Section 6 – Estimated Cost Implications of Reducing Bloodstream Infections in Patients With Medical Devices

What Is the Cost and Cost Savings Associated With Decolonization?

Determining the cost of the decolonization intervention and the expected cost savings associated with preventing infection can be key to the decision-making process. The following tables can help you estimate the cost and cost savings associated with implementing decolonization at your hospital.

First, it is important to estimate the expected reduction in infections if decolonization is adopted. The ABATE Infection Trial[1] showed that the use of decolonization in patients with select devices (central lines, midline catheters, and lumbar drains), led to the following:

- 32 percent reduction in all-cause bloodstream infections
- 37 percent reduction in positive MRSA and vancomycin-resistant enterococcus (VRE) clinical cultures

Table 6-1 shows the calculations necessary to estimate the reduction in infections at your hospital if decolonization is implemented. First, identify all annual bloodstream infections in non-ICU patients with central lines, midline catheters, and lumbar drains at your hospital. This includes all bloodstream infections regardless of whether they were related to the device. This number should be entered in place of variable AA below. A reduction of 32 percent is expected. If this number is not readily available, the annual number of central line-associated bloodstream infections (CLABSIs) in could be used as a surrogate. Be aware that the use of CLABSI will underestimate the expected benefit.

Second, identify all annual MRSA and VRE clinical cultures in non-ICU patients with central lines, midline catheters, and lumbar drains at your hospital. Enter that number into the table in place of variable BB. A 37 percent reduction in MRSA and VRE clinical cultures is expected if decolonization is implemented.

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Table 6-1. Estimated Benefit From Targeted Decolonization in non-ICU Patients With Selected Devices

Metric	Current Annual #	After Adoption of Universal Decolonization
Annual non-ICU bloodstream infections among unique patients with selected devices	AA	[AA * (1-0.32)]
Annual non-ICU positive MRSA and VRE clinical cultures among unique patients with selected devices	BB	[BB * (1-0.37)]

Table 6-2 lists additional data elements needed to complete the cost analysis.

Table 6-2. Input Variables

Variable	Definition
Bathing costs	Incremental cost of chlorhexidine bathing per patient day = daily chlorhexidine cost minus daily routine soap cost
Patient days	Patient days generated by non-ICU patients with selected devices
Admissions	Number of admissions to non-ICU locations involving patients with selected devices

After obtaining the above data, enter the numbers into Table 6-3. This table helps calculate the cost savings from prevented bloodstream infections after subtracting the added costs of chlorhexidine over regular soap. The cost savings from prevented MRSA and VRE clinical cultures are not estimated here since the costs saved depend on the type of infection which may vary across hospitals. Thus, the overall cost savings from Table 6-3 are an underestimate.

Table 6-3. Estimated Cost Reduction From Universal Decolonization

Metric	Calculation
$ Potentially saved from averted bloodstream infections (C)	[AA * (0.32)] * $32,000[2] = C
$ Saved from MRSA/VRE clinical cultures averted	Not calculated[a]
Product cost (D)	[(Bathing Cost * Patient Days) + (Mupirocin Cost[b] * Admissions)] * .79 = D[c]
Intervention savings (IS)	Difference (i.e., C-D=IS)

[a]Since the cost of MRSA and VRE clinical cultures is dependent on the type of infection plus any later sequelae due to MRSA/VRE acquisition, this amount is not easy to estimate without additional chart review at the hospital. Thus, we conservatively calculate cost savings without this outcome. Cost savings are therefore likely to be underestimated.

[b]Assumes a generic 22g multidose single patient tube of mupirocin will be dispensed to each qualifying patient to cover a 5-day course; this results in a single tube cost regardless of how many days the patient remains in the hospital.

[c]Represents the 79 percent adherence in the ABATE Infection Trial that yielded the 32 percent reduction in bloodstream infections.

References

1. Huang SS, Septimus E, Hayden MK, et al. Effect of body surface decolonisation on bacteriuria and candiduria in intensive care units: an analysis of a cluster-randomised trial. Lancet Infect Dis. 2016;16(1):70-9. PMID: 26631833.

2. Stevens V, Geiger K, Concannon C, et al. Brown J, Dumyati G. Inpatient costs, mortality and 30-day re-admission in patients with central-line-associated bloodstream infections. Clin Microbiol Infect. 2014 May;20(5):O318-24. PMID: 24112305.