Appropriate Use of Antibiotics and Guideline(s) for This Purpose

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1. Present Situation of Antimicrobial Resistance in Japan

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The emergence of antimicrobial resistant strains has been a serious problem in the treatment of infectious diseases. In case of *Streptococcus pneumoniae*, penicillins have been the

Figure 1. MIC distribution of *S. pneumoniae* to penicillin G¹⁻³⁾.

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drugs of choice for years. However, penicillin-resistant strains have been rapidly increasing in the last decade (Fig. 1). The increase is prominent in Japan compared to the USA or the UK (Fig. 2). Macrolide-resistance of *S. pneumoniae* has also become a serious problem, especially in Japan (Fig. 3). About 40% of isolates show a minimal inhibitory concentration (MIC) of 256 µg/ml or more (Fig. 4). As for

Staphylococcus aureus, more than half of the clinical isolates are MRSA. The prevalence is more prominent in isolates from inpatients compared to those from outpatients (Figs. 5, 6). However, at present, vancomycin and arbekacin have kept their activity to MRSA. Regarding *Haemophilus influenzae*, three types of resistance have been reported; beta-lactamase producing ampicillin resistance (BLPAR), beta-

Figure 2. Susceptibility of *S. pneumoniae* to penicillin G⁴⁾.

Figure 3. Susceptibility of *S. pneumoniae* to erythromycin⁴⁾.

lactamase non-producing ampicillin resistance (BLNAR), and beta-lactamase producing amoxicillin-clavulanic acid resistance (BLPACR). At present, about 30% of clinical isolates are ampicillin-resistant.

In Gram-negative rods, resistance due to beta-lactamases

has become a major problem. Extended-spectrum beta-lactamases (ESBL) have been detected in strains such as *Escherichia coli* or *Klebsiella pneumoniae*. *P. aeruginosa* or *Acinetobacter* producing metallo-beta-lactamases have been reported.

Figure 4. MIC distribution of *S. pneumoniae* to erythromycin¹⁻³⁾.

Figure 5. Antimicrobial resistance of *S. aureus* isolated from outpatients between 1999 and 2003.

Figure 6. Antimicrobial resistance of *S. aureus* isolated from inpatients between 1999 and 2003.

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2. Appropriate Use of Antibacterial Drugs and Guidelines: Special Aspects of Japan's Guidelines

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Key words: antibacterial drug, guideline, infectious disease

guidelines, a questionnaire survey was conducted in university hospitals and hospitals with physicians specializing in infectious diseases on staff.

Actual status of use of antibacterial drugs in Japan

To clarify the present status of appropriate use of antibacterial drugs in Japan and to determine the necessity for

Education time for staff and resident physicians (Fig. 1)

The left panel shows the time spent in educational programs concerning infectious diseases; the right panel shows

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