Can the Antiibiogram Be Used to Assess Microbiologic Outcomes After Antimicrobial Stewardship Interventions? A Critical Review of the Literature

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Hospitals are implementing antimicrobial stewardship programs (ASPs) in response to national guidelines to improve the use and to extend the utility of antiinfective drugs. An often implied purpose of ASPs is to curb or reverse the emergence of resistant bacteria. Because antibiotic use causes antibiotic resistance, there is a natural tendency to link local measures of antibiotic use to local measures of bacterial resistance, and the hospital antiibiogram is a readily available measure of resistance. We performed a literature review to identify published reports that used hospitalwide and unit-specific antiibiograms to assess the relationship of ASP interventions to changes in resistance. Eight studies were identified and reviewed. The relationship between hospital antibiotic use and resistance is complex, and the existing literature has several limitations. Furthermore, the antiibiogram itself is neither designed nor well suited to reflect changes in hospital antimicrobial drug use. The literature on the effectiveness of ASPs in reducing resistance continues to emerge, but at this time the antiibiogram bears an inconsistent relationship with changes in hospital antibiotic use and cannot be recommended to reliably evaluate an ASP intervention. Interrupted time series analysis is a superior strategy to assess the effect of an ASP intervention on bacterial resistance, but it is not widely used because of its complexity and greater data requirements. Nevertheless, before ASP efforts can be convincingly demonstrated to have a favorable impact on resistance, a more sophisticated approach that links drug use to resistance should become a priority, at least for hospitals that have sufficient resources.

Key Words: antiibiogram, antimicrobial stewardship, antimicrobial management, antimicrobial resistance, interrupted time series analysis.

(Pharmacotherapy 2012;32(8):668–676)

OUTLINE

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Source of Isolates
Additional Confounders Affecting the Relationship Between Antibiotic Use and Antiibiogram Outcome Measures
Do Antiibiograms and the Observed Changes in Resistance Patterns from One Year to the Next Accurately Reflect Inpatient Antimicrobial Drug Use?

Can a Stewardship Intervention Designed to Decrease Bacterial Resistance Use the Antiibiogram as an Outcome Measure of the Success of the Stewardship Program?
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Conclusion