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SURVEILLANCE OF STAPHYLOCOCCUS INFECTIONS IN DENMARK No. 10, 2002

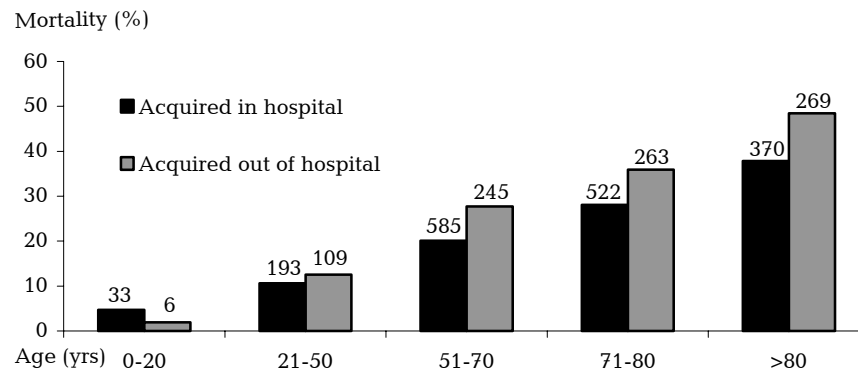
Occurrence

About 30-40% of all healthy persons are carriers of *Staphylococcus aureus*, which is one of the most common causes of hospital-acquired infections. In institutions, such as nursing homes, refugee centres and child-care institutions, outbreaks of staphylococcus infections usually occur in the form of skin infections, such as boils and impetigo. Furthermore, food poisoning may be caused by toxins secreted by *S. aureus* infections in relation to foreign bodies such as catheters, artificial heart valves and joint prostheses are primarily caused by coagulase-negative staphylococci, of which *Staphylococcus epidermidis* is the most prevalent.

Surveillance

In the management of outbreaks, it is important to know the source and route of infection, and typing of staphylococcus isolates can contribute to this. In collaboration with the clinical microbiological departments, the *Staphylococcus* laboratory has collected and typed all Danish bacterial strains since 1957. In addition, clinical and epidemiological data on the patients has been systematically collected. Several studies based on this material have helped to clarify the epidemiology and to improve our understanding of the development of *S. aureus* infections and their complications. Approx. 5,000 isolates are now typed annually, including methicillin-resistant *S. aureus* (MRSA) found by general practitioners. The results are used partly to investigate outbreaks in hospital wards, and partly to prevent outbreaks, as the incidence of the different types is followed continuously. *Staphylococcus* Annual Report is published on the basis of the collected data and can be seen on www.ssi.dk/PublicHealth. From 2000, the report is based on bacteraemia- and MRSA data only. The laboratory takes part in joint international projects, one of the objectives being to develop international typing standards. This is taking place to secure reproducible typing data, which, using Internet-based databases, can be used to quickly identify staphylococci of particular epidemic character across national borders.

Fig. 1. Mortality (%) and no. of deaths for patients with *Staphylococcus aureus* bacteraemia, by age group and whether the infection was acquired in or out of hospital, 1989-1998. (Total: 11,627 patients)

**Staphylococcus aureus bacteraemia**

Staphylococcus aureus bacteraemia (SAB) continues to be a serious problem, with high mortality. The number of SAB cases in Denmark has been rising steadily during the past 40 years, from 109 cases in 1957 to 1,448 cases in 1999. However, mortality has declined in the same period from 45% to 18%. Fig. 1 shows that mortality increases with age and is highest for cases acquired outside hospital. In order to follow developments, it is necessary to have a consecutive registration of epidemiological and clinical data.

Development of resistance - MRSA

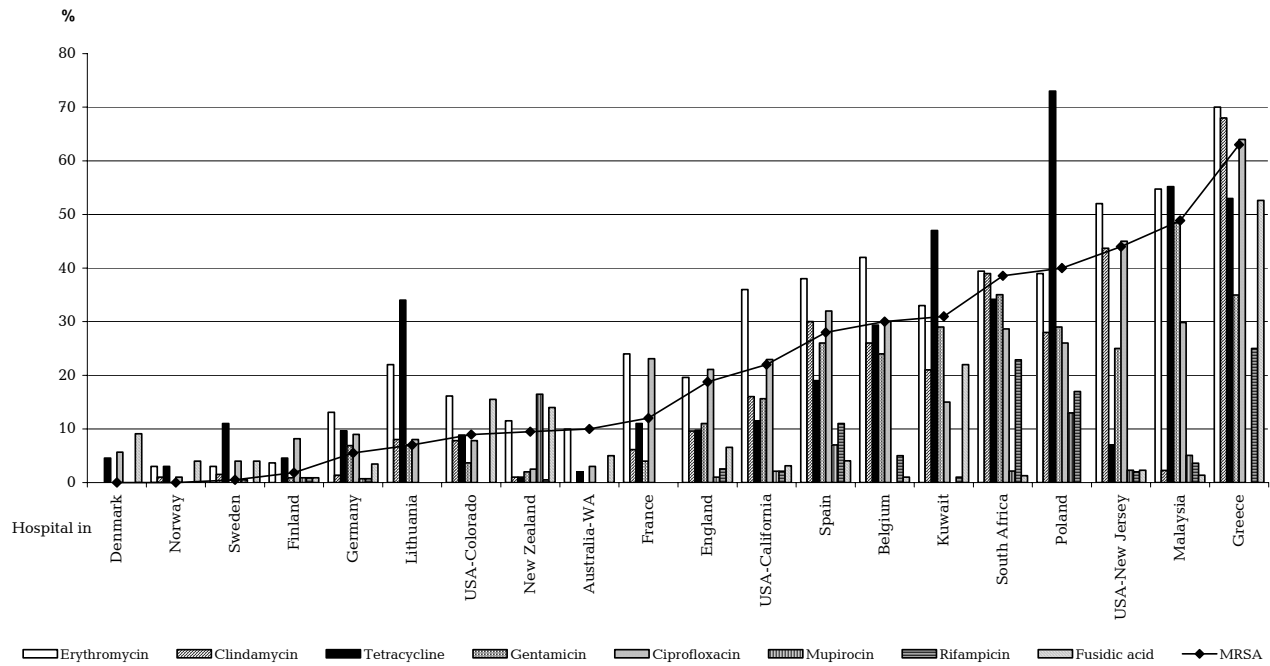
All over the world, an increased incidence of multi-resistant staphylococci is seen, such as methicillin-resistant *S. aureus* (MRSA), which is usually only sensitive to a few antibiotics, such as vancomycin. This is associated with uncontrolled consumption of antibiotics and poor hospital hygiene, with subsequent spread in both the primary and secondary sectors. It is therefore important to monitor the development of resistance, since the increased incidence of multi-resistant staphylococci impedes treatment. On this basis, the *Staphylococcus* laboratory has initiated a collaboration with the clinical departments of microbiology to submit all MRSA isolates, from both hospitals and general practitioners. This makes it possible to intervene quickly on suspicion of local clusters. The number of MRSA cases in Denmark has been 105 (provisional calculation for 2001), 97 (2000), 67

