The importance of advances in nasal decolonization for current and future infection prevention

Nasal carriage of Staphylococcus aureus has been reported in 30 percent of the population, and methicillin-resistant Staphylococcus aureus in 3 percent to 5 percent of the population. These are major risk factors for infection in community and healthcare environments. It is also now well understood that the nose, as a primary reservoir for such pathogens, can be a prolific source of contamination. Clinical evidence reveals that nasal decolonization can significantly reduce the risk of transmission. However, the traditional use of the topical antibiotic mupirocin for nasal decolonization is not supportive of antibiotic stewardship guidelines. New infection prevention programs using alcohol-based Nozin® Nasal Sanitizer® antiseptic allow for wider application of nasal decolonization than previously available with subsequent lowering of pathogenic burden. The benefits to the healthcare community can be profound with significant reduction of infection risks, improvements in patient care as well as substantial cost savings in the intensive care unit, operating room and other high-risk areas.

Evidence demonstrating that S. aureus nasal colonization was an infection risk led to efforts to identify effective antibiotics to control that risk. By the early 1980s, it became clear that S. aureus was capable of developing resistance to many antibiotics, including methicillin. Both methicillin-susceptible S. aureus (MSSA) and methicillin-resistant S. aureus (MRSA) are the cause of many infections. The antibiotic mupirocin became recognized as an effective S. aureus topical nasal decolonizing agent to reduce infection risk from both MRSA and MSSA in surgical and medical patients. A distinct disadvantage of mupirocin is its contribution to bacterial antibiotic resistance and the potential for transference of resistance to other bacteria.

The pre-operative MRSA/MSSA decolonization procedure with mupirocin typically involves a five-day, twice-daily topical application to the vestibule. However, poor patient compliance with self-administration of the multiple applications is an issue. Furthermore, an increasing body of research indicates that the consistency of successful decolonization with mupirocin may be less than previously thought, even when applied by trained staff. The necessary multiday process also restricts its usefulness for patients requiring immediate surgery.

The emergence of nasal antiseptics as a new approach to decolonization

In response to these concerns, alternatives to antibiotic use for nasal bacterial decolonization were developed. Primary among these are nasal antiseptics which conform with antibiotic stewardship guidelines. Unlike mupirocin, which kills the cells slowly by interfering with cellular functions, antiseptics kill on contact. In the case of the Nozin® Nasal Sanitizer® antiseptic, the alcohol immediately dissolves the bacterial cell membrane and coagulates its proteins. The carriage of MRSA, MSSA and other potentially infectious pathogens can be reduced upon application of the antiseptic with simple reapplications to maintain decolonization.

The magnitude and time course of the alcohol-based bactericidal activity is substantial, achieving multiple log reductions in overall bacterial levels within seconds, with persistence extending for 12 hours, requiring only twice-daily applications to maintain patient safety. Bacteria are not known to develop resistance to alcohol’s effects.

Programs using Nozin® Nasal Sanitizer® antiseptic

Perioperative strategies

The perioperative use of the Nozin® antiseptic adopted by many hospitals addresses the belief that not all surgical site infections are initiated intra-operatively and that infection risk extends to the post-operative period. To maintain decolonization post-surgery, the patient enters a twice-daily regimen of Nozin® applications that extends until discharge. Because of the cross-inoculation that has been demonstrated between nasal and body skin colonization, a bundle of nasal decolonization and daily skin decolonization with baths or wipes is recommended. To minimize contamination of at-risk surgical wounds through the common pathway of nose-to-hand transmission following early (1 to 3 day) discharge, some facilities send the Nozin® product home for continued use by both patient and home caregiver.

In one study published in the American Journal of Infection Control in 2017, perioperative use of the alcohol nasal antiseptic in spine patients was added to existing infection control protocols that included CHG bathing. The addition of nasal decolonization resulted in an 81 percent decrease in S. aureus SSIs, compared to the nine-month baseline period, which was maintained during the 15-month study period. Protection was extended to those with patient contact; pre-operative staff and surgical team members also voluntarily adopted daily self-use of the Nozin® antiseptic.

In a study presented at the 2018 American Academy of Orthopedic Surgeons conference, the addition of perioperative alcohol-based nasal decolonization to existing CHG bathing in hip and knee patients was assessed. All-cause SSI rates decreased 78.5 percent to 0.34 percent in treated patients during the prospective seven-month study period compared to 1.5 percent in matched control patients in the preceding 12 months. More information is available at Nozin.com.
In 2013, the results of a study of more than 74,000 adult ICU patients addressed a critical question regarding nasal decolonization strategy. Designed with three treatment arms, the study demonstrated that universal nasal and body skin decolonization of patients, without screening for nasal carriage, was more effective than screen-and-isolate as well as screen-and-decolonize protocols in reducing MRSA infection isolates and all-cause blood stream infections. This identification of the most effective decolonization approach would provide the path for most institutions, if it were not for the fact that nasal decolonization was achieved using mupirocin. Because of concerns for an antibiotic use that would unnecessarily treat patients, the substantial majority of whom were neither S. aureus (about 70 percent) nor MRSA (about 95 percent) colonized, the only acceptable option for many hospitals was the less effective, costlier screen-and-treat protocol.

