Antimicrobial Drug–resistant Salmonella Typhimurium (Reply to Helms)

In Reply to Helms: In the article by Helms et al., Helms concludes that infections with Salmonella Typhimurium strains resistant to ampicillin, chloramphenicol, streptomycin, sulfonamide, and tetracycline (hereafter referred to as penta-resistant) were associated with higher death rates than infections with non–penta-resistant S. Typhimurium. Helms also concluded that infections with quinolone-resistant (nalidixic-resistant) S. Typhimurium were associated with higher death rates than quinolone-susceptible S. Typhimurium.

Table 2 in Helms’ article provides information that enables close scrutiny of this conclusion and comparison of the excess mortality associated with penta-resistant, quinolone-susceptible S. Typhimurium. The conclusion is that only quinolone resistance is associated with excess mortality compared with nonresistant isolates. Penta-resistant, quinolone-susceptible S. Typhimurium has a risk ratio of 2.9 (1.1 to 7.9) compared to the ratio of non–penta-resistant isolates 2.1 (1.5 to 2.9). When these figures are compared, the approximate p value is 0.55, which, of course, is far from being significant. Thus, on the basis of the article by Helms, penta resistance may not pose a greater threat to human health than non–penta resistance. However, the measured effect of penta resistance is achieved by the inclusion of quinolone-resistant S. Typhimurium in the group.

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Table. Table showing additional comparisons (1)

<table>
<thead>
<tr>
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<th>Resistant</th>
<th>Susceptible</th>
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<tbody>
<tr>
<td>Deaths/cases</td>
<td>RR* (95 % CI)</td>
<td>Deaths/cases</td>
</tr>
<tr>
<td>Penta with and without quinolone</td>
<td>12/283 4.8 (2.2 to 10.5)</td>
<td>47/1,764 2.1 (1.5 to 2.9)</td>
</tr>
<tr>
<td>Penta with quinolone</td>
<td>5/40 13.1 (3.3 to 51.9)</td>
<td>47/1,764 2.1 (1.5 to 2.9)</td>
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<tr>
<td>Penta without quinolone</td>
<td>7/243 2.9 (1.1 to 7.9)</td>
<td>47/1,764 2.1 (1.5 to 2.9)</td>
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</tbody>
</table>

*RR, relative risk; CI, confidence interval.
*Adjusted for coexisting conditions
*Compared to the non-penta group
*Approximations based on the parameters from the table.
associated with excess mortality in the 243 patients included in the analysis, and the measured effect of ACSSuT was achieved by the inclusion of the nalidixic acid–resistant strains in this group. However, all deaths associated with nalidixic acid–resistant strains occurred in the 40 patients with R-type ACSSuTnx (being DT104s), whereas none of the 43 patients infected with non-ACSSuT strains resistant to nalidixic acid died. This finding may be related to small numbers in these subanalyses. However, because 25 of the patients with R-type ACSSuTnx were part of an outbreak, they may have had an average higher exposure dose, which may have contributed to some deaths (3). In addition, an interaction between different resistance traits in Salmonella may exist, which may lead to more deaths and disease, or DT104 may be somewhat more virulent than most other S. Typhimurium subtypes.

The database that we used for our analysis was updated in May 2002. We have now identified 13 deaths in 342 patients infected with strains resistant to ACSSuT (but Nx susceptible), which corresponds to a relative mortality rate of 4.18 (95% confidence interval [CI] 2.18 to 8.02) compared with a matched sample of the general population. Of 1,432 patients infected with pan-susceptible strains, 43 patients died (relative mortality rate 2.64; 95% CI 1.88 to 3.70). In other words, the mortality rate in patients infected with strains resistant to ACSSuT (Nx susceptible) was 1.6 times higher than in patients with pan-susceptible strains (p value for homogeneity 0.22). These estimates were not adjusted for coexisting conditions as were the estimates in the paper (6).

We agree with Dahl that particular problems are associated with quinolone resistance in zoonotic salmonellae and that fluoroquinolones may have reduced efficacy to treat patients infected with Salmonella strains that are nalidixic acid (quinolone) resistant (7). We therefore encourage initiatives to preserve the efficacy of fluoroquinolones, including a limitation of their use in agriculture. Whether infection with S. Typhimurium R-type ACSSuT, with no additional resistance, is associated with higher disease or death rates than pan-susceptible S. Typhimurium remains unclear. Although the difference was not significant (p=0.22), our recent estimates suggest that the death rate is approximately 60% higher in patients infected with such strains. This view is corroborated by recent studies from the United States, which suggest that S. Typhimurium R-type ACSSuT is associated with an increased risk for blood stream infection (8) and that resistance in nontyphoid Salmonella is associated with an increased risk for admission to hospital (9).

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Serogroup A Neisseria meningitidis Outside Meningitis Belt in Southwest Cameroon

To the Editor: Epidemic meningitis associated with serogroup A Neisseria meningitidis is a devastating disease in the absence of vaccination (1). Without treatment, the case-fatality rate is high, approaching 100%. In Africa, such epidemics occur regularly (1) within a well-limited geographic zone, the so-called

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