

## **Advice 14-2017 of the Scientific Committee of the FASFC on prevalence and control of carbapenem resistance in animals**

### **Background & Terms of reference**

Carbapenems are a group of antibiotics which are of great importance for the treatment of infections caused by Gram-negative bacteria in human medicine, in particular for Enterobacteriaceae producing broad spectrum  $\beta$ -lactamases. Carbapenem resistant (CPR) bacteria are resistant to nearly all  $\beta$ -lactam antibiotics. Moreover, carbapenem resistance is frequently occurring in multi-resistant bacteria which are also resistant against other critically important antibiotics.

Despite the fact that carbapenem antibiotics are not registered for use in veterinary medicine, this (self-tasking) opinion wishes to draw attention to the fact that carbapenem resistance is already sporadically detected in animals (companion animals as well as livestock) without an obvious cause. In case CPR bacteria are part of the microbiota (microflora) of animals, such bacteria or their resistance genes might be transferred to humans through direct contact or through the food chain and might cause therapy failure in humans.

To reduce the risk for animals and humans, the Comity wishes to draw the attention to the importance of the surveillance of CPR bacteria in animals. It formulates also some propositions for control measures in the hope of putting, as fast as possible, a stop of the spread of CPR bacteria in case of their emergence in the food chain.

### **Methodology**

This opinion is based on data available in scientific literature, on the results of current surveillance programs for CPR bacteria in Belgium and on expert opinion.

### **Prevalence of carbapenem resistant (CPR) bacteria in animals, animal products and in the environment**

In non-European countries, there are growing indications that CPR bacteria are widely spread in animals. Moreover, it has recently been proven that in some countries they also occur in animals in intensive animal production systems.

In Europe, the situation is different until further notice and CPR bacteria are sporadically isolated in animals. In the opinion, a literature overview concerning the occurrence of CPR bacteria in animals, including companion animals, in the EU is given. In Belgium, only one case of CPR bacteria in live animals (horses) has been reported so far. In addition, one VIM-1 carbapenemase-producing *Escherichia (E.) coli* strain has been detected in pork at the end of 2015. The source of this particular strain could however not be identified.

Furthermore, there is growing evidence of environmental contamination with CPR bacteria. These bacteria are probably of human origin because they show a strong similarity with human clinical isolates and because they are frequently isolated near hospitals and nursing homes. The opinion gives a short literature review on some cases of detection of CPR bacteria in the environment in the EU.

### **Possible introduction routes and selection of carbapenem resistance in the animal population**

Bacteria with acquired carbapenem resistance could end up in the animal population and further spread in three different ways:

- via the selection of resistant strains in animals as a consequence of the use of carbapenem antibiotics in these animals,
- via transfer of resistant strains from humans to animals through direct contact between animals and humans,

- via introduction of carbapenem resistance in the animal population through contamination of the environment (mainly of human origin).

After introduction of CPR bacteria from human origin or from the environment, these resistant strains could consequently be selected through co- and cross-resistance as a consequence of the use of other antibiotics which are frequently used in animals (e.g.  $\beta$ -lactam antibiotics).

If the animal population would become a reservoir for CPR bacteria, these bacteria could again be transferred to humans via direct or indirect contact (through the environment).

### **Recommendations for the prevention of introduction and spread of CPR bacteria**

Regarding the prevention of introduction it is strongly recommended to install a general prohibition for the use of carbapenem antibiotics in animals, not only in food producing animals (which is already the case) but also in companion animals. In addition, a policy of general restricted use of antibiotics is of great importance to prevent co- and cross-selection as much as possible. Furthermore, it is important to sensitize animal owners and caretakers which are carriers of CPR bacteria or which are in contact with human risk patients and/or travelers to endemic CPR areas about the possible risk they form to the introduction of CPR bacteria in the animal population.

Regarding the surveillance it is recommended to maintain the current screening for carbapenem resistance during the monitoring for antimicrobial resistance in indicator bacteria by the use of selective media in animals as well as animal products. In addition, it is recommended to stimulate the notification of possible CPR bacteria by the diagnostic laboratories or to perform a yearly survey.

### **Recommended measures in case CPR bacteria are found in animals or animal products**

Depending on the situation (CPR positive food producing animals, companion animals or animal products) a number of measures are proposed whose main objective is to prevent the further spreading and selection of the found CPR bacteria: enforced biosecurity, restrictive use of antibiotics, prohibition of animal movements, sampling and sensitization of owners and caretakers,...

In addition, it is of great importance to start an epidemiologic inquiry (tracing) to find the origin of the infection. If the risk of further spread is high according to a risk assessment, the slaughter of positive animals should be a possible mitigation strategy.

### **Conclusion**

In non-European countries, there are growing indications that CPR bacteria are generally occurring amongst animals. In Belgium, and by extension in Europe, the prevalence in animals is low until further notice. Nevertheless, CPR bacteria are sporadically isolated in animals and animal products across different EU member states.

In case CPR bacteria are part of the microbiota (microflora) of animals, such bacteria or their resistance genes might be transferred to humans through direct contact or through the food chain and might cause therapy failure in humans. Because carbapenem antibiotics are of great importance to treat infections caused by multi-resistant Gram-negative bacteria in human medicine, the Comity wishes to draw attention on the importance of the monitoring of CPR bacteria in animals. This monitoring exists already and it is recommended to continue it.

To prevent the introduction of CPR bacteria in animals, a number of recommendations are formulated. Finally, a number of measures are proposed in case CPR bacteria might be found in animals or animal products.

The full text is available on this website in dutch and in french.