With the availability of antiseptics for nasal decolonization, especially the Nozin® antisepctic that was designed for regular daily use, the concerns regarding the development of bacterial resistance to mupirocin are now removed. The Nozin® universal nasal decolonization protocol can be used to optimize infection rate reduction while eliminating the costs of screening. This approach can be expanded to other groups with high susceptibility to infection, including those immunocompromised or critically ill, as well as to use by healthcare staff in contact with patients. Since the Nozin® antisepctic is a pleasant and easily applied option, use by visitors could provide additional safety for these patients.

**The dilemma of contact isolation precautions**

There is currently a great deal of discussion surrounding the pros and cons of the elimination of contact isolation precautions. The situation is complex and involves decisions about how best to care for high-risk admissions to the hospital with a history of MRSA colonization and those on the “Hot List” with a high likelihood of carriage based on transfer from long-term care facilities, advanced age, medical conditions, etc.

Taking a broad view, the dilemma might be depicted as follows:

![The Dilemma of Contact Precautions](image)

<table>
<thead>
<tr>
<th></th>
<th>All Admits</th>
<th>Not Screened</th>
<th>Screened</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA (-)</td>
<td>95%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>MRSA (+)</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRSA (+)/CP</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Percentages are estimates based on population data.

On the right side are the general admissions to the hospital that are determined to warrant screening for MRSA carriage. For the sake of discussion, we will assume that this group constitutes about 25 percent of those admitted. Of this group, those patients who screen positive will enter CP (perhaps 10 percent in this “enriched” cohort). In many cases, their carriage will go untreated. The other 90 percent will move to standard precautions. Of the large, unscreened group on the left, statistically, about 5 percent can be expected to carry MRSA and 30 percent to carry S. aureus into the hospital. But these carriers are not identified, and the infection risk they pose, which could be comparable to that on the right, is not being addressed. Of those screening positive on the right, many remain colonized, despite our understanding that about 80 percent of the infections they will incur will be through self-inoculation.

A straight-forward solution to the infection risk represented on both sides of the diagram would be to decolonize everyone upon admission with a nasal antiseptic and continue to do so for the duration of their stay. By avoiding CP, this would facilitate the flow of admitted patients to their rooms, improve nursing care and increase patient satisfaction. The overall MRSA and MSSA colonization pressure in the facility would be reduced. Staff would be relieved of the fatigue of repeated goings for the isolation protocol. Significant direct cost savings from eliminating screening and personal protective equipment use in CP would greatly exceed the cost of antiseptic treatments. CP reduction using the Nozin® product represents one of several unique opportunities to reduce the risks of nasal colonization that have never before been considered because of concerns for unnecessary antibiotic use.

In a one-year study at Marshall Medical Center, a 113-bed acute care hospital in Placerville, Calif., the goal was to maintain low MRSA infection rates while eliminating CP for all but actively infected patients. In the prior three years at this facility, all patients actively infected, colonized or with a MRSA history were put in CP. The one-year protocol decolonized these patients using the alcohol-based Nozin® antiseptic and bathing with chlorhexidine wipes on a daily basis but isolated only those with active infections. The authors reported direct cost savings totaling more than $64,000 from the prior year. Acquired infection rates for the prior three years and one-year study remained at 0.13/1000 patient days.

**Conclusions**

New protocols utilizing nasal decolonization with Nozin® Nasal Sanitizer® provide welcome innovation for better healthcare with lower costs. These clinically proven Nozin programs can lower infection risk associated with nasal carriage in ICUs, ORs and other high-risk situations that could not be addressed in the past. An important program feature includes responsibly reducing screening and contact isolation precautions for MRSA colonization. Future utilization may support reducing colonization pressure throughout healthcare and related community environments. As Nina Deatherage, RN, BSN, CIC and Infection Control Lead at Marshall Medical Center, said, “The use of Nozin® with our MRSA colonized patients enables us to actively reduce the bacterial carriage of those who might be contributing to transmission and to lessen the environmental burden of potential pathogens.”

Sponsored by: Global Life Technologies Corp. is the leader in nasal decolonization with Nozin® infection prevention programs designed to improve care, lower infection risk and reduce healthcare costs. These programs utilize Nozin® Nasal Sanitizer® antiseptic with clinically supported solutions for healthcare facilities, their patients and the providers who care for them. Visit Nozin.com. ©2018 Global Life Technologies Corp.