospitals to help ensure the safety of patients and staff. International crises in the past have similarly led to the introduction of important innovations in an effort to improve outcomes and mitigate the loss of life. For example, the tourniquet was introduced to slow or stop bleeding of wounded soldiers during the 16th-century Italian war.¹ World War II brought the widespread use of penicillin, which is believed to have saved an estimated 80,000 lives.¹

Today, perhaps more than ever due to COVID-19, infection prevention (IP) departments are collaborating with hospital leadership to expedite the evaluation and adoption of innovative protocols and products in order to mitigate risk exacerbated by the pandemic. For example, since March 2020, there has been increased use of tools to reduce environmental contamination, including ultra-violet C band (UV-C) disinfection and dry hydrogen peroxide systems.^{2,3}

However, the laser focus on COVID-19 prevention has created an unintended consequence—less time for rigorous attention to the prevention of healthcare associated infections (HAIs), including those caused by methicillin sensitive *Staphylococcus aureus* (MSSA) and methicillin-resistant *Staphylococcus aureus* (MRSA).^{4,5}

Disruption Creates Opportunity to Adopt New Approaches

The traditional approach to containment of MRSA colonization, in order to prevent transmission and the development of central line associated bloodstream infection (CLABSI) and other HAIs, involves nasal screening and contact precautions (i.e. screening and isolation) for high-risk patients in the general hospital population, and targeted screening and decolonization of preoperative and intensive care unit (ICU) patients. In this time of constrained resources, an alternative approach, universal decolonization, is now being embraced by an increasing number of hospitals and healthcare systems as a more efficient and cost-effective preventive measure for general hospital, ICU and surgery patients.⁶

Decolonizing the nose of patients with mupirocin (antibiotic ointment) in addition to the skin with chlorhexidine (CHG) bathing has been the standard approach to MRSA decolonization for decades. This protocol has most widely been employed prior to orthopedic surgical procedures in order to reduce the risk of surgical site infections (SSI), and in ICUs in order to reduce the risk of device associated infections including CLABSI.⁷ However, the drawbacks of mupirocin use, including extended time to efficacy and patient non-

compliance, have contributed to the increased use of nasal antiseptic products.

While the use of mupirocin has well documented benefits, the evidentiary and positive outcomes through the use of iodine- and alcohol-based nasal antiseptics are mounting. In addition, the onset of effect of antiseptics in the reduction of pathogens is almost immediate, versus mupirocin which requires up to five days to achieve maximum efficacy. Another advantage of the use of the antiseptic in place of mupirocin is the reduction in the development of mupirocin-resistant strains of *Staphylococcus aureus*.⁸

Published studies and presentations at professional symposia have shown as much as 100% elimination of MRSA SSIs following universal nasal decolonization and annualized savings per facility from \$200,000 to more than \$400,000.⁹⁻¹¹ Huang and team demonstrated that universal decolonization resulted in a significantly greater reduction in the rate of all bloodstream infections in ICU than either targeted decolonization or screening and isolation.¹² Hospitals that employ universal decolonization are also reporting reduced use of personal protective equipment (PPE) supplies resulting from fewer patients placed in isolation.¹³

When compared to the screen and isolate approach, universal decolonization has been reported to increase staff and patient satisfaction and reduce costs associated with PPE use.¹⁹ Because of these advantages, healthcare executives and infection prevention departments are championing this approach in more than 700 hospitals and health care organizations.

Infection Prevention and Control During the Pandemic

The Centers for Medicare and Medicaid Services (CMS) attempted to mitigate the effect of diverted resources due to the pandemic by providing a number of waivers, such as for HAI surveillance and reporting requirements.²⁰ However, adding further reporting burden, a federal mandate was imposed for tracking and reporting 32-line items on a daily basis related to COVID-19 in each hospital.²¹

