

# DOES REDUCTION OF ANTIMICROBIAL USE INCREASE MORTALITY IN VEAL CALVES?

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## BACKGROUND & OBJECTIVE

The veal calf industry is widely known for their high level of antimicrobial use (AMU) caused by their sector structure, which contains major risk factors for disease (i.g. purchase, transport, commingling). AMU in Belgian veal calves already reduced drastically between 2007 and 2016 (~46%), but further reduction remains necessary. However, farmers and veterinarians are concerned, that decrease in AMU would increase mortality, and therefore hamper animal welfare. To give notice to this concern, the objective of this study was to explore the relationship between AMU (total and different classes) and mortality. The hypothesis was that a lower AMU would be associated with an increased mortality.

## MATERIALS & METHODS

- Retrospective cohort study
- AMU and mortality data over 2014-2016
- Data from largest veal practice in Belgium
- 76 production cycles
- 29 farms
- 45.001 dairy veal calves
- 2 veal companies

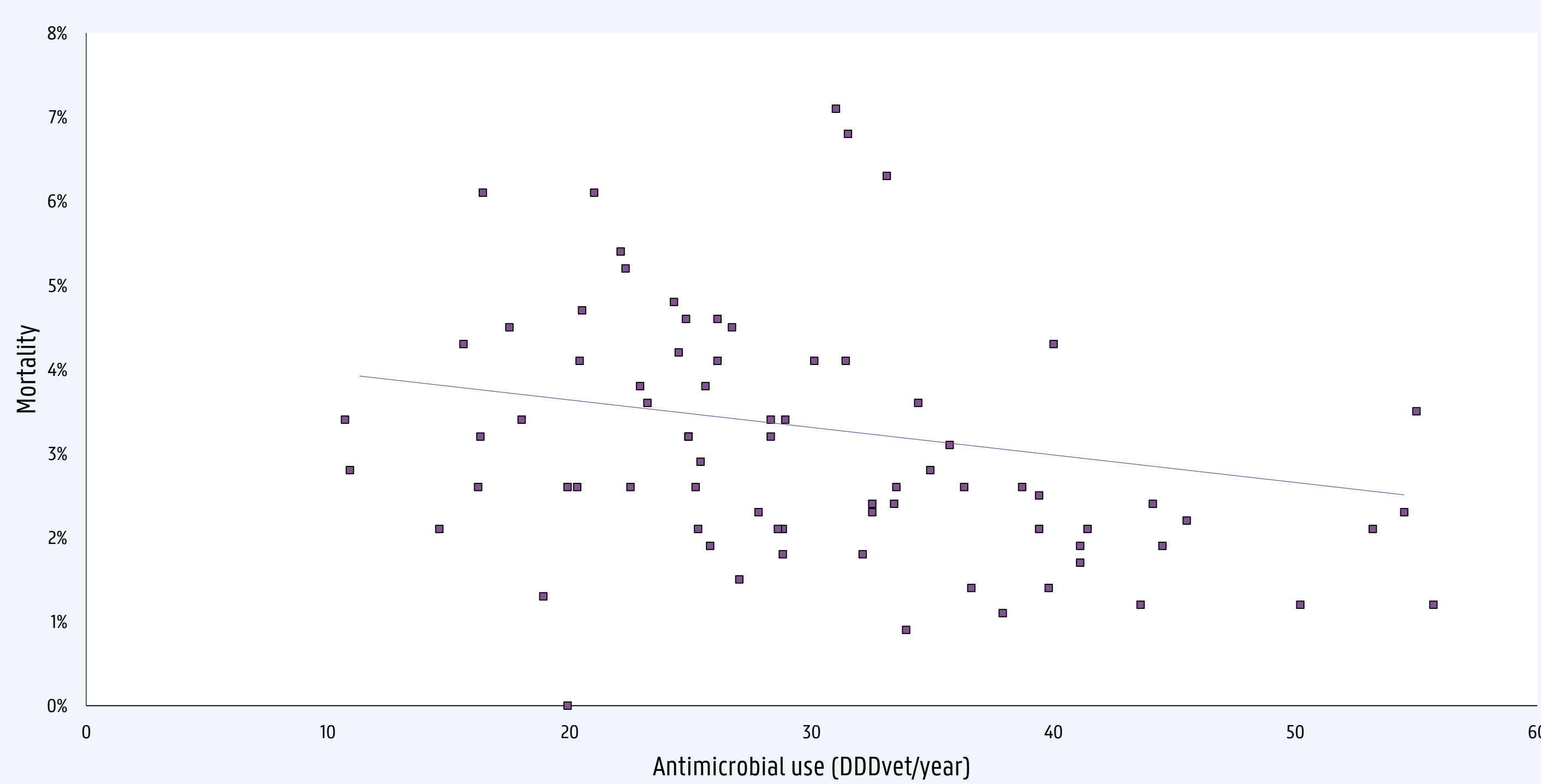


Figure 1. No association between antimicrobial use (DDDvet/year) and mortality (%) in white dairy veal calves (coefficient ( $R^2$ ) = 0.118;  $P$  = 0.34), hereby rejecting the working hypothesis (76 production cycles, 29 veal farms, 2014-2016, Belgium).

