# Analysis of antimicrobial use in pig farms in Catalonia

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## Introduction

Catalonia is one of the European areas with the highest pig densities and the first one in Spain. In pig production, antimicrobials are commonly used to treat important bacterial infections or as a preventive measure against primary or secondary bacterial infections, often related to respiratory or digestive disorders. Antibiotics in pigs are mainly administered by feed or drinking water.

## Objectives

- To evaluate prophylactic and therapeutic antimicrobial treatments in different pig farms in Catalonia.
- To analyse if the principle of "prudent and rational use of antimicrobials" is being followed and if any strategy can be modified in order to reduce antimicrobial use in pig production.

## Material and Methods

**10 pig farms** located in Lleida and Barcelona were analysed: three farrow-to-finish farms, one S1, three S1+S2 and three S3. A **survey** was administered to the pig farmers and to veterinarians by way of personal interview. The survey contains questions that can be grouped into 5 parts:

1. General data on the farm.
2. Biosecurity measures related to farm management and facilities.
3. Production parameters, sanitary conditions and feed.
4. Oral antimicrobial therapy including indications and production stages.
5. Other aspects of treatments.

Frequencies of data collection were conducted, per number of treatments and per number of farms. A statistical analysis was not performed due to a reduced number of samples (n=10).

## Conclusions

1. Pig farms in Catalonia often do not accomplish the principle of prudent and rational use of antimicrobials.
2. Preventing infections in the first instance is the best way to achieve a reduction and minimise the need to use antimicrobials.
3. Antibiotic resistance in bacteria associated with pigs also has an impact on human health due to the transfer of resistant bacteria via food chain.

## Results and Discussion

| Antimicrobial Classes | Sows | Growing stage | Finishing stage | Total farms |
|---|---|---|---|---|
| Tetracyclines | 0 | 100.0 (10) | 66.7 (4) | 90.0 (9) |
| β-lactams | 0 | 83.3 (5) | 50.0 (3) | 80.0 (8) |
| Macrolides | 57.1 (4) | 0 | 33.3 (2) | 60.0 (6) |
| Polymyxins | 0 | 33.3 (2) | 50.0 (3) | 50.0 (5) |
| Aminoglycosides | 0 | 50.0 (3) | 0 | 30.0 (3) |
| Sulphonamides-trimethoprim | 0 | 0 | 50.0 (3) | 30.0 (3) |
| Lincosamides | 0 | 50.0 (3) | 0 | 30.0 (3) |
| Phenicols | 0 | 33.3 (2) | 0 | 20.0 (2) |
| Pleuromutilins | 0 | 16.7 (1) | 0 | 10.0 (1) |
| Fluoroquinolones | 0 | 16.7 (1) | 0 | 10.0 (1) |
| Zinc oxide | 0 | 83.3 (5) | 0 | 50.0 (5) |

**Table 1.** Antimicrobial Classes and Zinc oxide administered in 10 pig farms in Catalonia, per production stage and in total: percentage and (number of farms).

The most used antimicrobial classes were Tetracyclines (mainly doxycycline), β-lactams (amoxicillin), macrolides (tylosin) and polymyxins (colistin).

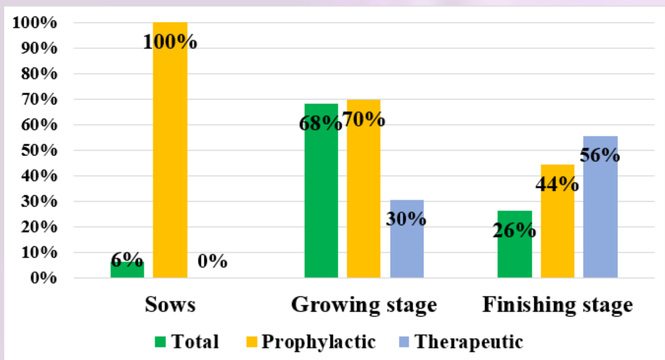


**Figure 1.** Frequency of the use of antimicrobial prophylaxis or treatment in 10 pig farms in Catalonia per production stage**.**

**Table 2.** Frequency of the use of antimicrobial prophylaxis or treatment by route of administration (feed or drinking water) and per production stage in 10 pig farms in Catalonia: percentage and (number of farms).

