test, all *K. oxytoca* isolates were omitted from the confirmatory testing. Thirteen *E. coli* strains (1.3%) and 4 *K. pneumoniae* strains (0.4%) were confirmed as ESBL producers. These values are the same as our previous report. Moreover, 2 *C. freundii* isolates (0.2%) were confirmed as ESBL producers by the CLSI disk with clavulanate test using Mueller–Hinton agar plates in the presence of 300 μg/mL of 3-aminophenyl boronic acid (final concentration) as a specific inhibitor of class C β-lactamases (Yagi et al., 2005). This result suggested that it is important to survey ESBL producers, not only *E. coli*, *K. pneumoniae*, *K. oxytoca*, and *P. mirabilis*, but also the other Enterobacteriaceae.

Twenty-five strains of *P. aeruginosa* (2.5%) were confirmed as MBL producers in this surveillance program by using imipenem and ceftazidime disk in the presence/absence of dipicolinic acid (Kimura et al., 2005b). Of the *P. aeruginosa*, 1.9% and 2.3% produced MBL in 2002 and 2004, respectively (Ishii et al., 2005a and 2006). The present data suggest that MBL-producing *P. aeruginosa* are increasing in Japan. On the other hand, imipenem-resistant *P. aeruginosa* were present in 18.6% (185 isolates) of the isolates in this study. So, this result suggests that class B β-lactamases are not the main mechanism for carbapenem resistance in *P. aeruginosa*. In 2006, MBL producers among the tested Enterobacteriaceae and *Acinetobacter* spp. were present in 0.2% (13 isolates) and 0.2% (2 isolates) by phenotypic testing. The isolation frequency of Enterobacteriaceae producing an MBL (2004) has the same value (0.2%: 12/5596 isolates). On the other hand, MBL producers of *Acinetobacter* spp. decreased from 1.2% (2004) to 0.2%. In 2004, MBL-producing *Acinetobacter* spp. (11 isolates) were isolated from only 5 hospitals.

MDR *P. aeruginosa* is a serious problem in the world (Paterson, 2006). These MDR organisms are resistant to carbapenems, fluoroquinolones, and aminoglycosides. We determined additional antimicrobial susceptibility testing results for imipenem-resistant *P. aeruginosa* by using the BD Phoenix system. Nineteen isolates showed resistance to amikacin and 119 isolates to levofloxacin (data not shown). Eighteen amikacin-resistant isolates were also resistant to levofloxacin, so the incidence of MDR *P. aeruginosa* was 1.7% (17 strains). This present data suggest, however, that the isolation frequency of MDR *P. aeruginosa* was not increasing compared with the 2004 results.

All tested Gram-negative organisms with the exception of *E. coli* and *Acinetobacter* spp. improved their susceptibilities for β-lactams (Table 3). For example, the percentages of imipenem-resistant isolates of *Serratia* spp. were 4.5% (1997), 4.4% (1998), 4.5% (2000), 3.6% (2002), 1.5% (2004), and 0.6% (2006) (Ishii et al., 2002, 2005a, 2006; Lewis et al., 1999; Yamaguchi et al., 1999). Fig. 1 illustrates the consumption of β-lactams in Japan from 1997 to 2006 (IMS-Japan K.K., Tokyo, Japan, agreed to present this data). These data indicate that the consumption of β-lactam exception of penicillins has been decreasing year by year. Also, these results suggest that regulation of antimicrobial usage and dosing can improve antimicrobial susceptibility patterns for Japanese clinical isolates.

In conclusion, the susceptibility of *P. aeruginosa* to almost β-lactam antimicrobial agents has improved compared with previous reported years. Overall, cefepime is maintaining its in vitro activity against Gram-positive and Gram-negative bacteria. It is very important to continue

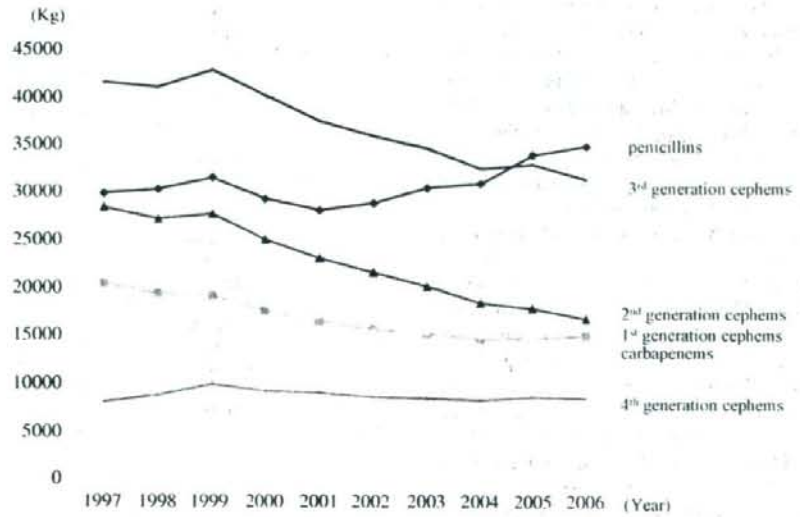


Fig. 1. The consumption of β-lactam antibiotics in Japan during 1997 to 2006 (Copyright 2007 IMS Japan. All rights reserved. Source: IMS JPM. Reprinted with permission).

surveillance for the MDR bacteria because of limited treatment options that could lead to optimal outcomes.

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