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X07-R
Vol. 30 No. 5

Surveillance for Methicillin-Resistant *Staphylococcus aureus*: Principles, Practices, and Challenges; A Report

This document was developed to provide infection preventionists (infection control practitioners), infectious disease specialists, and microbiologists with the latest information regarding the development and implementation of a successful MRSA surveillance program.

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X07-R
ISBN 1-56238-719-7
Volume 30 Number 5 ISSN 0273-3099

Surveillance for Methicillin-Resistant *Staphylococcus aureus*: Principles, Practices, and Challenges; A Report

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Abstract

Methicillin-resistant *Staphylococcus aureus* (MRSA) infections continue to be significant causes of morbidity and mortality worldwide in both health care and community settings. One strategy to reduce the transmission, particularly of MRSA, in health care settings is to conduct active surveillance of patients admitted to hospitals or other health care facilities for colonization using culture- or molecule-based identification methods. Because colonized patients serve as a reservoir of infection both for themselves and other patients, placing colonized patients in contact isolation with barrier precautions can reduce the spread of MRSA. Additional steps to decolonize the patient using mupirocin and chlorhexidine baths can further reduce transmission. CLSI document X07-R—*Surveillance for Methicillin-Resistant* Staphylococcus aureus: *Principles, Practices, and Challenges; A Report* was developed to provide microbiologists, infection preventionists (infection control practitioners), and infectious disease specialists with both laboratory and infection control information regarding the development and implementation of a successful MRSA surveillance program. Information on surveillance of health care workers and animals for MRSA is also provided.

Clinical and Laboratory Standards Institute (CLSI). *Surveillance for Methicillin-Resistant* Staphylococcus aureus: *Principles, Practices, and Challenges; A Report*. CLSI document X07-R (ISBN 1-56238-719-7). Clinical and Laboratory Standards Institute, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2010.

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Suggested Citation

CLSI. *Surveillance for Methicillin-Resistant* Staphylococcus aureus: *Principles, Practices, and Challenges; A Report.* CLSI document X07-R. Wayne, PA: Clinical and Laboratory Standards Institute; 2010.

Report

Approved by Board of Directors
February 2010

Published
February 2010

ISBN 1-56238-719-7
ISSN 0273-3099

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CLSI acknowledges the experts and their institutions listed below for their contributions in preparing this report:

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Contents

Abstract i

Committee Membership iii

Foreword ix

1 Scope 1

2 Introduction 1

2.1 Rationale 1

3 Standard Precautions 2

4 Terminology 2

4.1 A Note on Terminology 2
4.2 Definitions 3
4.3 Abbreviations and Acronyms 6

5 Characteristics of Methicillin-Resistant *Staphylococcus aureus* 6

5.1 General Characteristics 6

6 Laboratory Methods for Detecting Methicillin-Resistant *Staphylococcus aureus* in Samples 8

6.1 Specimen Collection 8
6.2 Anatomical Sites to Sample 9
6.3 Culture Methods for Methicillin-Resistant *Staphylococcus aureus* 11

7 Molecular Detection Methods 14

7.1 Assay Selection Criteria 14
7.2 Molecular Aspects of Methicillin Resistance 14
7.3 Target Genes and Strategies Allowing for Identification of Methicillin-Resistant *Staphylococcus aureus* 16
7.4 Assays Relying on the *orfX*-SCC*mec* Junction 17
7.5 Limitations of Current Molecular Assays 19
7.6 Role of Culture for Additional Testing 19
7.7 Strain Typing of Methicillin-Resistant *Staphylococcus aureus* Isolates 20

8 Factors to Consider Before Implementation of a Methicillin-Resistant *Staphylococcus aureus* Surveillance Program in a Facility 24

8.1 Methicillin-Resistant *Staphylococcus aureus* Prevalence 24
8.2 Screening of Patients 26
8.3 Screening Health Care Workers 33
8.4 Screening in Other Settings 34
8.5 When to Consider Sampling 36

9 Screening Companion Animals for Methicillin-Resistant *Staphylococcus aureus* 37

9.1 Screening Pets 37
9.2 Screening Horses 38
9.3 Screening Methodology: Sampling Sites 39
9.4 Screening Methodology: Laboratory Testing 39
9.5 Management of Colonized Animals 39

This is a preview of "CLSI X07-R Vol. 30 N...". Click here to purchase the full version from the ANSI store.

