

Ebbing Lautenbach, MD, MPH, MSCE

*LDI Senior Fellow, Associate Professor
of Medicine and Epidemiology
Center for Education and Research
on Therapeutics
University of Pennsylvania*

Theoklis Zaoutis, MD, MSCE

*Associate Professor of Pediatrics and
Epidemiology
The Children's Hospital of
Philadelphia
Center for Education and Research
on Therapeutics
University of Pennsylvania*

Preventing MRSA Infection in the Community

Editor's note: About two years ago, the death of a high school student athlete brought methicillin-resistant *Staphylococcus aureus* (MRSA) into the national spotlight. Preventing the spread of MRSA in schools, gyms, and other public facilities is an important public health goal. This Issue Brief presents current information on the prevalence and transmission of MRSA in community settings, and describes ongoing research on interventions to limit the spread of this increasingly common infection.

MRSA is not new, but is appearing more frequently in community settings

Methicillin-resistant *Staphylococcus aureus* (MRSA) emerged in health care settings in the 1960s. This strain of the common "staph" bacteria is resistant to many antibiotics, and poses a threat to the health of patients in hospitals, nursing homes, dialysis centers, and ambulatory surgical centers. When compared to methicillin-susceptible *S. aureus* infections, infections due to MRSA have been associated with significantly increased morbidity, mortality, and cost. Historically, MRSA has affected vulnerable patients in health care settings. However, over the past few years, MRSA has emerged as a prominent cause of infections in otherwise healthy adults and children in the community.

- Community-acquired MRSA strains generally cause skin and soft tissue infections, although occasionally they manifest in pneumonia or severe invasive infections. There is some evidence the community strains of MRSA may be more virulent than hospital MRSA strains. They require prompt treatment to avoid serious complications.
- Many people are colonized with staph, meaning that they carry the bacteria in the nose or skin folds without showing signs of infection or illness. About 30% of people are colonized with non-resistant staph, and about 1% are colonized with MRSA. This prevalence varies by area of the country.

Continued on next page.

-
- Skin infections occur when the bacteria enters the body through a scrape or cut. The infected area usually begins with a red bump that resembles a pimple or insect bite. If untreated, the lesion may become hard and painful or pus-filled.
 - MRSA is transmitted mostly through skin-to-skin contact, as well as through sharing items such as towels and razors that have been in contact with the infected area. The contagiousness of MRSA has created the need for preventive measures in places where crowding and contact occur, such as schools, camps, gyms, barracks, and prisons.

Hand hygiene prevents MRSA infection

The best prevention against MRSA infection is also one of the oldest and surest ways to reduce the spread of many organisms: consistent attention to handwashing and good hygiene.

- Thorough handwashing with soap and water (or use of an alcohol-based hand sanitizer) is the primary strategy to avoid MRSA infection.
- Because cuts and scrapes are a portal for MRSA infection, it is important to keep cuts and scrapes clean and covered with a bandage until healed, and to avoid contact with other people's wounds or bandages.
- Sharing personal items such as towels or razors, or anything that makes contact with skin, should be avoided.
- Showering or washing after contact sports or gym may reduce the risk of skin-to-skin transmission.
- On shared surfaces such as gym or athletic equipment, using a barrier of clothing or towels reduces the risk of MRSA transmission.

MRSA infections are treatable, but they can recur

The vast majority of community-acquired MRSA skin infections are successfully treated by incision and drainage of the lesion, sometimes in conjunction with antibiotic therapy. More invasive infections may require hospitalization.

- Most MRSA infections are treated by good wound and skin care that includes keeping the area clean and dry, washing hands after caring for the area, and carefully disposing of any bandages. If antibiotics are needed, the entire course should be taken to reduce the risk that the MRSA strain will become resistant to the antibiotics that work today.
 - Individuals often remain colonized with MRSA after the symptoms have resolved. It is likely that prolonged colonization contributes to repeated episodes of MRSA infection, and a greater likelihood of transmitting it to others. The recurrence rate, though not well-documented, is believed to be 10-30%.
 - In the case of recurrent infections, one strategy is to "decolonize" the individual by using antibiotic nasal ointment and/or body washes. The duration and effectiveness of this strategy in preventing infections remain unknown.
-

Household members often carry the MRSA bacteria

Because MRSA is spread by skin-to-skin-contact or by sharing personal items, household members and others who have close personal contact (such as sports teammates) are at risk of developing MRSA.

