



Infection Control *for* Physician Practices

Prevention strategies for physicians, patients and health care professionals



IN THIS ISSUE

■ **Resistant staph in the community:** Fatality in a pediatric clinic underscores the rapid and widespread emergence of CA-MRSA. cover

■ **Bug basics:** Is it staph, MRSA, or CA-MRSA? 3

■ **Education equals prevention:** IC professionals educate physician office staff about the essential elements of infection prevention 5

■ **Top 10 infection prevention tips:** The American Academy of Pediatrics outlines basic infection control measures for physician offices. 6

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Editor Gary Evans, Associate Publisher Coles McKagen, Consulting Editor Patrick Joseph, MD, and Nurse Planner Katherine West, BSN, MEd, CIC, report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study.

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Is your practice safe? Emerging community staph causes fatal infection

CA-MRSA threat puts new emphasis on infection prevention

Signaling an increasing risk to staff in physician offices, public health investigators suspect that a fatal infection with community-associated, methicillin-resistant *Staphylococcus aureus* (CA-MRSA) in a pediatric clinic worker in Nashville, TN, was occupationally acquired, *Infection Control for Physician Practices* has learned.

Though the case still is under investigation by the Centers for Disease Control and Prevention, interviews with CDC and state investigators reveal that a previously healthy 57-year-old worker at a pediatric clinic contracted CA-MRSA in October 2006 and died of septicemia after a weeklong hospitalization. One theory is that the worker contracted CA-MRSA from a clinic patient, some of whom were subsequently found to carry CA-MRSA USA300 strains like the one that killed her. In the aftermath of the worker's death, other staff members in the same clinic reported they previously had skin and soft-tissue infections that may have been acquired occupationally.

"Health care workers in outpatient settings are at risk because they are being exposed to these patients — even if it is only a relatively small proportion of them that have CA-MRSA — day in and day out," says **Rand Carpenter**, DVM, the CDC Epidemic Intelligence Service officer who is investigating the case. "There are risks. Some of the people working in this clinic had skin and soft-tissue infections that were likely from exposure in the clinic."

With molecular strain typing and other aspects of the investigation still in progress, investigators emphasize that there remains the possibility the worker acquired CA-MRSA in the community rather than occupationally. "There were other people who worked in this pediatric outpatient clinic who had complained or who had reported skin infections," says **William Schaffner**, MD, chairman of the department of preventive medicine at Vanderbilt University School of Medicine in Nashville, and a consultant to the CDC investigation. "That triggered the whole investigation, and they could be tied together. But I don't think we will be able to link this particular fatal infection irrevocably to her work exposure. Serious

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infections occur in people who do not work in health care facilities also."

The CDC is trying to review the worker's medical history and assess the risk of patient contact, since she was not officially assigned to direct patient care duties. "The hospitalized worker was normally involved in administrative office duties, but communication about her duties and health history has been a little difficult and emotional with the staff there," Carpenter says. According to the CDC, the primary mode of transmission is typically via hands that may become contaminated by contact with colonized or infected individuals or devices, items, or environmental surfaces contaminated with body fluids containing CA-MRSA. (See related story, p. 3.)

In any case, the fatal infection in the pediatric

clinic worker underscores the rapid and widespread emergence of CA-MRSA, which is capable of causing severe infections in otherwise healthy people. "We see it coming in all the time," says **Judie Bringham**, RN, BSN, CIC, an infection control professional responsible for oversight and education in physician offices and clinics affiliated with Duke University Medical Center in Durham, NC. "Honestly, there are days when I think CA-MRSA is going to take over the world. We are seeing it in the clinics, especially urgent care clinics where people come in with boils and 'spider bites.'"

USA300 in 40 states

The hardy and easily transmitted predominant U.S. strain of CA-MRSA has been detected in some 40 states. Of course, completely drug-susceptible staph strains can cause serious infections, but the emerging picture suggests that CA-MRSA is causing more severe disease than typical MRSA that has plagued hospitals for decades. "Infections with these strains have most commonly presented as skin disease in community settings," the CDC states in its most recent guidelines on the issue.¹ "However, intrinsic virulence characteristics of the organisms can result in clinical manifestations similar to or potentially more severe than traditional health care-associated MRSA infections among hospitalized patients."

Indeed, CA-MRSA has resulted in reports of such severe infections as necrotizing pneumonia, necrotizing fasciitis, and toxic shock syndrome.² More physician offices and clinics can expect to see incoming cases if CA-MRSA — particularly the USA300 strain — continues to establish a strong community presence. The fatal case in the Nashville clinic may one day be viewed as the occupational equivalent of a prior sentinel event: The deaths of four children in 1999 that heralded the independent emergence of resistant staph strains in the community.³

"I think these circumstances — that is the concern about CA-MRSA infections being acquired in the outpatient setting — are indeed a harbinger of more of these kinds of reports that will occur," Schaffner says.