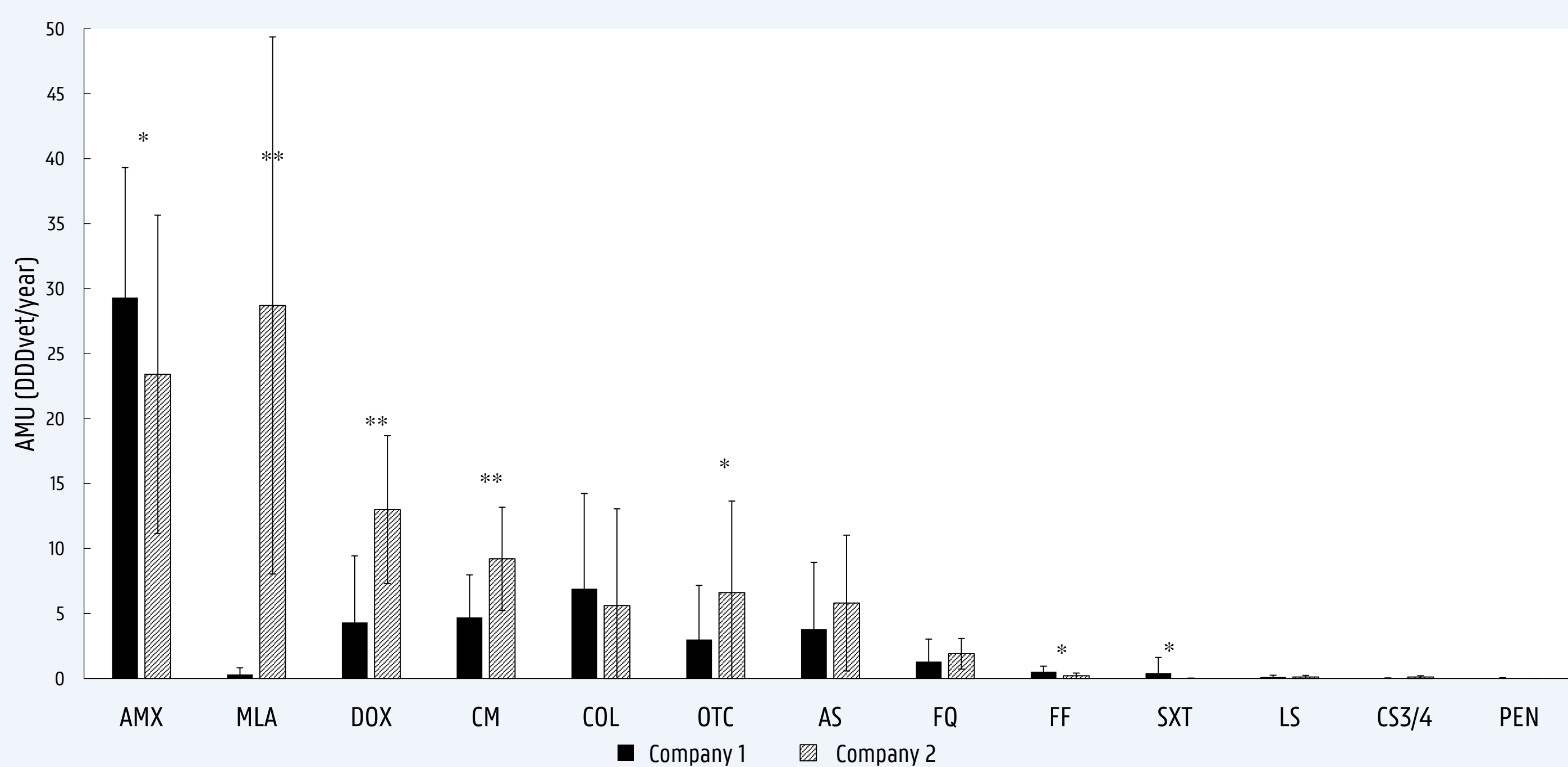


Figure 3. Consumption of different antimicrobial classes (DDDvet/year) stratified by veal company (76 production cycles, 29 farms, 2014-2016, Belgium). AMX: amoxicillin, MLA: long-acting macrolides, DOX: doxycycline, CM: classic macrolides, COL: colistin, OTC: oxytetracycline, AS: aminosides, FQ: fluoroquinolones, FF: florphenicol, SXT: trimethoprim sulfonamides, LS: lincosamides, CS3/4: cephalosporines of 3rd and 4th generation, PEN: penicillin. Antimicrobial use is expressed as DDDvet/year based on live weight. \*  $P$  < 0.05; \*\*  $P$  < 0.001.

## RESULTS

- Huge range in AMU and mortality risk over different farms (Table 1)
- No association between overall AMU and mortality risk (Figure 1)
- Association between AMU and mortality veal companies (Figure 2)
  - Veal company 1: positive association
  - Veal company 2: no association
- Difference in use of antimicrobial classes between veal companies (Figure 3)
- Risk factors for mortality: herd size (Figure 4), use of cephalosporines 3<sup>rd</sup>/4<sup>th</sup> generation
- Protective factor for mortality: use of long-acting macrolides

Table 1. Descriptives of mean antimicrobial use (AMU), mortality risk (%) and herd size (76 production cycles, 29 veal farms, 2014-2016, Belgium)

	Mean	Range	Veal company 1	Veal company 2
AMU (DDDvet/year)	30.1	10.7-55.7	22.4 (± 5.7)	35.9 (± 9.3)
Mortality (%)	3.1	0.0-7.1	4.1 (± 1.4)	2.3 (± 1.4)
Herd size (number of calves)	592	228-1171	731 (± 202)	485 (± 153)

