Oral antimicrobials increase antimicrobial resistance in *E. coli* from pigs – A systematic review

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Introduction

The administration of antimicrobials to livestock increases the risk for the occurrence of antimicrobial resistance (AMR) in commensal bacteria. Antimicrobial treatments in pig husbandry are commonly applied groupwise via feed or water and thereby ill alongside with healthy animals get treated.
The aim of this systematic literature review was to investigate the effect of orally administered antimicrobials on AMR in *Escherichia coli (E. coli)* from pigs.

Hypotheses

AMR increases after oral antimicrobial treatment vs.

a) before treatment

b) no treatment (control)

Materials and Methods

Scientific studies from electronical data bases were searched according to keyword combinations in their titles and abstracts and were assessed against eligibility criteria during autumn 2012.

Data bases

- Web of Science, PubMed, Scopus
- DIMDI
- ProQuest LLC (dissertations)

Key word combinations

- swine/pig/piglet/farrow/weaner/sows AND
- resistance/susceptibility AND
- antimicrobial/antibiotic/bacterial/aminoglycoside/cephalosporin/ macrolide/penicillin/quinolone/tetracycline/sulphonamide/polypeptide AND
- administration/application/medication/oral/feed/water AND
-E coli

Eligibility criteria

- defined treatment and control (initial value or non-treatment)
- administration and AMR-evaluation of the same anti-microbial group
- presentation of odds ratio or prevalence of resistance

Assessment

Table 1: Evaluation of the effect of antimicrobial treatment on AMR after vs. before or no treatment

odds/prevlance ratio	AMR
>0.1	increase
=0.1	no effect
<0.1	decrease

Results

Eleven studies, describing 36 different trials, fulfilled the inclusion criteria and were finally assessed.
Information on antimicrobials was missing in 4 of the 11 finally selected studies. Ten studies lacked presentation of sample size calculation.

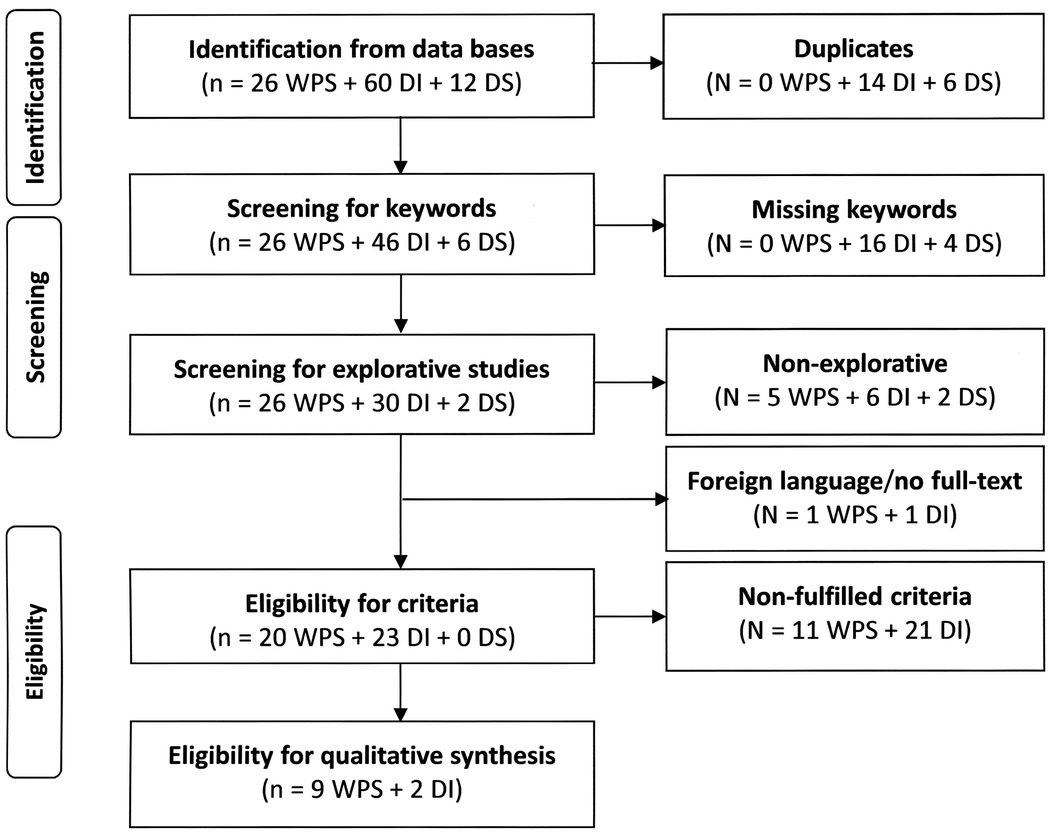

Figure 1: Flow diagram of process and number of articles in the literature review (Web of Science + PubMed + Scopus = WPS; DIMDI = DI; dissertations = DS**)**

Most studies and trials found an increase of AMR:

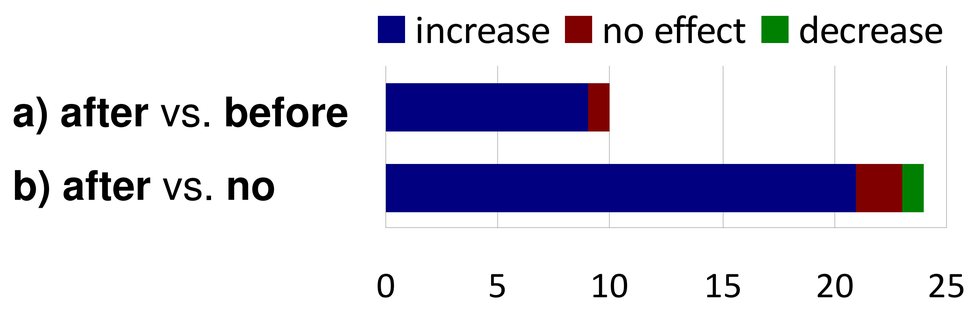

Figure 2: Number of trials out of 36 trials with AMR effect in *E.coli* from pigs after vs. 1a) before 1b) no oral treatment

Conclusion

Oral administration of antimicrobials increases the risk for AMR in *E. coli* from pigs. There is a strong need for good scientific studies to quantify the effects of dosages and longitudinal effects of orally administered antimicrobials on AMR among bacteria from pigs.

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