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# Risk to public health from using of pleuromutilin in pigs

Johanne Ellis-Iversen<sup>1</sup>, Lis Alban<sup>2</sup>, Margit Andreasen<sup>3</sup>, Jan Dahl<sup>2</sup> & Ute Wolff Sönksen<sup>4</sup>

The Danish Authorities provide guidelines to private veterinarians on selection of antimicrobials for use in animals. One of the components in the guidelines is the level of risk posed to public health from antimicrobial resistance formation, when using the drug. The recommendations are based on risk assessments. This poster presents the risk assessment carried out to assess the risk to public health from using pleuromutilin in pigs.

## METHODOLOGY:

Qualitative risk assessment following the OIE framework was carried out: RISK = RELEASE\*EXPOSURE\*CONSEQUENCES. Scale used: Very low, low, medium, high. A guideline developed by European Medical Agency (EMA) was used for inspiration and a risk pathway was developed to ensure a systematic and comprehensive approach to hazard identification and assessment.

## HAZARDS:

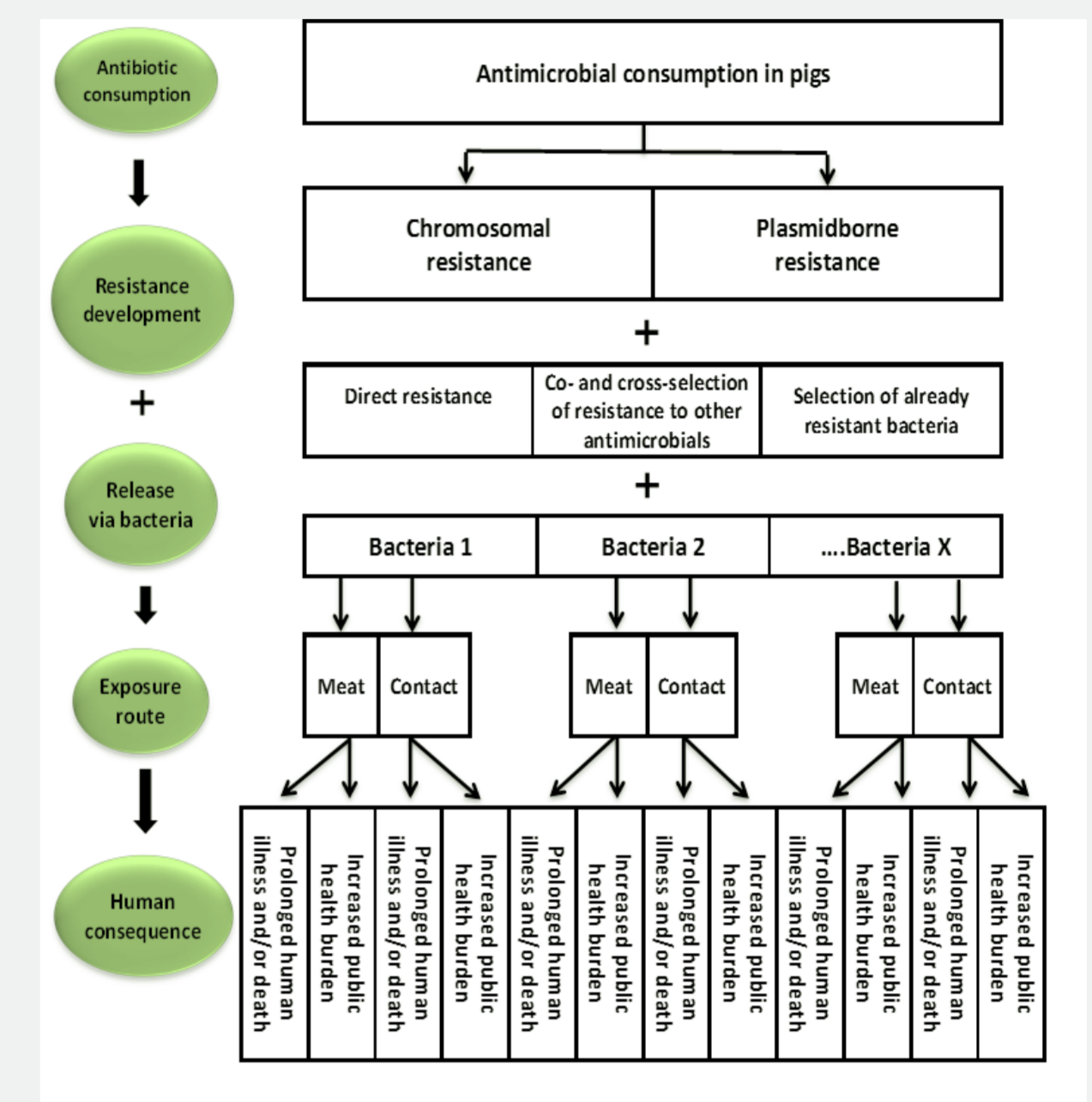
### Pleuromutilin consumption

*In animals:* Pigs use 99.9 % of all pleuromutilin prescribed in Denmark, which amounts to 10 % of total consumption of all antimicrobials in pigs. Only used for oral (group) short-term treatments. Consumption is low in comparison with other European countries.

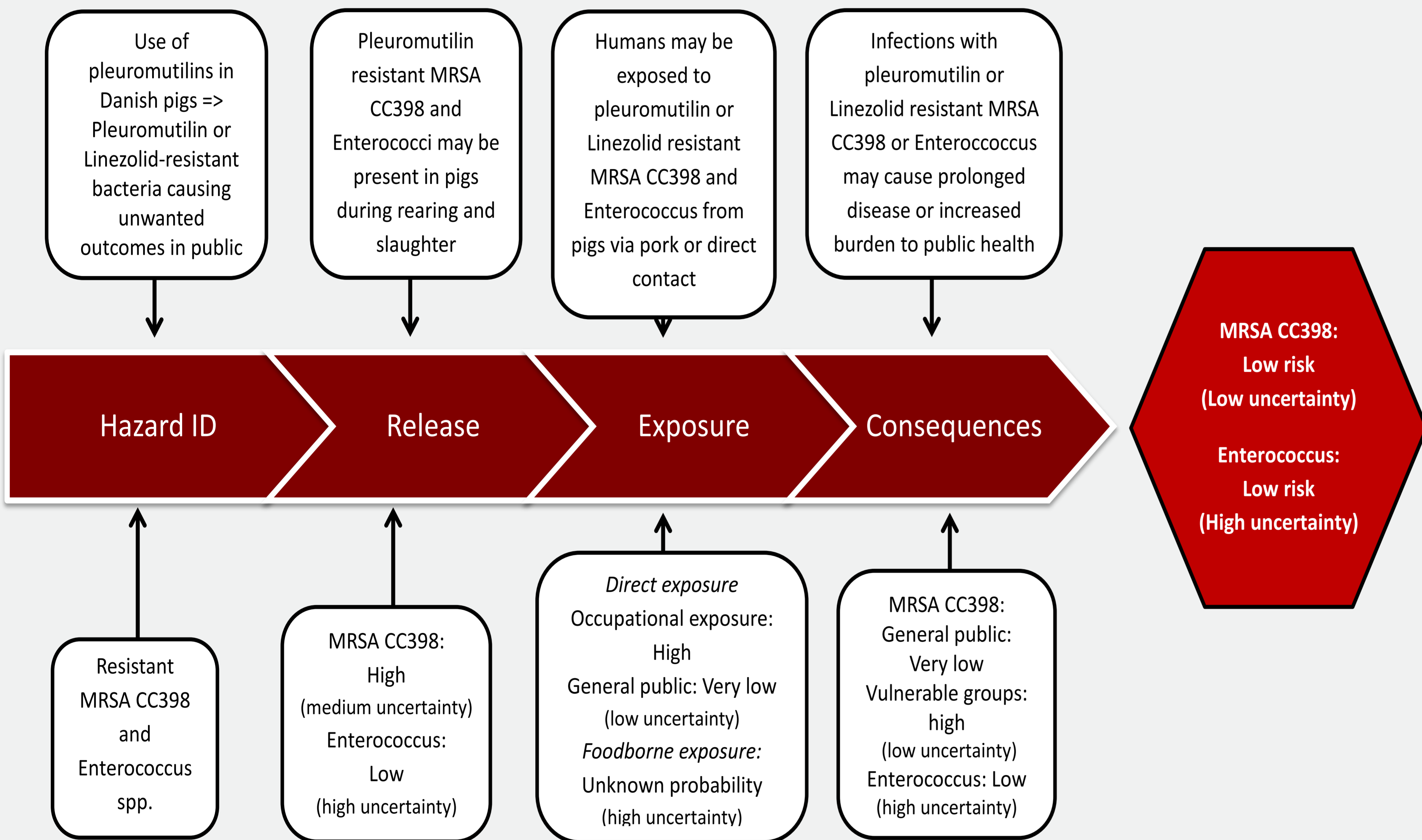
*In humans:* Pleuromutilins are not used for humans in Denmark. Cross-resistance to Linezolid may occur from pleuromutilin usage. Linezolid is a last line drug for highly resistant Gram positive infections and is hardly ever used/needed in Denmark.