| | Sows | Growing stage | Finishing stage | Total farms |
|---|---|---|---|---|
| **Prophylactic in-feed** | 57.1 (4) | 83.3 (5) | 66.7 (4) | 80.0 (8) |
| **Therapeutic in-water** | 0 | 83.3 (5) | 66.7 (4) | 80.0 (8) |
| **Therapeutic in-feed** | 0 | 16.7 (1) | 0 | 10.0 (1) |

**Table 3.** Indications for antimicrobial agents prescribed in 10 pig farms in Catalonia, per growing and finishing stage and in total: percentage and (number of farms).

| Indication and Antimicrobial Classes | Growing stage | Finishing stage | Total farms |
|---|---|---|---|
| Respiratory disorders | 83.3 (5) | 66.7 (4) | 100.0 (10) |
| Tetracyclines | 83.3 (5) | 66.7 (4) | 90.0 (9) |
| Macrolides | 0 | 33.3 (2) | 60.0 (6) |
| β-lactams | 83.3 (5) | 0 | 50.0 (5) |
| Sulphonamides-trimethoprim | 0 | 50.0 (3) | 30.0 (3) |
| Phenicols | 33.3 (2) | 0 | 20.0 (2) |
| Digestive disorders | 83.3 (5) | 50.0 (3) | 80.0 (8) |
| Polymyxins | 33.3 (2) | 50.0 (3) | 50.0 (5) |
| Aminoglycosides | 50.0 (3) | 0 | 30.0 (3) |
| Lincosamides | 50.0 (3) | 0 | 30.0 (3) |
| Fluoroquinolones | 16.7 (1) | 0 | 10.0 (1) |
| Meningitis and/or arthritis | 50.0 (3) | 50.0 (3) | 60.0 (6) |
| β-lactams | 50.0 (3) | 50.0 (3) | 60.0 (6) |

The majority of farms administered broad-spectrum drugs for both prophylactic and therapeutic treatments.

In all cases, the recommended dosages by the summary of product characteristics (SPC) were followed. However, the length of some prophylactic treatments was longer than the one specified in the SPC.

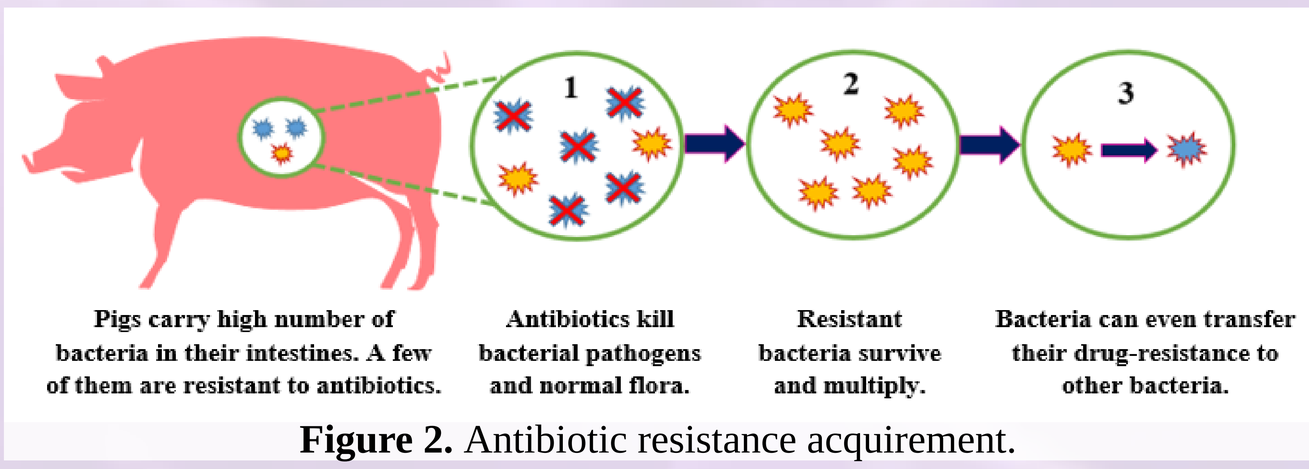


**Figure 2.** Antibiotic resistance acquirement.