Why chemical disinfectants are contributing to 'biocide resistance'

The World Health Organisation has issued a stark warning that superbugs— drug-resistant bacteria and pathogens—pose as one of the most dangerous and imminent threats to human health across the world.

The announcement follows an earlier proclamation from WHO. In 2014 WHO published its first report on antimicrobial resistance (or 'biocide resistance'), claiming "this serious threat is no longer a prediction for the future, it is happening right now in every region of the world."

The European Food Safety Authority and European Centre for Disease Prevention and Control has estimated that superbugs kill 25,000 Europeans each year. While most of these deaths occur among older patients in hospitals or nursing homes, or patients whose immune systems are suppressed, some are among the young and healthy. A new study of paediatric hospitals found that drug-resistant infections in children have increased sevenfold in eight years.

With growing evidence that shows a clear link between antimicrobial resistance and the negligent use of biocidal chemical cleaners, the use of these products within the facilities management shows no signs of slowing down.

And, with increasing concerns about the rise of 'superbugs' from the public, now more than ever contractors within the facilities management industry need to recognise the risk of biocide resistance and change their reliance on chemical biocidal cleaners.

Reasons for biocide resistance

Chemical disinfectants have been used for decades to control bacteria, but human error in the application of biocidal products can result in the development of immune organisms.

One of the key reasons for this problem is over dilution of chemical disinfectants by contractors.

If too much water is applied to disinfectant concentrates the amount of biocidal substance present can be reduced to a level that is no longer lethal to the targeted bacterial cell. This leaves a small proportion of the targeted bacteria remaining that develop immunity and go on to pass it to their progeny. The result is the emergence of potentially harmful bacterial strains with reduced biocide susceptibility.

Another cause of biocidal resistance is the overuse of chemical disinfectants. Indiscriminate use of biocidal products can result in low level residues of biocides remaining on the surface after cleaning.

The biocide residues come into long-term contact with the targeted bacteria and because the residues contain sub-lethal concentrations of the biocidal product, the targeted bacteria are becoming more resilient against the products used to treat them. This drastically weakens biocide efficacy and puts end-users at risk.

Why traditional chemical disinfectants pose a risk

Chemical disinfectants often contain antimicrobial additives that are effective against a broad spectrum of bacteria, fungi and viruses such as Triclosan, Quaternary Ammonia Compounds (QACs) and metal ions (e.g. silver and copper).

A 2012 study revealed that exposing E. coli bacteria to increasing concentrations of three different types of QACs resulted in E. coli populations that had become resistant to several families of antibiotics. The authors warn that use of low dosage use of QACs "may lead to the emergence of antibiotic-resistant bacteria and may represent a public health risk."

Antimicrobial resistance to silver-based additives has also recently been reported in strains of Salmonella typhimurium, E. coli, and other bacteria, after exposure to antimicrobial silver in wound dressings.

What is being done to tackle the issue of biocidal resistance in the marketplace?

In 2015, the EU Biocidal Products Regulations (BPR) announced changes that only biocidal products containing 'active substances' supplied by an approved supplier on the list can be legally placed on the EU market. The regulations were put in place to ensure the safety of biocides on the European market and to improve the assessment of the substances and products permitted for marketing in biocides.

To be an approved supplier, the EU Biocidal Product Regulations (BPRs) requires detailed information on the risk of resistance development in organisms targeted by the biocidal product, which means there is greater scrutiny than ever for disinfectant claims.

The case for 'good bacteria' in preventing the rise of biocidal resistance

Just as there are harmful bacteria, there is also an abundance of beneficial bacteria that can be used to tackle the issue of biocidal resistance within the facilities management industry.

While traditional biocides have been predominantly used in the facilities management and cleaning industries, the benefits offered by new biological cleaning products cannot be ignored.

Dr Phil Caunt, Research and Development Specialist at Genesis Biosciences says: "Traditional cleaners are 20th century solutions to 21st century cleaning challenges. These products can invariably leave low level biocide residues on surfaces, either due to human error or because of poor cleaning efficacy and so the continued use of chemical disinfectants will only serve to encourage the emergence of biocide resistant strains of bacteria."