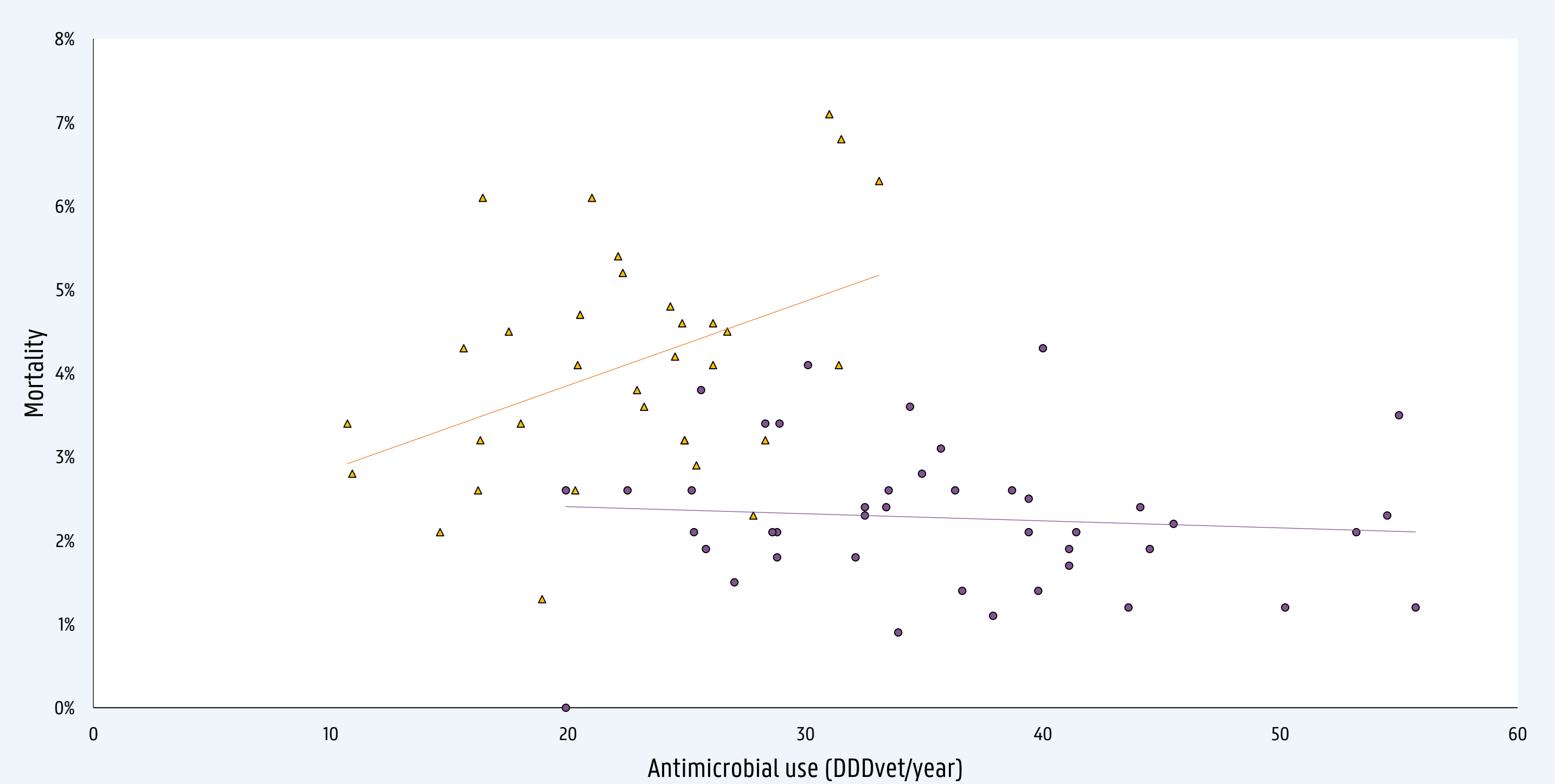


Figure 2. Association between antimicrobial use (DDDvet/year) and mortality (%) in white dairy veal calves (76 production cycles, 29 veal farms, 2014-2016, Belgium). Orange triangles: veal company 1 (coefficient ( $R^2$ ) = 0.176;  $P$  = < 0.05), purple circles: veal company 2 ( $R^2$  = 0.008,  $P$  = 0.57).

