

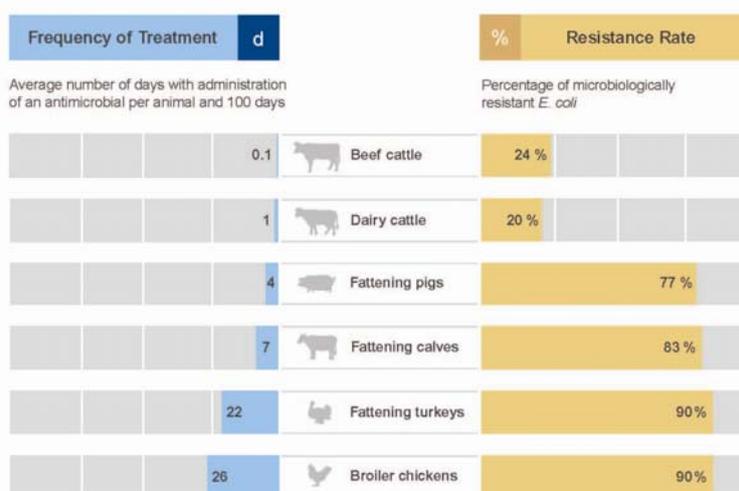
Connection between Frequency of Treatment and Resistance to Antibiotics

BfR information of 11 November 2013

Every use of antimicrobial agents can lead to a selection of resistant bacteria. The extent to which this actually happens depends on many factors, some of which are not yet known or could not be fully clarified up to now. As a tendency it can be recognised, however, that resistances to antibiotics are observed more often in animal species which are frequently treated with antibiotics. The following chart compares the observed frequency of treatment with the observed rate of microbiologically resistant *E. coli* in various livestock groups in Germany.

Figure 1: Comparison of the observed frequency of treatment with antibiotics and the observed rate of microbiologically resistant *E. coli* in various livestock groups in Germany

Antibiotics in Livestock Farming: Frequency of treatment and resistance rates



Data Source, Frequency of Treatment

VetCAB – Veterinary Consumption of Antibiotics (pilot study 2011).

Fattening calves, broiler turkeys: Lower Saxony Ministry of Food, Agriculture, Consumer Protection and Rural Development and the Lower Saxony State Office for Consumer Protection and Food Safety (2011)

Data Source, Resistance

BfR (mean values of the results of the years 2009–2012)

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1 Frequency of Treatment

The data from two studies were used to illustrate the frequency of treatment. The data from the pilot study VetCAB (Veterinary Consumption of Antibiotics for the year 2011 <http://www.vetcab.de/>) were supplemented to include results for other animal species taken from a study in Lower Saxony conducted by the Lower Saxony Ministry of Food, Agriculture, Consumer Protection and Rural Development and the Lower Saxony State Office for Consumer Protection and Food Safety (2011) (www.ml.niedersachsen.de).

In these studies, the use of antibiotics in a group of livestock herds/flocks documented by a veterinarian was recorded and placed in relation to the animals kept in these groups. The

frequency of treatment indicates the average number of days on which every animal in a population was treated with an active antimicrobial substance within a specified period. As the frequency of treatment always relates to individual active substances and the corresponding number of active substances in multi-ingredient products is taken into account, the use of a product containing two active substances is taken into consideration in the same way as the use of one active substance on 2 days.

The results of the two studies show that antimicrobials are used with different frequencies among the various species and production types (e.g. laying hens or broilers). The number of days on which antibiotics were administered was set in relation to a period of 100 days for all groups of animals. It was not taken into account whether the same animal was kept in the herd/flock over the entire period or whether different animals were kept within the time period.

2 Resistances to Antibiotics

The data from representative resistance monitoring with commensal *E. coli*, which was conducted at the Federal Institute for Risk Assessment (BfR) in cooperation with the federal states, were used to illustrate resistance rates. *E. coli* is regarded here as an indicator of the resistance situation.

The results show that different resistance rates can be observed among the different species and production types. When compiling these results, germs were classed as resistant if microbiological resistance, i.e. a deviation from the completely susceptible bacterial population, to at least one of the seven tested active substance groups (aminoglycosides, amphenicols, cephalosporins, quinolones, aminopenicillins, tetracyclines and folic acid synthesis inhibitors) was found.