The effect of banning avoparcin on VRE carriage in The Netherlands

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Sir,

Acquired resistance against antibiotics is closely related to the amount of drug used, a fact observed ever since these agents were introduced into human and veterinary medicine. However, the rate of development of resistance appears to have accelerated in the past decade. In animals, antibiotics are not only used for therapy and prevention of bacterial infections, but are also added to animal feed to act as growth promoters. In some countries, antibiotic use for growth promotion is greater than veterinary usage.

In countries using avoparcin, a glycopeptide antibiotic, as a growth promoter, vancomycin-resistant enterococci (VRE) are commonly found in the commensal flora of food animals, on meat from these animals and in the commensal flora of healthy humans despite very limited use of vancomycin in hospitals.1 In The Netherlands in 1996 and 1998, approximately 1500 and 1260 kg of avoparcin was used yearly in farming until 1997. By contrast, in those countries not allowing the use of avoparcin, no VRE have been detected in food animals, in faecal enterococci resistant to dalfopristin/quinupristin (sub)urban residents and of pigs and broilers from different farms were collected in 1996 and 1999. The prevalence and numbers of VRE have decreased significantly, not only from animals exposed to this compound but also in the endogenous flora of healthy humans. Faecal samples of healthy persons, from 12% in 1994 to 3% in 1997. In Italy the prevalence of VRE in poultry meats decreased from 15% to 8%.

In this report we have shown that, in The Netherlands, within 2 years of stopping the use of avoparcin, the prevalence and numbers of VRE have decreased significantly, not only in the faecal flora of food animals but also in the endogenous flora of healthy humans. Faecal samples of healthy persons, from 12% in 1994 to 3% in 1997. In Italy the prevalence of VRE in poultry decreased from 15% to 8%. By contrast, the prevalence in pigs (c. 20%) did not change during this time. Similarly, in Germany a decrease in the prevalence of VRE in poultry meat decreased from 100% in 1995 to 25% of samples tested by 1997. A decline in the prevalence of VRE was also seen in faecal samples of healthy persons, from 12% in 1994 to 3% in 1997. In Italy the prevalence of VRE in poultry meats decreased from 15% to 8%.

The observed decreases in the prevalence of VRE and of samples with a high degree of VRE in broilers is in accordance with the results described by others (Table). By contrast with the situation in Denmark, the prevalence of VRE in Dutch pig faecal samples also declined. The unexpected finding was the significant decrease in prevalence of enterococci resistant against dalfopristin/quinupristin in all three populations studied. This decrease probably, however, resulted from the antimicrobial growth promoter virginiamycin (a mixture of pristinamycins like quinupristin/ dalfopristin) being in short supply in The Netherlands during 1997 and 1998, because of production problems. No significant differences were noted for erythromycin resistance between 1997 and 1999.

The Swedish situation and the observed decrease in VRE in Germany, Italy, Denmark and The Netherlands after the ban on avoparcin makes it likely that discontinuation of the use of avoparcin in animals will eradicate VRE not only from animals exposed to this compound but also from the human healthy population. The observed decrease in faecal enterococci resistant to dalfopristin/quinupristin shows that the recent EU ban on the use of virginiamycin as a growth promoter may reduce the number of pristinamycin-resistant enterococci in the intestinal flora of healthy

VanB gene cluster and was acquired abroad.2 The Swedish example strongly suggests that removal of the selective pressure in animals can remove VRE from the human population in time. Moreover, not only has clonal spread of VRE occurred from animals to humans, but it has also been shown that the VanA gene cluster can be disseminated from animal to human enterococcal strains.

In April 1997, the European Commission suspended the use of avoparcin in animals. Denmark had already forbidden its use in 1995 and Germany in 1996. After the ban in Denmark the prevalence of VRE in poultry decreased from >80% in 1995 to <5% in 1998. By contrast, the prevalence in pigs (c. 20%) did not change during this time.

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Correspondence However, because of cross-resistance with macro-
lides and lincosamides, which are both commonly used in
human and veterinary therapy, complete disappearance of
resistance to this antibiotic is less likely to occur.

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Table. Prevalence of antibiotic-resistant enterococci and percentages of samples with a high degree (HD) of resistance in faecal samples collected in the
South of The Netherlands

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Concentration in agar (mg/L)</th>
<th>1997 prevalence</th>
<th>1999 prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin</td>
<td>10</td>
<td>12 HD</td>
<td>6* HD</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>10</td>
<td>50 HD</td>
<td>47 HD</td>
</tr>
<tr>
<td>Dalfopristin/quinupristin</td>
<td>8</td>
<td>30 NT</td>
<td>12** NT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75 NT</td>
<td>31** NT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92* NT</td>
<td>44 HD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80 HD</td>
<td>44 HD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34 HD</td>
<td>85 HD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 HD</td>
<td>66 HD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>20 HD</td>
</tr>
</tbody>
</table>

NT, not tested.

* Number of samples tested.

** Only E. faecium.

* Significantly different P < 0.05

** Significantly different P < 0.001.