To validate the perceived disruption in infection prevention departments due to the pandemic, a Twitter poll of members of the infection prevention community asked what percentage of time was required for COVID-19 response efforts. The majority of respondents (79%) estimated that >75% of their time was devoted to COVID-19 response efforts.²² That was confirmed in a recent article in a peer-reviewed journal, *Infection Control & Hospital Epidemiology*.²² The authors reported that the necessary COVID-19 prevention focus by IP professionals was resulting in reduced HAI surveillance time, which in turn may result in insufficient HAI case finding and the associated targeted infection prevention efforts. The authors reported reduced time devoted to IP process compliance monitoring, such as with CLABSI insertion and maintenance bundles. IP hospital rounding with coaching of healthcare workers is also impacted, all of which potentially increase the risk of HAI.²²

In another recent paper, hospitals in New York and Missouri reported that the type of HAI most significantly impacted by diversion of IP time and resources during the pandemic was CLABSI. Two hospitals reported a >300% increase in CLABSI during the pandemic to date, compared to the average rate for the prior 15 months. The authors suggest that this may be due to higher-acuity patients in the hospital for a longer duration. Additionally, one complication of COVID-19 is acute kidney injury, which can result in dialysis and the insertion of a central line, adding to overall risk of CLABSI.²³

Many United States (U.S.) hospitals are struggling during the pandemic to remain financially viable with reduced elective surgical cases and lower overall census. This financial impact can be compounded by any increase in HAI rates. A single case of CLABSI is estimated to cost a hospital \$48,108, in addition to the increased mortality risk and suffering for the patient and family.²⁴

In addition to the reported increase in CLABSI, there is a documented history of risk of secondary respiratory infections for patients with influenza. During the annual flu season, influenza bacterial coinfection is associated with increases in hospital admissions, more severe symptoms, and increases in mortality.²⁵ *Streptococcus pneumoniae* and *Staphylococcus aureus* are reported, in one review, to be among the most common causative pathogens for these infections, accounting for 35% and 28% of identified coinfecting bacteria, respectively.²⁶ Similar data have been reported for secondary bacterial infections that develop post-admission and represent an HAI threat.²⁷ Thus, it would appear to be prudent to add reduction of the source burden of MRSA and MSSA nasal carriage to prevention strategies as we approach the flu season, including in units where COVID-19 patients are treated.¹⁶⁻¹⁸

The Path Forward

Since MRSA and MSSA are pathogens that reside on the skin and most commonly in the vestibule of the nose, colonized patients can easily contaminate any indwelling line or incision, providing direct portals into the body potentially leading to infection. These organisms are also easily transmitted on the hands of healthcare workers, which can likewise increase the risk of transmission and HAI for other patients. Professional clinical guidelines recommend the use of nasal and skin decolonization using a vertical approach, i.e., for specific types of HAI including SSI, MRSA bacteremia and CLABSI.²⁸⁻³⁰

Given the current diversion of IP resources, transitioning the approach for MRSA/MSSA prevention from a vertical (targeted screen, treat and isolate) to a horizontal approach (universal decolonization) might provide an innovative and simple means to reduce the risk of CLABSI as well as other HAIs. It might also serve to reduce the significant risk of secondary bacterial respiratory infections for influenza patients. The logistics associated with a protocol change from targeted to universal skin and nasal decolonization can be facilitated by collaboration with vendor partners (providers of nasal antiseptics) who offer healthcare worker training on all shifts and assessment of practice compliance.

Conclusions

Now is the time to keep abreast of innovations in patient care to ensure optimal reduction of not only COVID-19 risk, but also HAI risk. With the support of hospital leadership, IP departments have long been early adopters of innovative products and practices in the interest of patient safety.

Universal nasal and skin decolonization is an innovative approach with many advantages designed to reduce the transmission of MRSA and MSSA and associated infection risk in the interest of patient safety and cost containment.

Use of widely available nasal antiseptics provides an inexpensive, effective, additional safety shield with benefits now, and into the future. As we approach flu season, while still battling the COVID-19 pandemic, patient safety has never been more critical.

Support of health care executives is mission critical for IP departments that seek to employ evidence-based innovations in order to optimize patient safety. Such alignment between leaders and providers is crucial for the resiliency of hospitals in the months and years ahead.

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