The occurrence of the Nashville case in a pediatric practice is consistent with national trends. For example, a recent study of 10 North Carolina hospitals found that pediatric patients were at nearly six times greater risk of CA-MRSA infections than

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Editor: **Gary Evans**, (706) 310-1727.

Senior Vice President/Group Publisher: **Brenda Mooney**, (404) 262-5403, (brenda.mooney@ahcmedia.com).

Associate Publisher: **Coles McKagen**, (404) 262-5420, (coles.mckagen@ahcmedia.com).

Senior Production Editor: **Nancy McCreary**.

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Editorial Questions

For questions or comments, call **Gary Evans** at (706) 310-1727.

(Continued on page 4)

Bug basics: Is it staph, MRSA, or CA-MRSA?

Basic infection control principles same for all

• What is *Staphylococcus aureus* and MRSA?

Staphylococcus aureus — often referred to simply as “staph” — are bacteria commonly carried on the skin or in the nose of healthy people. Approximately 25%-30% of the population is colonized (when bacteria are present, but not causing an infection) in the nose with staph bacteria. Staph can cause both minor skin infections and serious bloodstream infections, but these can be treated with antibiotics. Some staph bacteria become resistant to groups of antibiotics and the resulting infections can become more serious if the right antibiotic is not used on the patient. The main culprit in this group is called methicillin-resistant *S. aureus* (MRSA), which is resistant to such common antibiotics as oxacillin, penicillin, and amoxicillin. Staph infections, including MRSA, occur most frequently among patients in hospitals and health care facilities (such as nursing homes and dialysis centers) who have weakened immune systems. These health care-associated staph infections include surgical wound infections, urinary tract infections, bloodstream infections, and pneumonia.

• What is community-associated MRSA (CA-MRSA)?

MRSA infections that are acquired by persons who have not been recently (within the past year) hospitalized or had a medical procedure (such as dialysis, surgery, catheters) are known as CA-MRSA infections. CA-MRSA infections in the community are usually manifested as skin infections, such as pimples and boils, and occur in otherwise healthy people. Recently recognized outbreaks of CA-MRSA have been associated with strains that have some unique microbiologic and genetic properties compared with the traditional hospital-based MRSA strains, suggesting some biologic properties (e.g., virulence factors) may allow the community strains to spread more easily or cause more skin disease. There are at least three different *S. aureus* strains in the United States

that can cause CA-MRSA infections, but the primary emerging strain is called USA300.

• What are the clinical features of CA-MRSA?

CA-MRSA most often presents as skin or soft-tissue infection such as a boil or abscess. Patients frequently recall a “spider bite.” The involved site is red, swollen, and painful and may have pus or other drainage. Staph infections also can cause more serious infections, such as blood-stream infections or pneumonia, leading to symptoms of shortness of breath, fever, and chills.

• What about treatment of these infections?

Staph skin infections, such as boils or abscesses, may be treated by incision and drainage, depending on severity. Antibiotic treatment, if indicated, should be guided by the susceptibility profile of the organism. If *S. aureus* is isolated, the organism should be tested to determine which antibiotics will be effective for treating the infection. Ambulatory settings that outsource microbiology laboratory services should specify by contract that the laboratory provide either facility-specific susceptibility data or local or regional aggregate susceptibility data to identify prevalent drug-resistance trends and pathogens in the geographic area served.

• Who is at risk for CA-MRSA or MRSA infections?

CA-MRSA infection can occur in anyone, but clusters of skin infections have particularly been noted among athletes, military recruits, children, Pacific Islanders, Alaskan Natives, Native Americans, men who have sex with men, and prisoners. The main mode of transmission is via hands, which may become contaminated by contact with a) colonized or infected individuals; b) colonized or infected body sites of other persons; or c) devices, items, or environmental surfaces contaminated with body fluids containing CA-MRSA. Other factors contributing to transmission include skin-to-skin contact, crowded conditions, and poor hygiene. Emerging reports suggest health care workers also may be at risk of CA-MRSA if they do not follow basic infection control precautions when treating patients.

(Editor's note: The answers above were compiled and summarized from guidelines by the Centers for Disease Control and Prevention and interviews with its investigators.) ■

adult patients.⁴ The study showed an age-related variability in the prevalence of community MRSA infections, finding that 74% of cases in children under 18 were due to CA-MRSA. In addition, a study published last year found a 10-fold increase in nasal colonization of healthy children since 2001.⁵ “As colonization typically precedes infection, this increase may be a major factor in the emergence of community-associated MRSA as a pathogen of healthy children,” the authors concluded.

