

## Antimicrobial susceptibility of invasive *Haemophilus influenzae*, 2009

The antimicrobial susceptibility of all 64 viable invasive isolates of *H. influenzae* referred to ESR in 2009 was tested (see table). Ampicillin, co-amoxiclav, cefuroxime and cefaclor minimum inhibitory concentrations (MICs) were determined by Etest on *Haemophilus* test medium. Cefotaxime, ciprofloxacin, clarithromycin, co-trimoxazole, rifampicin and tetracycline susceptibilities were determined by disc diffusion on *Haemophilus* test medium. MICs and disc diffusion zone diameters were interpreted according to the Clinical and Laboratory Standards Institute's criteria.<sup>1</sup>

Eight (12.5%) of the 64 isolates were serotype b. Eleven (17.2%) isolates produced  $\beta$ -lactamase. Twelve isolates were ampicillin resistant, but not  $\beta$ -lactamase producing – so-called BLNAR ( $\beta$ -lactamase-negative, ampicillin-resistant) *H. influenzae*. One of the  $\beta$ -lactamase producing isolates appeared to also have the BLNAR mechanism of resistance, that is, an altered penicillin-binding protein (PBP).

### *Antimicrobial resistance among Haemophilus influenzae isolates from invasive disease, 2009*

Antibiotic <sup>1</sup>	Number tested	Number resistant <sup>2</sup>	Percent resistant
Ampicillin	64	23	35.9
Co-amoxiclav	64	13	20.3
Cefuroxime	64	13	20.3
Cefaclor	64	13	20.3
Cefotaxime	64	0	0
Ciprofloxacin	64	0	0
Clarithromycin	64	0	0
Co-trimoxazole	64	4	6.3
Rifampicin	64	0	0
Tetracycline	64	1	1.6

<sup>1</sup> Results for the full range of antibiotics tested are presented. Many are not appropriate for the treatment of invasive *Haemophilus* disease or the chemoprophylaxis of contacts.

<sup>2</sup> All BLNAR *H. influenzae* have been considered resistant to ampicillin, co-amoxiclav, cefaclor and cefuroxime, in line with the Clinical and Laboratory Standards Institute's recommendations, although they often test as susceptible to these antibiotics in standard susceptibility tests.

Trends in ampicillin resistance and  $\beta$ -lactamase production among invasive *H. influenzae* since 2000 are shown in the figure below. Until 2005, most of the ampicillin resistance was due to  $\beta$ -lactamase production. However, since that time, only about half the ampicillin-resistant isolates have been producers of  $\beta$ -lactamase, with the other half being BLNAR *H. influenzae*.

<sup>1</sup> Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing; nineteenth informational supplement. Villanova, PA, USA: CLSI; 2009. CLSI document M100-S19

*Ampicillin resistance and beta-lactamase production among invasive Haemophilus influenzae, 2000-2009*