(1999), 54 (1998), 41 (1997) and 34 (1996), respectively. In 1997, for the first time in many years, a new abscess-related clone was introduced to Denmark, and this now constitutes approx. 40% of the Danish MRSA strains (EDK97-1). This clone is seen mainly in general practice. Furthermore, around the country, a few sporadic cases of the well-known English epidemic MRSA-16 (EMRSA-16) have been identified. This clone has also recently been the cause of a major epidemic in Sweden. Fig. 2 (overleaf) shows a 1998 multi-centre study carried out in collaboration with 19 hospitals abroad. In each hospital, 200 *S. aureus* isolates were consecutively collected and tested for resistance to the antibiotics shown. The study showed a significant correlation with resistance to methicillin and resistance to erythromycin, clindamycin, tetracycline, gentamicin, ciprofloxacin and partially rifampicin. Mupirocin and fucidic acid resistance were not related to the incidence of MRSA. International databases are in the process of being developed in collaboration with several other European countries, with the objective of being able to compare and warn of the occurrence of epidemic MRSA. Good antibiotic policies, provisions for isolation on import of MRSA, and efficient intervention with regard to carriers of MRSA, will hopefully ensure a low incidence of MRSA in Denmark on an ongoing basis.

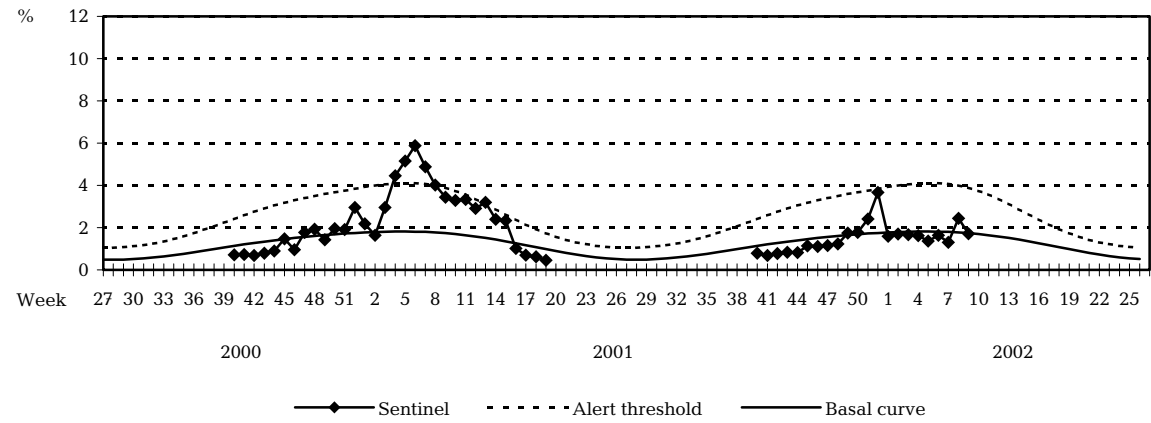
(C. Elsberg Zinn, N. Frimodt-Møller, Dept. of Microbiology R&D)

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Fig. 2. Distribution (%) of antibiotic resistance in 20 hospitals, where 200 Staphylococcus aureus isolates were collected consecutively in each hospital, 1998



Sentinel surveillance of influenza activity
Weekly percentage of consultations, 2000/2001/2002



Sentinel: Influenza consultations as % of total consultations
Basal curve: Expected frequency of influenza consultations under non-epidemic conditions
Alert threshold: Possible incipient epidemic

Sentinel specimens received 2001/2002

Week no.	40-52	1	2	3	4	5	6	7	8	9
Specimens received	43	1	2	5	18	12	10	10	6	4
Influenza A										
Moscow/10/99-like	0	0	0	1	4	1	0	0	4	0
Influenza A, not typed							1			2

In specimens outside of the sentinel system one influenza A strain and one influenza B/Sichuan/379/99 virus strain were found. The isolated influenza strains are covered by the current influenza vaccine.