Though pediatric physicians may be facing the vanguard of CA-MRSA emergence, that trend is subject to change. Currently, it appears more adult patients with CA-MRSA seek care in emergency rooms rather than physician offices. That was the conclusion of CDC investigators who recently estimated that there were 11.6 million ambulatory health care visits for skin and soft-tissue infections possibly due to *S. aureus* in the United States each year from 2001 through 2003.⁶ “These data indicate that the number of *S. aureus* skin and soft tissue infections is substantial and that the emergence of CA-MRSA may affect ambulatory health care in the United States,” they concluded. “[The] rapid progression of lesions, frequently described as spider bites, may lead persons to seek care in emergency departments rather than physician offices.”

In addition, CA-MRSA might disproportionately affect particular socioeconomic groups who are more likely to seek care in emergency settings rather than physician offices, they surmised. “However, this finding does not mean that visit rates to other ambulatory care settings will not increase as CA-MRSA continues to emerge,” they warned.

A new emphasis on infection control

Given such trends, physician offices and clinics need to emphasize infection control precautions and environmental cleaning measures to ensure CA-MRSA does not infect staff members or other patients, investigators emphasize. Though specific breeches have not yet been identified, Carpenter said staff at the clinic were “inconsistently applying” recommended infection control guidelines. In general, the most recent CDC guidelines recommend that ambulatory settings use standard precautions for patients known to be infected or colonized with drug-resistant organisms such as CA-MRSA, making sure that gloves and gowns are used for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes and bags. With CA-MRSA emerging in communities, infection control

professionals and consultants are trying to educate clinic staff — many of whom may not have extensive medical training — about the infection control basics. (See related story, p. 5.)

“Not really to our surprise, when one goes into an outpatient setting you frequently find infection control issues that can be improved,” Schaffner says. “They may think they are doing things appropriately, it’s just that they haven’t had their practices reviewed by a knowledgeable infection control practitioner in some time. I think we will see increasing attention devoted to enhancing infection control practices in the outpatient setting stimulated by the concern of CA-MRSA.”

Concern about CA-MRSA was palpable in the Nashville clinic staff after seeing their co-worker’s infection take a disastrous course. Again, the workers immediately suspected the case was of occupational origin because they too had incurred skin and soft-tissue infections that possibly were work-related.

“When this person was hospitalized with septicemia, it worried many of the staff there,” Carpenter reports. “They began to talk amongst themselves and realized that there had been several skin and soft-tissue infections among them in the proceeding months. They were worried about a problem.”

The CDC began an investigation of the clinic that included doing nasal swabs on staff and patients to detect colonization with CA-MRSA. “We did a nasal swab survey of the workers there, as well as a sample of the patients coming into the clinic just to see how much CA-MRSA and susceptible *S. aureus* were in those two populations,” he explains. “We did a swipe survey of the environment of the clinic, the exam rooms, and public areas.”

Though the numbers were still being crunched as this issue went to press, Carpenter confirmed that some of the patients were colonized with the USA300 CA-MRSA strain that infected the clinic worker. “We did find it in a few of the patients,” he says. “We didn’t get much of a medical history on these patients. We just grabbed everybody that came into the clinic for a couple of days and swabbed them.”

Overall, 245 patients and 45 staff members were cultured. Though CA-MRSA was not found in other staff, 12 were positive for susceptible staph strains and two had MRSA strains typically seen in a hospital. Drug-susceptible staph strains also were found in a “limited” number of environmental samples, he adds.

The antibiotic susceptibility profile of the

infecting USA300 isolate in the Nashville case has not been reported, but many community-acquired MRSA strains tend to be susceptible to tetracycline, clindamycin, and trimethoprim/sulfamethoxazole (TMP/SMX). However, resistance patterns in CA-MRSA strains in general are changing and becoming a matter of increasing concern, epidemiologists report. In any case, antibiotic susceptibility patterns are distinctly different from hospital strains, and initial empiric therapy often is inappropriate because physicians do not suspect resistant staph in the community. CDC guidelines emphasize that ambulatory settings that outsource microbiology laboratory services should “specify by contract that the laboratory provide either facility-specific susceptibility data or local or regional aggregate susceptibility data in order to identify prevalent MDROs and trends in the geographic area served.”¹

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Preventing infections in physician practices

Physician practices respond to CA-MRSA

With community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) continuing to emerge nationally, infection control professionals and consultants are educating physician office staff — many of whom may not have extensive medical training — about the essential elements of infection prevention.

