**Microbiology Update:**
*IDEXX Continues to Identify Methicillin-Resistant Staphylococci on Routine Cultures and Offers a MRSA Screen for Healthy Pets*

**Introduction**
People are natural hosts for *Staphylococcus aureus*, which colonizes the nasal passages of up to 40% of healthy adults. Methicillin-resistant *S. aureus* (MRSA) is an emergent threat in human medicine, reflecting the overall trend toward antibiotic resistance. MRSA is a *Staphylococcus aureus* that has acquired the mecA gene, which encodes a protein (PBP2A) that reduces the binding affinity of penicillins and cephalosporins. Therefore, MRSA strains are resistant to all β-lactam antibiotics and frequently also possess genes conferring resistance to many other antimicrobials, including aminoglycosides, macrolides, fluoroquinolones, lincosamides, tetracyclines and potentiated sulfa drugs. Both nosocomial- and community-acquired MRSA infections in humans have become epidemic. Other staphylococci are more frequently isolated from companion animals. Methicillin resistance can also occur in these bacteria and is becoming more prevalent particularly in *S. intermedius* group (including *S. intermedius* and *S. pseudointermedius*) and *S. schleiferi* isolates. The increased morbidity and mortality among infected humans and animals because of the multiresistant nature of these organisms makes their isolation and identification extremely imperative.

**Prevalence**
Methicillin-resistant (MR) staphylococci are emerging pathogens in small animals. They have been isolated from domestic animals since the early 1970s, but until recently, the prevalence was considered to be relatively low. However, a recent study in a tertiary referral center revealed that 35% of the *S. aureus* isolates, 17% of the *S. intermedius* isolates and 40% of the *S. schleiferi* isolates in dogs and cats were methicillin resistant, which seemed alarmingly high. A follow-up study collected cultures from 50 healthy dogs and 59 dogs with inflammatory skin disease. MR staphylococci were isolated from 4% of the clinically healthy dogs and 10% of the dogs with inflammatory skin disease.

**Clinical Presentations**
Symptomatic MRSA infections in veterinary patients are rare and, in most cases, suspected to be the result of reverse zoonosis from infected humans. Most veterinary cases have been associated with postsurgical and wound infections, chronic dermatologic lesions and infections of the lung or bone.

Methicillin-resistant *Staphylococcus intermedius* group infections are being recognized more and more frequently. Dogs most commonly present with pyoderma, otitis externa, abscesses or infected wounds or surgical incisions; however, infection of other sites can occur. *Staphylococcus schleiferi* appears to be commonly associated with canine pyoderma, and many strains appear to be methicillin resistant.

**Culture Recommendations**
Empirical therapy of abscesses, wounds and incisions often involves use of β-lactam antimicrobials, which would be ineffective against MR staphylococci infections. As MR staphylococci infections become more common, it is becoming increasingly important to prescribe antimicrobial therapy based upon culture and sensitivity testing performed prior to initiation of therapy. For superficial pyoderma and otitis externa, culture and sensitivity testing should be performed if there is lack of response to the first line empirical therapy prior to changing treatment to a different class of antibiotics.

An important difference between MRSA infections in people and MR staphylococci infections in companion animals is that in our patients these organisms are not more virulent, they are just more resistant to treatment. These are still typically opportunistic staphylococci infections. For example, if a dog has pyoderma caused by a MR staphylococcus, this is not likely a primary contagious disease, but an opportunistic infection to an underlying dermatopathologic problem (e.g., atopy, hypothyroidism). The underlying condition needs to be addressed and the dog treated with antibiotics based on culture and sensitivity results.

