Antimicrobial use is significant factor accounting for the selection and spread of antimicrobial resistance in commensal and pathogenic bacteria (Burrow et al., 2014;  Horigan et al., 2016). Bacteria are frequently found resistant to many antibiotics to the point that both animal and public health are now seriously challenged (Megha et al., 2014). Exploring the trend possibly associating antimicrobial consumption and resistance is a highly desirable exercise, that was tentatively completed in the present study focused on indicator Escherichia coli from farm animals in Belgium.

**Materials and methods**

**Antimicrobial consumption evaluation**

Total of all veterinary antimicrobials sold in Belgium (2011 to 2015) adjusted with the biomass

**Antimicrobial resistance evaluation**

Isolate E. coli and determine Minimal Inhibitory Concentration (MIC) for:

- Ampicillin (AMP)
- Chloramphenicol (CHL)
- Ciprofloxacin (CIP)
- Colistin (COL)
- Cefoxitin (FOX)
- Gentamicin (GEN)
- Nalidixic acid (NAL)
- Sulfamethoxazole (SMX)
- Cefazolin (TAZ)
- Tetracycline (TET)
- Trimethoprim (TMP)

**Correlation?**

Pearson
Spearman’s rho
Kendall’s tau
Logistic regression

**Results and perspectives**

Results were obtained by Kendall’s model that best suited our aggregated, non-parametric, non-linear data. It is also better resistant to outliers than the Spearman’s model (Coxes and Dehon, 2010). The effect was subsequently quantified via logistic regression.

Interestingly, in spite of continuous decrease in consumption of most antimicrobials and complete prohibition for chloramphenicol in food animals, marked resistance is still observed. Except for ampicillin (p=0.01), the Kendall’s model could not assess a significant correlation (p<0.05) between antimicrobial consumption and resistance during the study period. It should be noticed that positive correlations were found for most antimicrobials, yet borderline significant for colistin, sulfamethoxazole, trimethoprim and tetracycline (p=0.05).

Logistic regression models showed significant positive associations between specific antimicrobial use and resistance, except for gentamicin and chloramphenicol. When considering total use, there is a significant positive association between resistance and total use, except for colistin and gentamicin.

Results should only be considered valid for indicator E.coli, and should not be readily extrapolated to other antimicrobial–bacteria combinations. Consumption can induce direct resistance but resistance can also occur through indirect selection (co-resistance). (Bell et al., 2014; Harada and Arai, 2010) through exposure to disinfectants, antiseptics, preservatives and heavy metals (European Food Safety Authority, 2016; Wales and Davis, 2015).

These analyses were performed on small datasets, though, and care must be taken while making inference.

From 2017 onwards, data concerning resistance and consumption will be collected each year in Belgium following the launching of a mandatory notification and documentation system (SANITEL-MED) allowing the analysis on non-aggregated data.