“When I do inservices, [CA-MRSA] always comes up,” says Judie Bringham, RN, BSN, CIC, an infection control professional responsible for oversight and education in physician offices and clinics affiliated with Duke University Medical Center in Durham, NC. “Staph is always a concern, so I try to hit them from the angle that if they are protecting themselves they are going to protect their patients.”

Though she doesn’t go into too complicated of an explanation, Bringham tells the workers that the CA-MRSA being seen in patients in the Duke clinics is different from the typical MRSA acquired by hospitalized patients.

“I tell them it used to be only a hospital-acquired bug, but it is not anymore,” she says. “In the clinics,

we have [employees] that are not degreed health care workers. A lot of them are medical assistants, and I have some clinics that do not have a nurse [at all]. I have to meet them where they are at when I am talking to them. If they have a patient with a draining wound, we do expect them to gown and glove and we check to see if there are gowns in the clinics.”

Of course, hand washing and other aspects of standard infection control precautions are emphasized, but physician offices and clinics may not have the ease of access to the alcohol gel dispensers that have become ubiquitous in hospitals.

“There are fire safety requirements,” Bringham says. “I have lots of clinics without sprinklers and more than a few with carpets. They can’t put them in egress halls but they still put them over a sink in the exam room.”

Designate a procedure room

Another common sense infection control measure physician offices can take to protect staff and patients from transmission of pathogens such as CA-MRSA is designating certain rooms for “dirty” procedures such as incision and drainage of abscesses related to skin and soft-tissue infections.

Such recommendations are being emphasized by the Centers for Disease Control and Prevention in the wake of a fatal CA-MRSA infection that

possibly was acquired on the job by a pediatric clinic worker in Nashville, TN.

“One thing that is hard in an outpatient setting is to try doing certain higher-risk or ‘dirtier’ procedures in designated locations,” says **Rand Carpenter, DVM**, the CDC Epidemic Intelligence

Service officer who is investigating the Nashville clinic case. “It is common in many clinics that once a person gets into a exam room, the tendency is to do everything that needs to be done with them in that room. [We discussed with clinic staff] designating certain exam rooms or procedure

10 steps to stop infections in the physician office

AAP guidance applicable to other settings

The American Academy of Pediatrics recommends the following basic infection control measures for physician offices:¹

1. All health care workers should wash their hands before and after patient contact. Parents and children should be taught the importance of hand washing.

2. Standard precautions should be used in dealing with all patients. Standard precautions, as recommended for hospitalized patients, should be used in the care of every child because it cannot be determined which child harbors an infectious agent. Gloves should be available for use by all health care professionals. Gloves should be worn when contact with blood, body fluids, secretions, excretions, and items contaminated with these fluids is reasonably anticipated. Gloves do not need to be worn for routine well-child care, such as wiping a nose or changing a diaper. When gloves are used, hands should be washed after they are removed because contamination can occur during removal or from a break in the glove. Masks, face shields, and protective eyewear should be worn if splashing of body fluids is anticipated. When soiling of clothes with blood, body fluids, secretions, or excretions is highly likely, gowns can be worn. Water-impermeable gowns are needed if splashes of blood or blood-containing body fluids might occur.

3. Contact between infected, contagious children and uninfected children should be minimized. Policies to deal with children who present with infections, such as varicella or measles, should be implemented. Prompt triage of immunocompromised children should be performed routinely.

4. Alcohol is preferred for skin preparation before immunization and routine venipuncture. Skin preparation for incision, suture, and collection of blood for culture requires iodine; solutions of choice are 1% or 2% tincture of iodine or povidone iodine. (*Editor’s note: The AAP is in the process of revising infection control guidelines for physician offices. More current guidelines by other groups recommend using chlorhexidine solution for skin preparation.*)²

5. Needles and sharps should be handled with great care. Needle disposal units that are impermeable and puncture-proof should be available next to the areas used for injection or venipuncture. The containers should not be overfilled and should be kept out of the reach of young children. Policies should be established for removal and incineration or sterilization of contents.

6. Policies for management of needlestick injuries also should be in place.

7. Standard guidelines for sterilization, disinfection, and antisepsis should be followed.

8. Judicious use of antimicrobial agents is essential to limit the emergence and spread of drug-resistant bacteria.

9. Outpatient offices and clinics should develop policies and procedures for communication with local and state health authorities regarding reportable diseases and suspected outbreaks.

10. Ongoing educational programs that encompass appropriate aspects of infection control should be implemented, reinforced, and evaluated on a regular basis.

