The healthcare-associated infections meticillin-resistant Staphylococcus aureus (MRSA) and Clostridium difficile hit the headlines 15 years ago. With these bugs threatening the lives of patients, government targets and a focus on hygiene and infection prevention in hospitals significantly reduced the number of cases.

Today, MRSA and C. difficile are still with us and although the threat they pose is lower, other organisms are causing the sort of concern these once provoked.

Escherichia coli (E. coli) is now the most prominent of the ‘Gram-negative’ bacteria that are seen as a threat, and is responsible for about two thirds of cases. Enhanced monitoring began in 2011, and in 2016 the then health secretary Jeremy Hunt announced plans to halve the number of bloodstream infections Gram-negative bacteria cause by 2020 – a target that has since been put back to 2021.

At the time, the Department of Health said the infections had killed more than 5,500 NHS patients in 2015 and would cost the NHS £2.3 billion by 2018.

But despite financial incentives for providers tackling E. coli, the overall rates have not gone down.

According to Public Health England, in 2018-19 the rate in England increased to 77.7 cases per 100,000 population, up from 73.7 per 100,000 in 2017-18. Since 2012-13 the reported number of infections has increased by about a third to more than 43,000 cases.

E. coli is all around us

The challenge is that tackling E. coli is not something hospitals can do in isolation and the bacteria is not one that can be eradicated; we all have E. coli in our bodies and it is largely harmless.

However, some serotypes (strains) of the bacteria can cause severe food poisoning, including traveller’s diarrhoea and urinary tract infections (UTIs). The E. coli 0157 strain, often contracted through food, is particularly unpleasant and produces toxins that cause stomach cramps, vomiting and bloody diarrhoea.

Some patients infected with a toxin-producing form of E. coli develop haemolytic uremic syndrome, which can lead to renal failure.

E. coli is dangerous when it moves out of the gut, either into the bloodstream or urinary tract.

Many people will develop E. coli infections in the community – 75-80% of infections develop outside hospital, says Infection Prevention Society president Pat Cartini.

As RCN professional lead for infection prevention and control Rose Gallagher points out, that
means the challenges are different to MRSA. While the focus of the MRSA campaign was on improving hospital hygiene, the response to E. coli and other Gram-negative bacteria needs to be more wide-ranging.

The principles of good infection control still apply, she says, but ‘it is about how we care for patients in health and social care and those outside it – it is a societal problem’.

Hydration is important, says Ms Cattini, and people should be encouraged to drink 1.5-2 litres a day to avoid urinary tract infections, the leading cause of infection.

Tackling E. coli on the ward and in the community

Involving the whole health and care system may have helped turn the corner on E. coli infections in Kent.

The area is one of three selected by NHS Improvement to pilot a collaborative approach to infection prevention, which involves acute and community trusts, care homes and is now being extended to the community.

Urinary tract infections (UTIs) account for 45% of the E. coli infections in the region. Kent Community Health NHS Foundation Trust had already developed a ‘catheter passport’, and the trust has renewed efforts to ensure patients do not have unnecessary catheters.

This is paying dividends, says trust assistant director infection prevention and control Lisa White.

‘We have implemented review stickers to go into patient notes to indicate if they have had their catheter use reviewed,’ she says. ‘We have also introduced bladder scanners for our community teams so that they can do trials without catheters and check if there is urinary retention or not. Some GP practices have clinics for trials without catheters.’

A hydration campaign aims to persuade more people to drink at least eight cups of fluid a day, while money has been found to support care homes with infection control work, UTIs and catheters.

Latest figures for E. coli infections in the region show it is bucking the national trend, with a 3% decline in 2018-19 on the previous year.

How you can help prevent infections

» Encourage people who are at risk of E. coli infection to increase their fluid intake. Offer a range of drinks – tea, water and fruit juice – and aim for eight cups a day. Think about access to drinks as well – do they need to be within reach?
Do patients need help to drink?

