Fluoroquinolone resistance in *E. coli* in broilers: mapping the spread

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**Objective**

Although restrictions on the use of fluoroquinolones in livestock have been imposed in Belgium since 2016, high levels of fluoroquinolone (FQ) resistance are still found in commensal *E. coli* in broilers. The purpose of this study was to describe the FQ resistance prevalence in *E. coli* and to investigate the role of day-old chicks and the environment in the dynamics of the spread within different flocks.

**Materials and methods**

On 29 broiler farms, antibiotic use was monitored and both water and environmental samples were collected prior to arrival of the chicks. Thirty broilers were sampled per farm on days 0 (before entering the stable), 3 and 35 of the production round. In all samples, total *E. coli* and FQ resistant *E. coli* isolates were quantified by plating on MacConkey agar without and with 0.25 µg/ml enrofloxacin (ECOFF). All isolates were identified using MALDI-TOF MS. A selection of the isolates was submitted for whole genome sequencing to investigate their phylogenetic relatedness using core-genome MLST (cgMLST) analysis, and to detect resistance determinants.

**Results**

Before they entered the stable, the day-old chicks carried FQ resistant *E. coli* in 82.8% of the farms and FQ resistant *E. coli* were found in the environment on boots (10.3%), hygiene locks (24.1%), drinking cups (10.3%), feeding pans (20.7%), and stable floors (24.1%). According to cgMLST, overall there was a large diversity of FQ resistant *E. coli* strains. However, identical FQ resistant isolates were found on day 0 and day 35, suggesting that FQ resistant isolates present in the environment at the start of a production round or in day-old chicks, remained present until slaughter, even though no FQs were used.

**Conclusion**

The continued presence of FQ resistant *E. coli* in Belgian broiler farms is likely the result of both a historical contamination at the farm level and a continuous influx along the production chain.