- The rate of household transmission of MRSA is not known. Small studies have found that up to 70% of household contacts of a MRSA-infected individual are colonized with MRSA, but most contacts do not develop an infection. The epidemiology of household transmission is not well understood.
- Some evidence suggests that colonization of a household member is associated with a prolonged duration of MRSA infection in the affected individual. Interventions to decolonize household members have been tried, but need further study to determine whether they reduce transmission of MRSA infections within families or in the community.
- To reduce the likelihood of household transmission, the same preventive strategies of hand hygiene and not sharing personal items should be followed. In addition, clothing that has come into contact with a draining wound should be laundered after each use, and dried thoroughly.

Institutional response to MRSA should target mode of transmission, not the individual

Schools and other community institutions at risk should have policies in place to contain the spread of MRSA.

- In general, it is not necessary to close a facility because of MRSA infections. Attention to hand hygiene, covering wounds until healed, and cleaning surfaces likely to be in contact with wounds should limit the spread of MRSA.
- Cleaning high-contact areas with detergent-based cleansers or Environmental Protection Agency (EPA)-registered disinfectants is effective against MRSA. Surfaces such as floors and walls are not usually involved in the transmission of MRSA.
- There is no need to exclude an individual with a MRSA infection from all activities, as long as draining wounds can be covered and hand hygiene is followed.
- An affected individual should avoid whirlpools, swimming pools, and activities in which bandages might come off.

POLICY IMPLICATIONS

The prevalence of MRSA is rising, although most people in the community are not at risk for a serious invasive infection. Still, the rise of community-acquired MRSA requires individual and institutional action to limit the spread of the bacteria and to avoid serious complications in both hospital and community settings.

- The most effective way to prevent MRSA infection is through hand hygiene and wound covering. Institutions that are characterized by crowding and frequent skin-to-skin-contact (such as schools, college dorms, daycare centers, correctional facilities, military barracks, and gyms) should develop and maintain policies that promote consistent adherence to handwashing and hygiene guidelines.

Continued on back.

POLICY IMPLICATIONS

Continued

- New strategies for preventing MRSA transmission in the community require an improved understanding of the dynamics of colonization and infection among adults and children within households. A longitudinal study is ongoing at the University of Pennsylvania to better understand how MRSA spreads within household members and the factors contributing to the spread of MRSA within the household.
- The development of antibiotic-resistant organisms, in general, is linked to overuse and improper use of antibiotics. It is possible that prior antibiotic use is associated with the development of MRSA infection in an individual. Ongoing research at the University of Pennsylvania is investigating the link between antibiotic use and MRSA in children. If this link is confirmed, it would add another compelling argument for the judicious use of antibiotics.

This Issue Brief was supported by the Agency for Healthcare Research and Quality, Centers for Education and Research on Therapeutics, University of Pennsylvania School of Medicine (U18 HS016946). The opinions expressed are those of the authors and not the funding agency.

Published by the Leonard Davis Institute of Health Economics, University of Pennsylvania, 3641 Locust Walk, Philadelphia, PA 19104.

Janet Weiner, MPH, Associate Director for Health Policy, Editor

David A. Asch, MD, MBA, Executive Director

Visit us on the web at www.upenn.edu/ldi

Issue Briefs synthesize the results of research by LDI's Senior Fellows, a consortium of Penn scholars studying medical, economic, and social and ethical issues that influence how health care is organized, financed, managed, and delivered in the United States and internationally. The LDI is a cooperative venture among Penn schools including Medicine, Nursing, Dental Medicine, Communication, and Wharton, and the Children's Hospital of Philadelphia. For additional information on this or other Issue Briefs, contact Janet Weiner (e-mail: weinerja@mail.med.upenn.edu; 215-573-9374).

© 2009 Leonard Davis Institute

*Published by the
Leonard Davis Institute
of Health Economics
University of Pennsylvania*

Issue Brief



*3641 Locust Walk
Philadelphia, PA 19104-6218
215.898.5611
fax 215.898.0229
ADDRESS CORRECTION REQUESTED*

*Nonprofit Organization
U.S. Postage
PAID
Permit No. 2563
Philadelphia, PA 19104*