The real risk of antibiotic resistance is minimal

Recently published scientific research shows that use of two macrolide animal antibiotics, tylosin and tilmicosin, does not adversely affect the safety of the food supply. The findings were reported in the peer reviewed publication, the Journal of Food Protection.

"We found that there is an extremely low risk of a person eating beef, poultry or pork and acquiring a resistant infection that is untreatable with a human macrolide antibiotic," lead author H. Scott Hurd, DVM, PhD of Hurd-Health Consulting of Roland, Iowa, USA told International Poultry Production.

The study assessed two bacteria, which are known to have resistance to certain antibiotics, and developed a mathematical equation to determine if using these two macrolide antibiotics could lead to foodborne infections in humans that are difficult to treat.

The results of the study, which was conducted by Dr Hurd and a number of independent medical, food safety and veterinary experts, show that the risk of acquiring a resistant campylobacter infection from beef, pork or poultry that results in a difficult to treat foodborne illness is less than one in 10 million. For resistant Enterococci faecium, the chances are even lower – less than one in three billion.

"Given these results, and the fact that human macrolide antibiotics are rarely used to treat people who have foodborne infections, macrolides certainly are among the safest for use in food animal production," Ronald N. Jones, MD of The Jones Group/ JMI Labs of North Liberty, Iowa and one of the co-authors of the article, told us.

Risk (high to low)	Yearly probability
Being injured at work	1 in 49
Dying from heart disease	1 in 384
Illness or death from pneumonia	1 in 4,300
Illness or death from the flu	1 in 130,000
Dying from choking	1 in 200,000
Acquiring a foodborne infection from fruit or vegetables	1 in 375,000
Being struck by lightning	1 in 550,000
Illness or death from chicken pox	1 in 4.4 million
Dying from a bee sting	1 in 6 million
Acquiring resistant campylobacter from macrolide-treated poultry which results in treatment failure	<1 in 14 million
Dying from a dog bite	1 in 18 million
Acquiring resistant campylobacter from macrolide-treated swine which results in treatment failure	<1 in 53 million
Acquiring resistant campylobacter from macrolide-treated beef which results in treatment failure	<1 in 236 million
Acquiring resistant E. faecium from macrolide-treated poultry which results in treatment failure	<1 in 3,000 million
Acquiring resistant E. faecium from macrolide-treated swine which results in treatment failure	<1 in 21,000 million
Acquiring resistant E. faecium from macrolide-treated beef which results in treatment failure	<1 in 29,000 million

Table 1. Risk comparison.

"Antibiotic risks associated with other infectious diseases, such as pneumonia or bronchitis, are infinitely higher than for macrolide resistant bacteria that could be acquired from food," he said.

Dr Jones said that antibiotic resistance efforts should focus on decreasing misuse of human antibiotics, such as prescribing them for colds and other viral infections that do not respond to treatment with antibiotics.

Pat James, president of Elanco Animal Health, which assembled the expert panel noted, "We are extremely pleased that the multi-disciplinary expert group did a thorough risk assessment and found that tilmicosin and tylosin can be safely used in pork, poultry and beef production.

"Elanco is committed to bringing forth the best science to assure all stakeholders that antibiotics can remain a very important tool for ensuring the health and welfare of food animals."

The two macrolide antibiotics included in the study, tylosin and tilmicosin, are used in poultry to treat, prevent and control diseases and for health maintenance.

The study was conducted using US Food and Drug Administration (FDA) risk assessment guidelines. The study authors analysed the potential for a person to either acquire macrolide resistant campylobacter, a foodborne bacterium, or macrolide resistant E. faecium, which is thought to carry antibiotic resistance genes, resulting in illness that does not respond to treatment by human antibiotics.

Treatment failure was defined as additional duration of illness, progression to a more serious case of illness, or in the worse case scenario, mortality.

"Given the low probability of treatment failure as a result of eating meat or poultry from animals treated with these macrolide antibiotics, we concluded that using tylosin and tilmicosin in food animal production has a very low risk to human health," Dr Hurd told us.

The results were:

- **Poultry** – the probability of a resistant infection from poultry resulting in treatment failure is less than one case out of 14 million people per year for campylobacter, and less than one in three billion people per year for E. faecium.
- **Beef** – the probability of a resistant infection from beef resulting in treatment failure is less than one case in 236 million per year for resistant campylobacter and less than one case in 29 billion per year for resistant E. faecium.
- **Pork** – the probability of acquiring a resistant infection from pork resulting in treatment failure is less than one out of 53 million people per year for resistant campylobacter and less than one out of 21 billion people per year for E. faecium. ■