» Support people with minor continence problems. Refer people to specialist continence services when appropriate, rather than dismissing continence issues as ‘just part of ageing’

» Use catheters only when necessary and for the shortest time possible. Always have a plan for removal. Your employer may have guidelines or a catheter ‘passport’

» Manage other indwelling devices such as IV and ET (endotracheal) tubes to minimise the risk of an E. coli infection. Check local policy on how often devices should be changed, and the ‘non-touch’ policy. Be aware of the signs of infection such as redness, swelling and pain from the insertion site

Think about how you might reach people who are not in regular contact with the health service and what messages would work for them

» Encourage patients to check the colour of their urine. If it is any darker than a light yellow, they may need to drink more
» E. coli infections. Ms Cattini, lead nurse and deputy director of infection prevention and control at the Royal Marsden Hospital in London, says encouraging people to check the colour of their urine and adjust their fluid intake helps.

Support with continence issues
‘People at increased risk tend to be older – people with dementia who do not have an adequate thirst response, people with mobility problems who cannot access drinks, and people with continence problems who are worried they could wet themselves,’ she says.

Ms Gallagher believes supporting people with minor continence difficulties is important because it may prevent the development of problems that could end with the need for a catheter. This is difficult, though, with community and specialist continence nurse numbers falling.

Many people will be given antibiotics when they present with a UTI, without tests to check which organism is causing the infection, Ms Cattini says. This can lead to a trial-and-error approach, and greater antibiotic resistance.

She emphasises that catheters should be used for as short a time as possible, and there should always be a plan to remove them. Many areas have adopted catheter passports and there is now a national catheter passport to help healthcare staff manage how catheters are used.

The focus needs to be on a plan to remove the catheter if there is no good reason for continuing to use it, says Ms Cattini. Other indwelling devices, such as intravenous and endotracheal tubes, also need to be managed to minimise risk of E. coli infection.

Prevention measures
As well as reducing use of catheters, there is much that nurses, especially those in the community, can do to limit patients’ risk of E. coli infection. This includes improving hydration, continence care and hand hygiene. But more could be done, says Ms Cattini.

‘We need more investment in infection prevention. We are not expected to do more with less.’ Staff in residential care homes have an important part to play in E. coli infection prevention but may miss out on training and support, she adds.

Public awareness
Many older people at risk of E. coli infection may not be in regular contact with the NHS, nor aware the infection could be a threat to them. ‘If we intervene it makes a big difference in mortality for people in that population. There is not the public knowledge out there – the papers have not been making a fuss,’ says Ms Cattini.

Reaching this group needs a different approach, taking on board what has been learned from other public health campaigns. Stickers on the back of toilet doors encouraging people to drink and to check the colour of their urine are ideas, Ms Cattini suggests.

“These are simple public health messages. A lot of these people are not coming into hospital. We need to be talking to them through other means – like libraries, bereavement centres and charities such as Age UK. These are places where healthier people in this age group go for social contact,’ she says.

‘MRSA was hitting the headlines [years ago], but there are eight times more cases of E. coli than we ever saw of MRSA.’

NHS Improvement’s resource Preventing Healthcare Associated Gram-negative Bloodstream Infections tinyurl.com/improvement-resource

Alison Moore is a health journalist

Alternative threats – other infections to watch out for
E. coli may be the most prominent of the Gram-negative bacteria but it is not the only one being monitored. Others include:

Pseudomonas aeruginosa
» Often found in soil and ground water, but can cause infections, especially in those with weakened immune systems. Some infections can be fatal
» Associated with contaminated water or indwelling devices
» Resistant to many antibiotics: earlier this year antibiotic-resistant strains caused surgical site infections in patients at a clinic in Mexico
» The World Health Organization lists the carbapenem-resistant strain as a pathogen where there is a critical need for new antibiotics

Klebsiella spp
» Found in the environment and in the gut
» Can lead to pneumonia, bloodstream infections, surgical site infections and meningitis
» Immunocompromised patients and those with invasive devices at much higher risk
» Spreads through faecal contamination

Candida auris
» A type of fungus, first identified in 2009
» Can cause invasive candidiasis, which affects the bloodstream, nervous system and internal organs
» Is often drug-resistant and different strains have been found in hospitals around the world
» First cases in Europe were reported in 2016 at the Royal Brompton in London, with around 50 patients affected. Stringent cleaning of the environment, isolation of patients, decolonisation and staff screening was undertaken
» Does not seem to be as dangerous as other pathogens