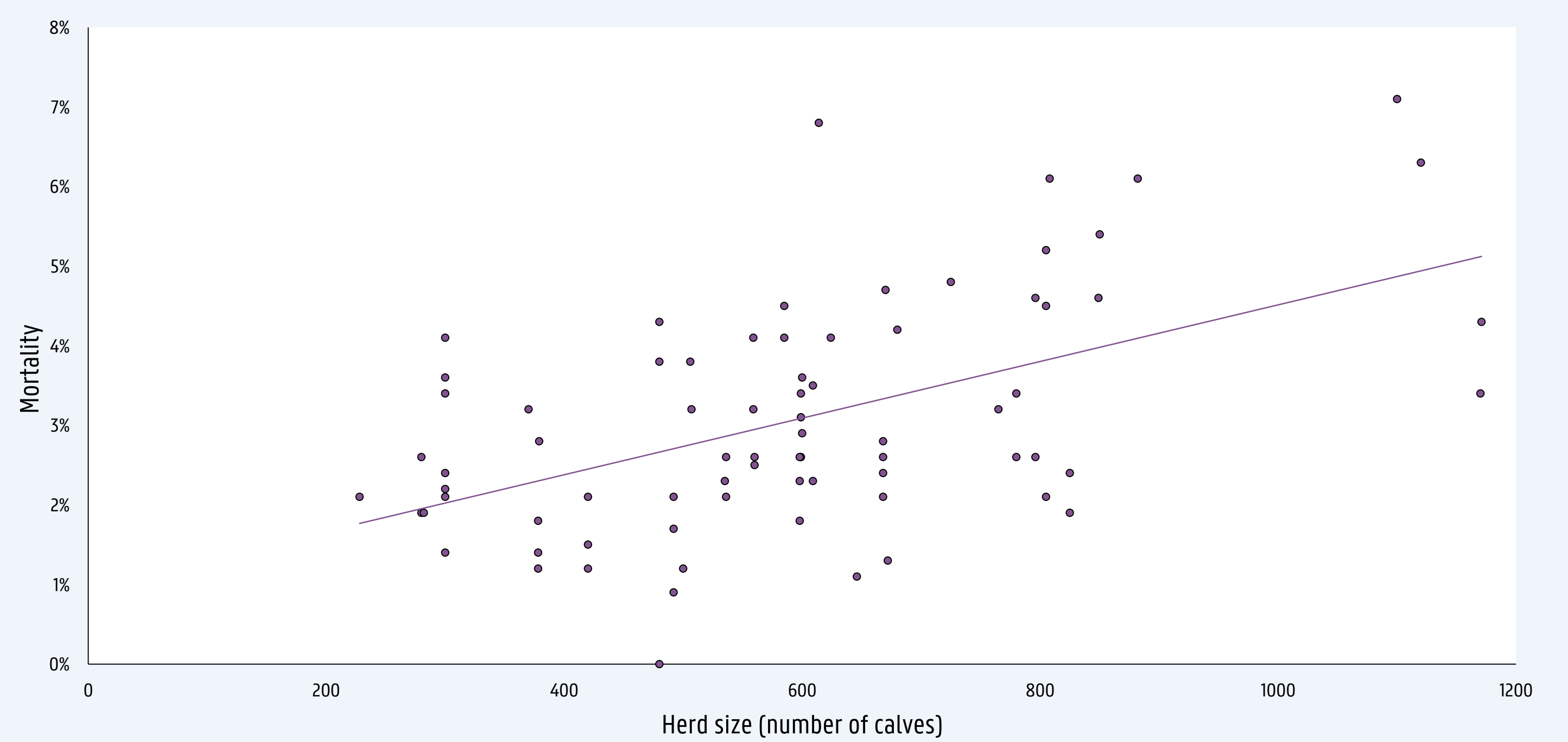


Figure 4. Association between herd size and mortality (%) ( $R^2$  = 0.23.  $P$  < 0.001) in dairy white veal calves (76 production cycles, 29 farms, 2014-2016, Belgium).

## CONCLUSION

These data suggest that low levels of AMU in the veal industry do not need to be associated with problems of increased mortality, and that a further reduction in AMU should be attempted. The mortality risk of this population is the lowest reported for the veal calf industry system worldwide. Identification of herd size, use of cephalosporins and long-acting macrolides as risk/protective factors for mortality can aid the sector towards a further reduction in mortality.