The role of hygiene in tackling ‘superbugs’

A new action plan drawn up by the EU to fight against superbugs focuses in on the use and development of antibiotics and prevention as the key areas recognised as a high priority. In this month’s column the UK Cleaning Products Industry Association looks at the role of cleaning and the dangers of the overuse of biocides.

“Antibiotic resistance is one of the greatest threats to modern health and we face a future without cures for infection if antibiotics are not used responsibly.” These words from Dame Sally Davies, chief medical officer for England, were echoed in countries across Europe in November as the fifth European Antibiotic Awareness Day was launched to impress on us all the very real threat and need for concerted action.

About 25,000 people now die every year in the EU from infections with antibiotic-resistant bacteria – infections with bacterial species that we once could easily treat and cure. Though efforts to reduce the numbers of MRSA infections in hospitals are stabilising that situation, infections with other resistant strains of bacteria such as Klebsiella pneumoniae and E. coli are rising rapidly in many countries across the European continent.

This grave state of affairs has arisen through the overuse and abuse of antibiotics in treating, or trying to treat, both people and animals as well as in animal husbandry. The EU’s action plan to tackle the problem has three main planks: more prudent use of antibiotics, developing new antibiotics, and better prevention of infection. Importantly, these are now recognised as having equal priority.

Vital role of hygiene

Preventing infection, in which cleaning and hygiene
have a central role, helps tackle the problem in two ways. Firstly, the fewer infections, deaths and suffering, the lower the burden on health service finances and resources. And secondly, better prevention of infection sets up a virtuous circle because the fewer cases to be treated, the fewer antibiotics we use – which directly reduces the ‘selection pressure’ so we get fewer resistant bugs.

Currently, the focus of efforts to improve infection prevention is naturally in hospitals and healthcare. But it’s clear that superbugs, as the media christen them, also spread to, from and within the community, including homes, offices, schools, hotels – everywhere we spend our day. The spread in the community is relatively invisible because many superbugs are ‘opportunist pathogens’ that only cause infections in vulnerable people with depressed immune systems or wounds that provide points of entry through the skin. Hospitals are full of people with such vulnerabilities, including surgical and cancer patients, and superbugs on the skin soon get an opportunity to infect. In the community, people with such vulnerabilities are thinner on the ground, but some superbugs can keep silently spreading from person to person, carried on the skin, for example, until they find their window of opportunity.

In the UK, almost 25% Staph. aureus infections are due to MRSA. In some countries of Europe, notably those where antibiotics are available over the counter, these rates are often nearer 50% or more. These infections are much more difficult to treat and cure once established, but killing MRSA on surfaces or hands with a biocidal product before it causes an infection is simple and no different to killing the non-resistant strain.

Slowing the spread of antibiotic resistance through hygiene needs to go far beyond tackling outbreaks. Arguably, it should be informed not by infection statistics but by surveillance of ‘carriage’, where bacteria are present on people without causing symptoms, and surveillance of the built environment through which they travel. Should we indeed be re-thinking hygiene priorities that currently focus on preventing infection, and supplementing those with intelligently targeted measures aimed at slowing the silent spread of resistant bacteria or their acquisition of resistance?

Can biocides encourage superbugs?
Whichever way we target hygiene measures, biocidal products will have a key role to play. But what about suggestions that biocides might themselves encourage the emergence or spread of resistant strains? It’s well known that in the lab, bacteria can be ‘trained’ to become temporarily more resistant to some biocides by constantly exposing them to very low levels of the biocide. It’s also true that some genes that make bacteria less sensitive to some biocides can also make them less sensitive to antibiotics. However, half of the contents of the kitchen spice rack can ‘switch on’ similar resistance mechanisms in the lab.

In the real world, outside the lab, there’s no sign that biocides are encouraging antibiotic resistance in practice. In the main this seems to reflect the fact that resistant bacteria don’t thrive unless they have an advantage – only when there is a low concentration of, say, an antibiotic that they can resist, but their ‘normal’ cousins can’t, do they proliferate. Take away those special conditions and they lose ground.

When biocides are used for hygiene they are used in concentrations hundreds or thousands of times greater than those that bacteria might ‘learn’ to resist. Surveys of homes where antibacterial cleaning products are regularly used show no greater presence of antibiotic resistant bacteria than those that don’t use such products. This even goes for the drains where low concentrations of leftover biocide might plausibly exert some selective effect.

**Prudent use and vigilance are essential**

There’s no room for complacency though. It’s important that biocides, like antibiotics, are used prudently so their effectiveness isn’t jeopardised. Just as antibiotics should be taken only for relevant conditions, in specified doses and for the correct period of time, biocidal cleaners should be targeted according to need, and should be used at the right concentrations following the manufacturer’s instructions.

Vigilance is especially crucial where biocides are used at low concentrations, close to the level some bacteria can learn to tolerate. With prudent use, biocidal cleaning products will be able to play their increasingly important role, helping to protect the population from the silent spread of resistant superbugs.
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