**Public Health Considerations**
Recent documentation of coinfection of owners and their pets has led to growing concern about the potential role of veterinary species in maintaining MRSA infections. More commonly, MRSA will be encountered in veterinary medicine when an owner or family member has been diagnosed with an MRSA infection that has not responded to appropriate therapy. Similar to exposed humans, healthy dogs and cats can be asymptptomatically colonized with the bacteria after...
exposure to an infected human. If continuous reexposure does not occur, the infection is generally short-lived. However, if reexposure does occur, colonized pets can be a source of reinfection in susceptible people. Because of this possible outcome, medical doctors often instruct patients to have their pets screened for MRSA to check if they are carriers. Although not as common, other MR staphylococci species can also infect people. These staphylococci do not appear as pathogenic as MRSA, however, contact between infected companion animals and immunocompromised, geriatric and pediatric humans should be minimized or avoided.1,11

**MRSA Screening Culture**

IDEXX has a well-established protocol for screening cultures for MRSA following the latest guidelines from the Centers for Disease Control and Prevention (CDC) and Clinical and Laboratory Standards Institute (CLSI). It is recommended that screening samples from dogs and cats be collected by swabs of both the nasal passages and the rectum. All dogs and cats in the household with potential exposure to infected humans should be screened. Results will be reported as either negative for MRSA or positive for MRSA with susceptibility.

**Identification of Methicillin-Resistant Staphylococci Infections on Routine Culture**

Both coagulase-positive and coagulase-negative hemolytic staphylococci can develop methicillin resistance. When staphylococci are isolated at IDEXX Reference Laboratories from any culture, we routinely screen these for methicillin resistance. Oxacillin is the preferred agent to test for methicillin/oxacillin resistance. In addition, if a coagulase-positive staphylococcus is methicillin resistant, an attempt will be made to identify the organism. When indicated, extended susceptibilities are also performed.

**IDEXX Culture Results**

On every routine culture where a hemolytic staphylococcus is isolated, there will be a comment stating that the isolate was screened for methicillin resistance and whether it is or is not methicillin resistant. On multiple resistant organisms, a special extended susceptibility panel designed specifically for MR staphylococci organisms will be performed.

**When a MR staphylococcus is isolated, the comment will read:**

- This isolate is resistant to oxacillin and therefore is methicillin resistant.
- All hemolytic staphylococci are screened for methicillin resistance. Oxacillin can be used to predict methicillin sensitivity.

**When a methicillin-sensitive staphylococcus is isolated, the comment will read:**

- This isolate is sensitive to oxacillin and therefore is not methicillin resistant.
- All hemolytic staphylococci are screened for methicillin resistance. Oxacillin can be used to predict methicillin sensitivity.

**What should you tell the client if a MR staphylococcus has been isolated from their pet?**

- Clinical infections should be treated based upon culture and sensitivity results.
- Routine antibiotic therapy for colonized pets is not recommended.
- Avoid contact with immunocompromised or at-risk individuals, including the elderly, sick and young children.
- Avoid contact with infected sites and wash hands after contact with alcohol-based products (wipes, gels, etc.).
- If MRSA is isolated, then most likely more members of the family are carriers. Suggest client contact their physician.

**Ordering information**

While IDEXX Reference Laboratories maintains the highest quality in microbiology testing, the advent of increased rate of isolation of methicillin-resistant staphylococci requires us to adjust the cost of our routine cultures to help offset the high cost involved in isolating these organisms routinely. See the current IDEXX Reference Laboratories Directory of Tests and Services for list price information.

**MRSA Screening Culture**

test code | test name and specimen requirements
---|---
2497 | Methicillin-Resistant Staphylococcus aureus (MRSA) Screening Culture
Culturettes (swabs taken from nasal passages and rectum)

**Routine Cultures**

<table>
<thead>
<tr>
<th>test code</th>
<th>test name and specimen requirements</th>
</tr>
</thead>
</table>
400 | Aerobic Culture (ID and Susceptibility)
Culturette or sterile container |
401 | Aerobic Culture (ID and Susceptibility) and Anaerobic Cultures (Organism ID Only)
Culturette or sterile container (no formalin); please specify source |
4035 | Urine Culture and MIC Susceptibility
5 mL urine in a sterile container (cystocentesis preferred) |

**Contacting IDEXX**

**Laboratory Customer Support**

If you have any questions regarding test codes, turnaround times or pricing, please contact Laboratory Customer Support at 1-888-433-9987, option 3, option 5.

**Expert Feedback When You Need It**

Our team of internal medicine specialists is always available for complimentary consultation. Please call 1-888-433-9987, option 4, option 2, if you have questions.
References