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rooms that can be cleaned easier and that you know may need special cleaning.”

Designating such rooms not only emphasizes environmental cleaning, but reminds workers entering them to perform procedures to don protective equipment. “There are advantages to that,” Carpenter says. “It takes on special significance and it serves as a reminder to people that [this procedure] should be done in a special room while ingraining the notion in staff that they may need to take infection control precautions as well.”

Follow infection control recommendations

In the aftermath of the fatal infection, Carpenter and colleagues have recommended that the clinic follow CDC infection control recommendations and those created for physician offices by the American Academy of Pediatrics. (See related story, p. 6.)

The infection control issues go well beyond CA-MRSA of course, as the number of increasingly complex medical procedures performed in physician offices, clinics and other ambulatory care settings continues to increase. The general consensus among health care epidemiologists is that infection control and prevention have not been sufficiently emphasized in physician offices and outpatient clinics. The issue drew national attention a few years ago when four large out-

breaks of hepatitis B and C virus infections occurred in the United States among patients in ambulatory care facilities that included a private medical practice, a pain clinic, an endoscopy

CNE/CME questions

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1. What strain of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) caused a fatal infection in a Nashville, TN, pediatric clinic worker and has also been detected in some 40 states?
A. USA100
B. USA200
C. USA300
D. USA400
2. A recent study of 10 North Carolina hospitals found that which of the following patient groups were at nearly six times greater risk of CA-MRSA infections than adult patients?
A. geriatrics
B. pediatrics
C. dialysis
D. neonates
3. A common-sense infection control measure physician offices can take to protect staff and patients from transmission of pathogens such as CA-MRSA is designating certain rooms for procedures such as incision and drainage of abscesses related to skin and soft-tissue infections.
A. True
B. False
4. Under standard precautions, gloves should be worn when contact with which of the following is anticipated?
A. blood
B. body fluids except sweat
C. secretions
D. All of the above

CNE/CME instructions

Physicians and nurses participate in this CE program by reading the issue, using the provided references for further research, and studying the questions. Participants should select what they believe to be the correct answers, then refer to answer key to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. After completing the semester's activity, you must complete the evaluation form that will be provided and return it in the reply envelope to receive a credit letter. ■

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clinic, and a hematology/oncology clinic.¹

Investigators cited egregious infection control lapses in all of the outbreaks. A 2002 pain clinic outbreak in Oklahoma reached staggering proportions, resulting in 31 clinic-associated HBV infections and 71 clinic-associated HCV infections. An endoscopy clinic outbreak of HCV infection in 19 patients was linked to reinserting needles into contaminated multiple-dose anesthetic vials. In a hematology/oncology clinic outbreak, syringe reuse apparently led to the contamination of saline bags used to flush out implanted catheters, resulting in 99 identified HCV infections.

Transmission probably occurred indirectly from patient to patient after exposure to injection equipment that was contaminated with the blood of one or more source patients. All four outbreaks could have been prevented by adherence to basic principles of aseptic technique for needle use and the preparation and administration of parental medications, investigators emphasized.

Of course, such problems are not confined to bloodborne pathogens, but they are much easier to pick up than bacterial infections, epidemiologists advise. Hepatitis infections are required to be reported by public health officials, but there is no formal surveillance system for many bacterial infections. Historically, prevention of bacterial infections in ambulatory care has focused on appropriate use of multidose vials, intravenous administration sets and line flushing preparations. In addition, proper storage, aseptic technique and care, and maintenance of preparation areas — including separating infective materials from materials to be injected — are required to limit bacterial infections. The emergence of CA-

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MRSA is bringing a new emphasis on such infection prevention measures in physician offices and ambulatory settings.

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Look for OSHA compliance coverage in next issue

Agency conducts 'special emphasis' inspections

In the next issue of *Infection Control for Physician Practice*, we begin our ongoing coverage of compliance and enforcement issues for physician offices under the Occupational Safety and Health Administration's bloodborne pathogen standard. Contrary to a general misconception, physician offices are not exempt from the requirements, and OSHA is conducting some "special emphasis" inspections to reinforce that point. Look for specific information you can use to avoid OSHA citations and stay in compliance in our next issue. ■

CNE/CME objectives

After reading each issue of *Infection Control for Physician Practices*, the infection control professional will be able to do the following:

- Identify potential sources of outbreaks and infections in the physician office and outpatient clinic;
- Implement infection control guidelines to protect patients and staff
- Cite regulatory requirements and standards of care required for infection prevention in physician practice. ■

CNE/CME answers

1. C; 2. B; 3. A; 4. D.