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Title: Influences on antimicrobial resistance: more than bugs and drugs

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1 **Guest Editorial**

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3 **Influences on antimicrobial resistance: More than bugs and drugs**

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5 The interplay of host, agent and environmental factors is often discussed in the context of  
6 infectious disease in animal populations, yet this interaction is less frequently considered in relation to  
7 the occurrence of antimicrobial resistance in such groups. Instead, when discussing antimicrobial  
8 resistance, attention is usually focussed on the relationship between antimicrobial use and resistance.  
9 Whilst antimicrobial use is undoubtedly the primary selective pressure for the emergence and  
10 persistence of antimicrobial resistance, and might be considered as a ‘host’ factor, the role played by  
11 other host, agent and environmental factors in the occurrence of resistance is often overlooked. The  
12 influence of such factors is demonstrated by Dr Karla Cameron-Veas and colleagues, of the Centre de  
13 Recerca en Sanitat Animal (CRESA), Barcelona, Spain, in their paper on excretion of cephalosporin  
14 resistant *Escherichia coli* in pigs treated with antimicrobial agents, published recently in *The*  
15 *Veterinary Journal* (Cameron-Veas et al., 2016).

16

17 In this study, the selective effect of use of antimicrobial agents was demonstrated by an  
18 increase in the numbers of cephalosporin resistant *E. coli* (CR-*E. coli*) in faeces following the use of a  
19 single injection of ceftiofur at a therapeutic dose in piglets already colonised with CR-*E. coli*.  
20 However, treatment with ceftiofur was not a significant predictor of the occurrence of resistance in the  
21 study group as a whole. Instead, farm of origin (an environmental factor) had the greatest influence on  
22 the occurrence of cephalosporin resistance, with the selective pressure of antimicrobial use only  
23 exerting an effect in those herds where CR-*E. coli* was already present. Furthermore, the study  
24 showed that the proportion of animals shedding CR-*E. coli* and the numbers of CR-*E. coli* shed  
25 decreased with animal age (a host factor).

26

27 Resistance to third generation cephalosporins in *E. coli* is mediated by a number of  $\beta$ -  
28 lactamases, the extended spectrum  $\beta$ -lactamase (ESBL) and acquired AmpC-type  $\beta$ -lactamases being

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