STAPHYLOCOCCUS AUREUS

(methicillin resistant *Staphylococcus aureus*, MRSA;
glycopeptide intermediate resistant *Staphylococcus aureus*, GISA)

REPORTING INFORMATION

- Staphylococcal skin infections: Class C. Report by the end of the next working day after an outbreak, unusual incidence, or epidemic is suspected or identified.
- GISA (glycopeptide intermediate resistant *S. aureus*) is not among the diseases listed as notifiable in the Ohio Administrative Code, however its occurrence is of concern and it should be reported by telephone as soon as it is identified.
- MRSA (methicillin-resistant *S. aureus*) is also not a reportable entity, but its occurrence should be noted in an institution, with close monitoring of antibiotic use to avoid development of vancomycin resistance.

AGENT

Staphylococcus aureus is a Gram-positive coccus arranged in grapelike clusters. *S. aureus* is coagulase-positive, and is resistant to heat, drying, and many chemicals.

CASE DEFINITION

Staphylococcal infections are not included in the "Case Definitions for Infectious Conditions Under Public Health Surveillance" from the CDC (*MMWR* 1997;46[RR-10]). In Ohio, cases are reportable which are culture confirmed and part of an epidemic or unusual incidence. Cases which are culture confirmed with demonstrated resistance or intermediate resistance to glycopeptide antibiotics, e.g., vancomycin, are not reportable in Ohio according to the Ohio Administrative code, however the appearance of such organisms is extremely concerning and ODH, Bureau of Infectious Diseases, should be notified by telephone (614) 466-0265.

SIGNS AND SYMPTOMS

Although *S. aureus* is a normal inhabitant of the skin, mucous membranes, and respiratory and gastrointestinal tracts, it can invade any organ or system to produce infection, ranging from localized to invasive disease. Localized diseases include furuncles, impetigo, and wound infections. Suppurative and/or invasive infections include septicemia, osteomyelitis, arthritis, endocarditis, and pneumonia. Staphylococcal food poisoning results from the ingestion of staph enterotoxin which has been produced in food contaminated with *Staphylococci*. Toxic shock syndrome results from the production of a systemically absorbed toxin and is a reportable entity (see Toxic Shock Syndrome elsewhere in this manual).

DIAGNOSIS

The organism can be identified in a Gram stain of the infected site. Isolation of the organism from a culture of the infected site is considered diagnostic confirmation. Antibiotic sensitivities should be run on isolates to detect any resistance patterns. Glycopeptide (vancomycin) intermediate *S. aureus* (GISA) resistance is defined as an isolate for which the minimum inhibitory concentration (MIC) of vancomycin is >4ug/ml.

EPIDEMIOLOGY

Source and Occurrence

Staphylococci are ubiquitous, living in dust, environmental surfaces, and on humans and animals worldwide. Anterior nares and moist body surfaces can be colonized at any given time. This carrier role has been implicated in nosocomial spread. *S. aureus* that is capable of withstanding treatment with a particular antibiotic is defined as resistant. Resistant *S. aureus* causes community-acquired as well as nosocomial infections of the bloodstream, skin, soft tissue, and bone. The emergence of GISA in the United States suggests that *S. aureus* strains with full resistance to vancomycin may eventually emerge. It is recognized that resistance to common antibiotics such as methicillin and vancomycin has emerged due to widespread antibiotic use. While antibiotic therapy is necessary for

serious infections, the use of a sensitive agent such as vancomycin should be approached with caution and careful review of antibiograms for alternative antibiotics.

Mode of transmission
Most often endogenous via a break in the skin or mucous membrane. Person-to-person transmission occurs frequently from the failure of caregivers to wash hands after contact with an infected or colonized site. Other predisposing factors include the presence of invasive or prosthetic devices, chronic diseases, and kidney dialysis treatment.

Period of communicability
At least 48 hours after treatment with an appropriate antibiotic.

Incubation period
Variable, depending on the site and resistance of the host. Staph enterotoxin will cause symptoms within a few hours. Impetigo can appear one day after exposure.

PUBLIC HEALTH MANAGEMENT

Case

Treatment/Therapy
Antibiotic sensitivities should be determined for *S. aureus* isolates. Appropriate antibiotic use will help to decrease the further development of antibiotic resistance. Topical medications are available for treatment of nasal colonization if necessary in the health care setting.

Isolation
Contact isolation precautions must be strictly followed, including handwashing with an antimicrobial soap.

Contacts
Since *Staphylococci* are so common in the environment and on human hosts, there is no benefit to culturing the environment or persons on a routine basis. The ODH Lab can provide PFGE analysis of *Staph* isolates to assist with the investigation of an outbreak.

Prevention And Control
The hands of health care personnel remain the most common vehicle for transmission of staphylococcal infections, and proper hand washing cannot be over emphasized. Appropriate antibiotic use will help decrease the development of antibiotic resistance.