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## **The importance of disinfectants in an age of advancing antibiotic resistance and global spreading of dangerous virus diseases**

### **1. Background**

Due to emerging antibiotic resistances and epidemics of dangerous viruses or their introduction, disinfectants have been gaining an ever more important role. But it emerges that the provisions of the Biocidal Products Regulation and the ensuing conditions for the evaluation and approval of biocide products, which include disinfectants, mainly refer to hazards for the environment and staff – without sufficiently taking into account the significance of disinfectants for health protection. For reasons of environmental and staff protection, these conditions are so restrictive that rising numbers of established active substances with a reliable disinfectant effect are banned from medical care and will no longer be available. Such restrictions do not or not appropriately consider the aspect of public and individual health protection, while aspects of environmental and staff protection are over-emphasized. Therefore, it is necessary to not only examine the “abstract” hazard but also the resulting realistic risk and to then adequately weigh the risks against the benefits (as is done for medicinal products). In particular, against the backdrop of the advancing development of antibiotic resistances and the new challenges from globally spreading virus infections, a higher standing must be ensured for the health protection aspect. In this setting, disinfection has gained a new level of importance for health protection which should be reflected also in regulation under the Biocidal Products Regulation.

### **2. The situation regarding antibiotic resistance**

In recent years, there has been a strong increase worldwide in antibiotic-resistant pathogens. In the USA alone, approx. 2 million persons are annually infected with them; 23,000 persons die in direct consequence of these infections, and many more lose their lives due to

complications attributable to infections with such pathogens. Antibiotic-resistant pathogens contribute to lower chances of healing, higher health costs and the necessary treatment with substances of higher toxicity. Irrespective of major progress in research into the effects of antibiotics, no new antibiotic agents have recently been developed; this applies particularly for agents against gram-negative bacteria. According to the ECDC (European Center for Disease Prevention and Control), no newly developed antibiotics are likely to be available before 2020; in particular, no new antibiotic agents can be expected in the gram-negative range.

The effects of the above are dramatic, both regarding the consequences for patient protection and the economic impacts. According to a new study by the British government, a considerable increase in morbidity and mortality must be expected globally. The economic impacts are immense too. In 2009 around 10.7 billion US dollars were spent in the USA on antibiotic therapy, including 6.5 billion dollars for out-patients. Costs of approx. 20 billion dollars due to the development of antibiotic resistances are quoted for the US economy. Meanwhile, the significance in the field of public health has been realised; inter alia, the issue was on the agenda of the G7 summit in Elmau in 2015. It was also addressed by the 71st General Assembly of the United Nations (UN) in September 2016 where a health topic was covered for the fourth time with the threat of antibiotic resistant pathogens and up to 700,000 deaths/year – after HIV, non-communicable diseases and Ebola.

In view of the anticipated high costs, new developments of more antibiotic agents cannot be seen as a realistic option for the next decade. It remains questionable whether there will be noteworthy developments of new antibiotics at all.

In the described situation, the use of disinfection methods is of paramount importance, as the characteristic of antibiotic resistance usually does not come with an increased resistance to disinfection processes. Quite the contrary, partly there is even a higher sensitivity.

This is why the existing evaluation practice for disinfectants and disinfection methods should not focus predominantly on a potential harmful effect on the environment or staff protection. Instead, the evaluation should equally appreciate the contribution of disinfectants to an effective control of the spreading of multi-resistant pathogens (MRPs). Obviously, staff protection needs to be ensured by established measures when carrying out disinfection processes, e.g. wearing gloves, ventilation etc. Environmental protection aspects have to be given consideration too, but with the correct choice and application the effect of disinfectant active substances on the environment is apparently overrated.

### **3. New emerging and re-emerging viruses**

In the last decade, viruses quite often cross species barriers or appear in locations not previously seen such as Ebola, MERS, Zika virus or even avian flu (H5N1, H7N9). The fast global spreading of these virus outbreaks raise the question how to prevent and respond quickly to emerging infectious disease threats. When facing an emerging infectious disease outbreak, the reaction time to control the spread is crucial. Therapeutics and vaccines will take time to be developed and to scale up production.

Particularly hand hygiene and surface disinfection are infection control procedures with clearly proven efficacy and remains the cornerstone of efforts to reduce the spread of

infections The challenge becomes even greater when faced with a wholly new disease such as SARS, MERS and Nipah virus infection, which are just three examples of diseases that have emerged at the human-animal interface in the last two decades. However hand hygiene and appropriate surface-disinfection can be adopted almost immediately by the public and healthcare workers to limit the spread by reducing the transmission. According to WHO guidelines, hand hygiene is the most important infection prevention and control measure against Ebola viruses. Infectious agents may persist on surfaces for several days or even months and can be transferred directly from contaminated surfaces to susceptible patients. Therefore, the disinfection of surfaces frequently touched by patients and staff such as door handles, faucets, and railings plays an important role in the prevention and control of outbreaks in healthcare settings. Using disinfectant products with proven efficacy is an essential part to the bundle of measure necessary to prevent spread of infectious diseases.

#### **4. Conclusion**

It is deemed urgently necessary to give more focus on the benefits of disinfectants for health protection, also in the political arena. It must be prevented that yet more established active substances for effective disinfection – controlling large numbers of various pathogens – become unavailable for use exclusively for reasons of environmental and staff protection.

- The unbalanced criteria for the evaluation of disinfectant active substances need to be reconsidered urgently, attaching much more importance to health protection aspects.
- In the interest of public health protection, a further reduction or restriction of disinfectant active substances can no longer be accepted.