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Practice forum article

## Development of a unit-specific antibiogram and planning for implementation: Preimplementation findings

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This practice forum reports experiences with the development of a unit-specific antibiogram and planning for its implementation. Involvement of internal and external facilitators was a key strategy for addressing issues, including data limitations, coordination, and planning. These activities were incorporated and reported as part of the facility's broader antimicrobial stewardship program, and represent the first step in a set of planned projects to evaluate the impact of antibiograms on provider behavior and patient outcomes.

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The development of antibiograms is complex, requiring laboratory and information technology (IT) resources, and labor-intensive.<sup>1,2</sup> This is typically why antibiograms are reported only at the facility level. A study comparing hospital-wide and intensive care unit (ICU) antibiograms found numerous significant differences, however.<sup>3</sup> Assessing isolates from a homogenous population (eg, ICU patients) may provide improved sensitivity and specificity<sup>4</sup> and a more accurate assessment of the relationship between antimicrobial stewardship program (ASP) interventions and outcomes.<sup>5,6</sup>

Limited information is available on the development and implementation of unit-specific antibiograms, although identified challenges include IT limitations, Clinical and Laboratory Standards Institute (CLSI) guidelines for minimum isolates, the number of in-service sessions needed to educate providers, and effective dissemination.<sup>1</sup> The reason for nonuse is typically tied to the need for increased access and education on the use of antibiograms.<sup>7,8</sup>

This is relevant for facilities with spinal cord injury (SCI) units, given the high risk of infection and antimicrobial resistance in this patient population compared with general acute care patient populations.<sup>4,9</sup> The present study documented experiences with the development of and planning for implementation of a SCI unit-specific antibiogram.

**METHODS***Study design and time frame*

Initial discussions began in December 2013, and meetings were held between January 2014 and January 2015 (Fig 1). This study was reviewed and designated as a quality improvement study by the local Institutional Review Board.

*Study sites and teams*

One VA facility with an SCI unit was included. The facility included in the pilot offered support via pharmacy leadership, infectious disease (ID) leadership, and microbiology/laboratory leadership and had an ongoing ASP, which enhanced buy-in and coordination. The content of the antibiogram and implementation planning were developed collaboratively by an interprofessional group including the evaluation team (with expertise in health services research in SCI, epidemiology, antimicrobial

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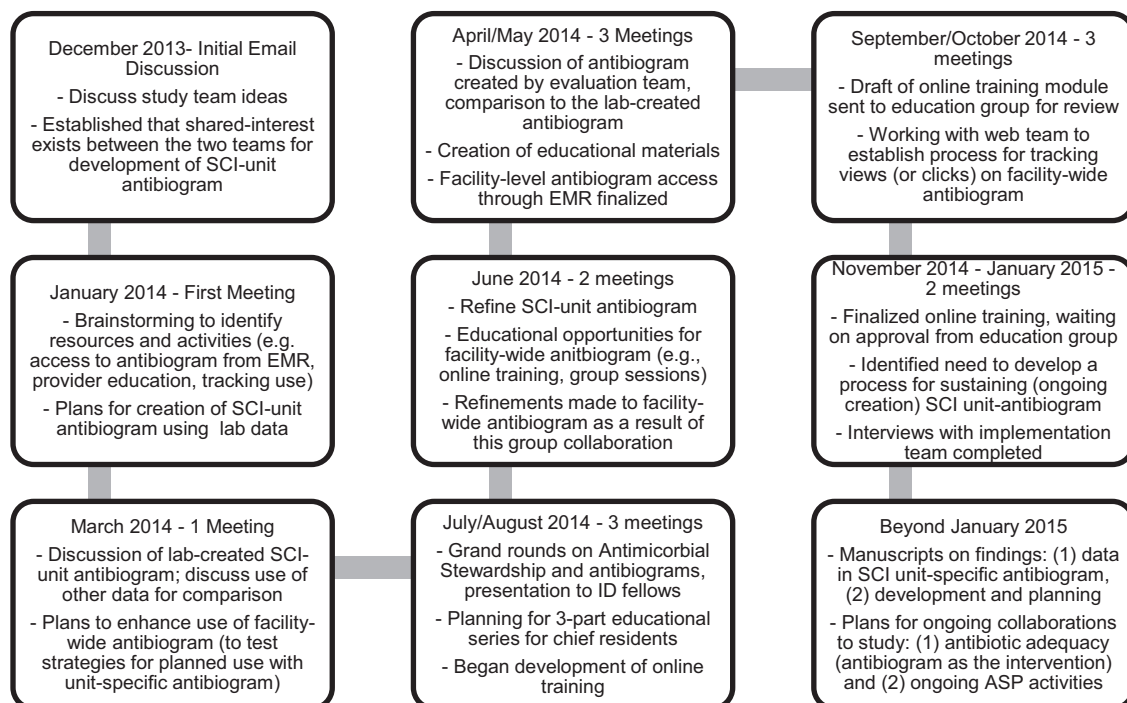


