About the editor

Stephanie J Dancer

Stephanie J Dancer is currently a medical microbiologist in NHS Lanarkshire (UK), having previously held the position of Consultant Microbiologist at the Southern General Hospital in Glasgow (UK). She trained at St Bartholomew's Hospital in London (UK), and during her postgraduate studies at Guy's Hospital (London, UK) she produced a thesis on the epidemiology and biochemistry of toxin-producing staphylococci. She has long been involved in monitoring the spread of staphylococcal strains, having set up the methicillin-resistant *Staphylococcus aureus* (MRSA) surveillance for Scotland during her time at Health Protection Scotland, and evaluating real-time PCR as a tool for rapid identification of MRSA. She has been an active member of several national working groups on antibiotic prescribing and hospital cleaning, and was a formal referee for the Scottish Health Technology Assessment on MRSA screening. In her current role in NHS Lanarkshire, she balances clinical and editorial duties – she has published over 100 papers on staphylococci, hospital cleaning and antibiotic resistance – with a number of research projects, including those investigating the role of antibiotics, screening and cleaning in the control of MRSA.

FOREWORD

Staphylococcus aureus antibiotic resistance

Stephanie J Dancer

Staphylococcus aureus, including methicillin-resistant strains, is an important cause of nosocomial infections. The rise of specific strains in hospitalized patients and even in the community calls for a greater understanding of prevention and control measures. Reduction of the spread of these strains requires education of healthcare workers, pre-emptive isolation of high-risk patients and antimicrobial stewardship. Proposals to instigate active surveillance cultures in a clinical setting remain contentious. This book aims to provide clinicians and healthcare workers with guidance from leading experts on the best practice for screening, diagnosis and treatment of at-risk populations.

Chapters 1 & 2 cover resistance mechanisms and the epidemiology

of antibiotic-resistant *S. aureus*, with a focus on how this should translate into best practice for screening. Epidemiological studies based on the molecular characteristics of outbreak-associated strains permit insight into the dissemination of clones. In **Chapter 2**, the author discusses how, in order to inhibit hospital outbreaks among high-risk patients, it is important to identify carriers of these clones and swiftly implement guidelines for controlling methicillin-resistant *S. aureus* (MRSA).

This book also explores infections in at-risk groups, such as neonates. Neonates are vulnerable to colonization and infection with MRSA and, as discussed in **Chapter 3**, may suffer significant morbidity and mortality as a consequence. Recent research has helped determine the risk factors

that predispose infants to MRSA acquisition and infection. The authors note how advances in the technologies that allow viability to extend to even younger gestational ages may lead to an increase in the number of infants being treated in neonatal intensive care units, with concomitant increased risk for development of MRSA colonization and infection.

Continuing the focus on infection prevention, **Chapter 4** reviews environmental cleaning and the effect that cleaning can have on the MRSA transmission risk. Responding to questions posed by other chapter authors, the author discusses products, protocols and standards that aid in reducing the risk of transmission from the hospital environment and looks at how these will evolve in the future.

Simulation modeling has demonstrated how outbreaks in a healthcare facility can propagate to other healthcare facilities through patient transfer within a region. In **Chapter 5**, the authors review outbreak risk factors and use modeling of past outbreaks to provide details on corresponding prevention and control measure that can safeguard at-risk groups.

In **Chapter 6**, the authors note how the evidence suggests that patient outcomes, particularly in the critically ill, are improved when best choice antibiotic therapy can be rapidly selected using

evidence-based diagnostic tools. A rapid test that can distinguish between a methicillin-susceptible *S. aureus* infection and a MRSA infection can provide healthcare workers with valuable information for antimicrobial selection, and various rapid-testing strategies are discussed in this book to determine the value of each.

Finally, in **Chapter 7** the authors review compounds and therapies that make up the current and future lines of defense against *S. aureus*. They discuss how we may need to look to alternative therapies, such as vaccines, probiotics, prevention of biofilm formation and photodynamic therapy, but note that more research is required in these areas.

Recent data from the US CDC have shown that rates of MRSA infection have been falling, possibly as a result of increased awareness along with a range of multifactorial strategies. For this trend to continue, it is important that this awareness of diagnosis, best prevention and treatment practice is promoted further. It is hoped that this book will assist in providing readers with evidence and expert opinion on these important topics.

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