Contents (Continued)

References....40

Appendix. Methods....50

The Quality Management System Approach....52

Related CLSI Reference Materials....54

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Foreword

Considerable attention has been given to the subject of methicillin-resistant *Staphylococcus aureus* (MRSA) colonization and infection in the press, particularly since the emergence of community-associated MRSA infections. The deaths of otherwise healthy college athletes resulting from MRSA septicemia, the deaths of school-aged children following MRSA wound infections, and the morbidity caused by outbreaks of MRSA infection among professional sports teams are certainly newsworthy. Yet, underlying these news events of community disease is the more troubling reality of the transmission of MRSA and the ensuing morbidity and mortality among hospitalized patients around the world. To be sure, MRSA is only one of several health care–associated pathogens that deserve attention. Yet, that fact does not diminish the impact that this organism is having on health care around the world. The cost of health care–associated MRSA infections in the United States alone is astronomical. Thus, infection preventionists (formerly called infection control practitioners), infectious disease specialists, and clinical microbiologists are pursuing a variety of strategies aimed at reducing health care–associated MRSA (and methicillin-susceptible *Staphylococcus aureus* [MSSA]) infections. One strategy that is being implemented in multiple centers is active surveillance of patients admitted to hospitals or other health care facilities for MRSA colonization in an effort to identify patients who may serve as a reservoir of infection for other patients. In some cases in the United States, state legislative authorities have mandated such surveillance efforts, whereas other health care systems have initiated such studies prospectively. It has become increasingly clear that there is a dearth of information regarding the "how" of conducting active surveillance (ie, which patient populations to screen, optimal laboratory methods to use, and metrics to assess the effectiveness of the program), more than the "why" of such efforts (ie, reducing infection rates and cross-transmission of MRSA among patients). Therefore, this CLSI document was developed to provide information to those institutions that, for whatever reason, have decided to initiate an MRSA surveillance program.

Key Words

Colonization, cross-transmission, epidemiology, infection control, infection prevention, isolation precautions, methicillin resistance, mupirocin, nucleic acid amplification testing, rapid testing, staphylococci, surveillance

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Surveillance for Methicillin-Resistant *Staphylococcus aureus*: Principles, Practices, and Challenges; A Report

1 Scope

This report describes a framework for establishing a surveillance program to detect methicillin-resistant *Staphylococcus aureus* (MRSA) colonization and infection in patients, health care workers (HCWs), and animals. It reviews the characteristics of MRSA isolates; both culture-based and molecular methods for detecting MRSA isolates in clinical samples, surveillance cultures, and environmental reservoirs; strain typing methods; epidemiological issues surrounding the spread of MRSA isolates in health care and other settings; interventions to halt transmission of MRSA; MRSA issues associated with animals; and public health aspects of MRSA transmission. Evidence-based information is presented to assist laboratories that are charged with the task of setting up MRSA surveillance programs for their institution or community. Additional information targeted to infection preventionists (infection control practitioners), clinicians, and public health officials to aid them in implementing a surveillance program for MRSA is also provided.

2 Introduction

2.1 Rationale

According to reports from the US Centers for Disease Control and Prevention (CDC) and others, the incidence of infections caused by MRSA has increased dramatically over the last decade, despite widespread measures aimed at preventing spread.[1-5] To further complicate matters, the epidemiology of this potentially lethal pathogen has also evolved, with an ever-increasing number of MRSA cases arising among individuals in community settings without prior contact with the health care system.[6] These community-associated MRSA strains (CA-MRSA), and the more familiar health care–associated MRSA strains (HA-MRSA), have, in some cases, been associated with more severe clinical outcomes and a substantially increased cost of care for affected patients.[7]

In response to these changes, many clinicians, health care administrators, and those working in infection control and prevention are taking a more aggressive approach toward preventing the spread of MRSA in their health care centers. Yet, a number of patient advocacy groups and public figures have been critical of what they perceive as too little effort to reduce the spread of MRSA. This has led to a series of unfavorable editorial commentaries in the popular press and the enactment of legislative initiatives aimed at promoting additional awareness and control of MRSA.[8] Increasingly, a move toward "zero tolerance" of MRSA has been promoted in some regions in which the goal of prevention efforts is not simply to reduce the overall burden of infections caused by MRSA but actually to completely eliminate MRSA from individual units, patient care areas, hospitals, regions, and even entire countries.

For the most part, the tools historically available to prevent the dissemination of MRSA and other multidrug-resistant organisms (MDROs) have emphasized the management of patients identified as colonized or infected with these organisms in the course of routine clinical care. In this approach, standard infection control and prevention methods, including hand hygiene and environmental cleaning, are applied uniformly for all patients. In addition, more intensive measures, such as the implementation of isolation precautions (the use of gowns and gloves when in contact with the patient or surrounding environment), are put in place once a patient is identified as colonized or infected with MRSA.[9]

Because of the renewed focus on MRSA control, even more aggressive measures have been proposed. Specifically, patients in many centers are being screened through culture and more rapid molecular diagnostic methods to identify those who are colonized with MRSA even in the absence of signs or

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