### Hazards of relevance:

- Pleuromutilin or Linezolid-resistant MRSA CC398
- Pleuromutilin or Linezolid-resistant Enterococcus



## RESULTS:



## RISK ESTIMATE JUSTIFICATION

### Pleuromutilin or Linezolid Resistant MRSA CC398

#### Risk = Low (low uncertainty) :

- Low prevalence of mobile resistance mechanism.
  - Mobile genes were not (*cfv*) or only very rarely (*vrg*) found in Danish MRSA CC398
- Occupational exposure is main transmission route
  - Only small part of population directly exposed
- Current prevention of MRSA at Danish hospitals include screening of patients with daily contact to pigs on admittance
- Linezolid not currently used in treatment
- Medium human-human transmission potential

### Pleuromutilin or Linezolid Resistant Enterococci:

#### Risk = Low (high uncertainty)

- Low prevalence of resistance
  - No *optrA* or *cfv* reported in pigs isolates
  - No linezolid resistance identified in surveillance data (14 yrs)
- Low probability of spread to humans
- Low virulence
- High ability of acquiring resistance genes
- Limited number of alternative antimicrobials

## DISCUSSION OF RESULTS

- The risk estimate increased from Very Low to Low since 2010

The risk estimate applies to today's situation only and assessment should be repeated if:

- Pleuromutilin consumption increases substantially in pigs
- A new pleuromutilin is developed for use in humans
- Increasing prevalence of mobile, easily transmissible resistance mechanisms
- Public health need for Linezolid increases

### Relevant data gaps

- *C. difficile* was identified as a possible hazard but excluded because of
  - Insufficient knowledge and Linezolid is not used for treatment
- Resistance to pleuromutilin is not monitored in Denmark
- MRSA CC398 resistance to Linezolid is not monitored
- The public health relevance of *Enterococcus spp.* originating from pigs is uncertain

