

## Preface



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Guest Editors

Staphylococci are both common human commensals and one of the leading causes of infection in humans. *Staphylococcus aureus* in particular, although persistently or intermittently colonizing most humans without incident, is a major cause of morbidity and mortality. Staphylococcal infections encompass a spectrum from relatively mild localized infections to rapidly fatal invasive infections. Before the antibiotic era, invasive staphylococcal infections were frequently fatal. The introduction of penicillin in the 1940s significantly improved the prognosis of these infections; however, staphylococci have proved to be adept at developing mechanisms to resist being killed by antimicrobial agents. Methicillin-resistant *S aureus* (MRSA), which possesses an altered penicillin-binding protein conferring resistance to all  $\beta$ -lactam antimicrobial agents except the recently developed ceftobiprole, was described shortly after the introduction of methicillin in the early 1960s. Throughout the subsequent decades, MRSA became an increasingly important cause of infection in hospitalized patients and remains a leading cause of health care-associated infections. In the 1990s, new strains of MRSA emerged as a cause of infection among otherwise healthy people in the general community, adding to the overall burden of community-associated *S aureus* infections.

With this issue of *Infectious Disease Clinics of North America*, we have been privileged to work with contributors who have generously shared their expertise in the areas of staphylococcal epidemiology and pathogenesis and the management and prevention of staphylococcal infections. The issue begins with an article by Drs. Shinefield and Ruff offering a historical perspective on staphylococcal infections and insight about how history can inform current efforts to prevent and control staphylococcal infections. Drs. Shinefield and Ruff point out that, despite all that has been learned thus far about staphylococcal disease, there is still an urgent need to understand more about the mechanisms of virulence and transmission that turn a common commensal organism into one that is highly pathogenic. To that end, Drs. DeLeo, Diep, and Otto present an overview of host defense and pathogenesis in *S aureus* infections, reviewing human neutrophil function in the context of *S aureus* virulence mechanisms and exploring the role of a number of virulence factors in the pathogenicity of community MRSA strains.

Drs. Anderson and Kaye point out that surgical site infection remains a leading cause of morbidity and mortality in modern health care, with *S aureus* being the most common cause of these infections. They provide a thorough summary of the epidemiology, diagnosis, pathogenesis, and clinical management of *S aureus* surgical site infections, and both proven and controversial prevention strategies. Although *S aureus* has long been a common cause of community-associated infections, the recent emergence of MRSA as a community pathogen has altered the epidemiology of these infections. Drs. Miller and Kaplan describe the changing epidemiology and clinical manifestations of community-associated *S aureus* infections in adults and children and discuss implications for clinical management. Coagulase-negative staphylococci are most frequently encountered by clinicians as contaminants of microbiologic cultures; however, as Drs. Rogers, Fey, and Rupp indicate, coagulase-negative staphylococci have been increasingly recognized to cause clinically significant infections in patients with indwelling medical devices. In their article, they describe the epidemiology, clinical spectrum, and pathogenesis of coagulase-negative staphylococci infections, and discuss current and future prevention and management strategies.

The constantly evolving resistance of *S aureus* to antimicrobial agents and the increasing transmission and prevalence of resistant strains (notably MRSA) in both health care and community settings have presented challenges for the treatment of *S aureus* infections. Drs. Gold and Pillai provide a comprehensive review of available antistaphylococcal agents, including mechanisms of action and resistance, clinical use, and drug toxicities and interactions. Preventing staphylococcal infections in the first place is the ideal solution. The elimination or suppression of *S aureus* colonization (known as “decolonization”) is one potential means of preventing *S aureus* infections. In their article, Drs. Simor and Daneman explore the evidence supporting *S aureus* decolonization as a prevention strategy in both health care and community settings. Development of an effective *S aureus* vaccine would provide the ultimate prevention strategy; however, efforts so far have been unsuccessful. In the final article of this issue, Drs. Schaffer and Lee describe the challenges in developing staphylococcal vaccines and immunotherapies, summarize trials completed to date, and outline considerations to be taken into account in vaccine development.

The articles in this issue cover some of the most important and sometimes controversial issues in the pathogenesis, prevention, and management of staphylococcal infections. They offer thorough reviews of established prevention and control strategies and provide a framework for considering the potential advantages and disadvantages of less established interventions. It is our hope that the reader finds these articles as informative and useful as we have.

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