Fig 1. Timeline of process and activities.

prescribing/stewardship, and implementation) and the implementation team (ie, ID pharmacist, ID physician, and microbiology).

#### Data collection and management

Interprofessional meetings were recorded using detailed meeting minutes by the project manager (S.R.). These notes provided a running log of project activities, discussions, tasks, and responsibilities from the perspective of participants.<sup>10</sup> As a final step in the preimplementation phase, we conducted semi-structured interviews with the 3 members of the implementation team.

## ANALYSIS

### Qualitative analyses

Qualitative analysis was performed by a member of the evaluation team (J.N.H.) with expertise in qualitative methods. All analyses (eg, meeting minutes and semistructured interviews) followed a mixed deductive-inductive<sup>11,12</sup> approach beginning with a preliminary coding structure using the Consolidated Framework for Implementation Research constructs for deductive coding and grounded thematic coding (inductive).<sup>13</sup> Nvivo 8 software was used to facilitate data storage, organization, and retrieval. The results have been summarized and are presented in brief herein.

## RESULTS

### Preliminary meeting and early antibiogram development

Before the start of the pilot, the external change agents (evaluation team) along with the implementation team (ID pharmacist, microbiology/laboratory personnel, and ID physician) met to discuss the possibility of and the need for an SCI unit-specific

antibiogram. Following that discussion, a test data pull was conducted using laboratory data. A summary of the discussion is presented in Table 1.

While refinement of the unit-specific antibiogram was underway, the team used the time to also develop the preimplementation plan. Details of these activities are presented in Figure 1.

### Follow-up interviews

Interviews with the implementation team explored barriers, facilitators, and strategies adopted to mitigate or harness them. For example, one individual stated: "If we hadn't done this, we wouldn't have known that significant differences exist." The SCI

Table 1  
Topics of discussion in preliminary and early meetings

Preliminary meeting discussions	
Existing challenges with facility-wide antibiogram	<ul style="list-style-type: none"> <li>• Modification needed in the laboratory package (used to extract data)</li> <li>• Manual entry of susceptibility data owing to firewall restrictions</li> </ul>
Efforts to promote facility antibiogram	<ul style="list-style-type: none"> <li>• Posting to the facility website and sharing through word of mouth</li> <li>• Planned link to website though antibiotic ordering menu</li> </ul>
Potential issues with a unit-specific antibiogram data pull	<ul style="list-style-type: none"> <li>• Separating by ward (eg, ICU, SCI) is possible, however the orders are linked to the location, so an SCI patient in the ED would be attributed to the ED and cannot be separated out.</li> </ul>
Development of SCI unit-specific antibiogram discussions	
Issues using laboratory data	<ul style="list-style-type: none"> <li>• Low number of patients for some patients or antibiotics</li> </ul>
Comparison antibiogram developed using national databases	<ul style="list-style-type: none"> <li>• Given the concerns expressed by the laboratory, the evaluation team used a broader data pull (using national databases to select facility-specific data) to develop another SCI antibiogram.</li> </ul>

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