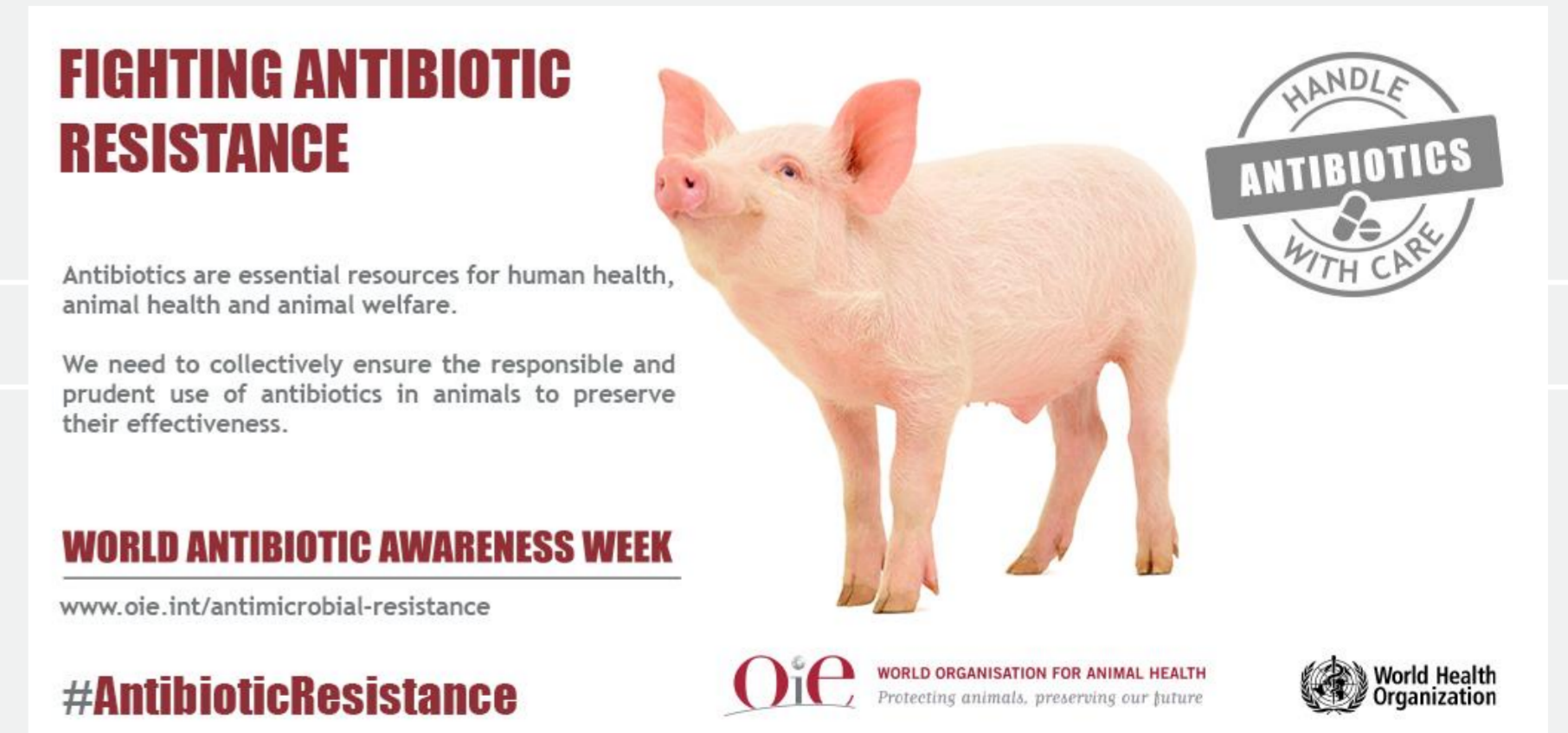
## RECOMMENDATIONS

- Prudent use of antimicrobials is paramount – even low risk antimicrobials
- Guidelines for usage of antimicrobials should be based on risk assessments for the actual situation, where the guidelines apply
- Development of risk assessment frameworks reflecting the biology of antimicrobial resistance is needed

## DISCUSSION OF METHODOLOGY

### Issues with risk assessment of antimicrobial resistance

- Risk (antimicrobial consumption) is not limited to one species or one source
- Current frameworks struggle to handle cross-resistance and co-resistance
- Relevance to public health of resistance genes in the environment is unknown
- Risk question is paramount and must be precise, detailed, comprehensive and agreed
- Antimicrobial consumption levels in the present has long-term effects on resistance
- Surveillance of mobile resistant elements is usually limited to within specific bacterial species



## AFFILIATIONS

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