Undrinkable an

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released to the Irish Daily Mail. They show that:

- Almost 26,000 people have to boil their water because of problems including cryptosporidium, a parasite that can be fatal yet could easily be removed;
- 919,883 are still suffering with substandard water that does not reach water quality standards.
- The Environmental Protection Agency has already lodged three cases against Irish Water, although in previous cases court fines have been as little as €750

As Irish Water prepares to charge citizens for their water for the first time, the figures reveal the legacy of under-investment and poor planning and the failure of public health bodies to tackle the issues.

Yesterday, Jerry Grant, Irish Water's head of asset management, told the Irish Daily Mail that the Environmental Protection Agency and Irish Water had deemed 126 water treatment plants, supplying 919,833 people, to have substandard drinking water at the moment.

Even more worryingly, 25,888 people are connected to supplies that are infected by cryptosporidium or e-coli or have unacceptable levels of lead or nitrates present – making them unfit for human consumption under HSE guidelines.

Cryptosporidium is a microscopic parasite that causes the diarrhoeal disease cryptosporidiosis.

Both the parasite and the disease are commonly known as 'crypto'.

Though the symptoms can be treated, there is no cure for the disease, which is particularly dangerous for young children, the elderly and people whose immune systems are compromised – and a number of international fatalities have been recorded.

Yet the parasite can easily be removed from public water supplies, either by adequate filtration or by UV radiation treatment.

'UV treatment will kill the parasite as it goes through the water, while different types of filters, from sand to membrane filters, will physically remove the parasite like a sieve,' explained Dr. Frances Lucy of IT Sligo's Centre for Environmental Research, Innovation and Sustainability.

'City could be fixed for no more than €3m'

According to Professor Jenni Colbourne, the UK Drinking Water Inspectorate's chief inspector, a town the size of Galway could have its water treatment systems brought up to standard for 'no less than €500,000 and no more than €3million' – a fraction of the €86million that Irish Water plans to spend on consultants.

In 2010, the UN General Assembly passed Resolution 64/292, explicitly recognising access to safe, clean drinking water and proper sanitation as a basic human right.

Meanwhile, Irish Water is facing three separate prosecutions in the courts by the Environmental Protection Agency relating to drinking water supplies, The Irish Daily Mail can reveal.

And the utility could face at least ten other prosecutions if the EPA decides to pursue it through the courts in all cases in which directives have not been complied with by the specified deadline.

The three court actions are as many as the EPA took in the previous six years, when the local authorities were in charge of water supply.

The cases relate to supplies in Letterkenny, Co. Donegal; Treannagleeragh, Co. Mayo; and Tralee, Co. Kerry, according to the EPA's Remedial Action List.

Prosecutions are only taken once the EPA has already issued a direction – a legal document demanding that remedial work is completed by a specified date. Once this date has passed and the work has not been carried out to its satisfaction, the agency can take a prosecution in the courts.

The three prosecutions relate to the presence of cryptosporidium, lead contamination from old pipes and fittings, and high levels of chemicals known as trihalomethanes, which are by-products of the disinfection process.

Quizzed about the spike in prosecutions taken this year, Mr Grant last night said Irish Water inherited deadlines from the 34 local authorities.

The EPA has successfully prosecuted Galway County Council twice, in 2008 and 2009; and Mayo County Council in 2012.

But only modest fines of between €750 and €4,000 were imposed by the courts on top of costs incurred by the EPA of €14,600.

Fianna Fáil's environment spokesman, Barry Cowen said: 'These issues of basic maintenance and repair are being put aside in a rush to generate revenue and fund this corporate monster that is Irish Water.'

He compared the country's cryptosporidium concerns to those of a Third World country.

Last night, the Department of the Environment, Community and Local Government said: 'This is a matter for the EPA in the first place as they carry out the testing and compile the lists of schemes which are under threat.

'Secondly, it is now a matter for Irish Water to prioritise funding for schemes under the capital programme which they launched in May.'

Mr Grant said the cost of bringing water supplies up to standard would vary with the type of treatment required.

'Every water supply is different and the water treatment processes required are a function of the raw water quality.

'We have a programme of work to address drinking water quality deficits across the country, with cryptosporidium being a high priority.

'In some cases, the problems can be addressed by ultraviolet radiation, but in many cases, full chemical conditioning, with associated settlement and filtration processes, are required. These were not always provided on good quality raw waters in Ireland.

'The requirement is for a well designed treatment system, operated effectively and free from overloading.

'Irish Water is responsible for planning and implementation of appropriate treatment of drinking water, subject to adequate funding being available.

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Ultraviolet kills it. Filters can block it. So why do so many thousands of homes have this lethal bug in their water?

Q&A

What is cryptosporidium?

Cryptosporidiosis is a diarrhoeal disease caused by a microscopic parasite, cryptosporidium. Once an animal or person is infected, the parasite lives in the intestine and passes in the stool. The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine-based disinfectants. It can survive temperatures greater than 70C. It is found (particularly in water) through the world.

Dr. Frances Lucy of the Centre for Environmental Research, Innovation and Sustainability in IT Sligo explained: 'It is a parasite, not a virus. It's a single-cell organism that is three to five microns in size and not visible to the naked eye.'

How many people have it in their water supply?

There are 25,888 people connected to supplies that are infected by cryptosporidium, contaminated with E-coli or have unacceptable levels of lead or nitrates present making them unfit for human consumption under HSE guidance.

Where cryptosporidium is confirmed in sampling, Irish Water notifies the HSE which may then decide to issue a 'Boil Water Notice' if it considers that a health risk exists.

In total, 126 water treatment plants serving 919,883 customers have been deemed 'unsafe' by the EPA, Jerry Grant, Irish Water's head of asset management, said yesterday.

Some are microbiologically compromised; others simply don't have sufficient treatment equipment for modern water quality standards.

Why is it dangerous?

The most common symptoms of cryptosporidiosis are watery diarrhoea and stomach cramps. Other symptoms may include fever, nausea, vomiting and loss of appetite. Some people with the infection have no symptoms at all.

The first signs of illness appear between one and 12 days (average seven days) after a person becomes infected.

Symptoms may come and go and may last days to weeks. People with a weak immune system may have more severe symptoms that can last for months.

Dr. Lucy said: 'It's really only dangerous to immuno-compromised people, the very young and the very old generally.

The issue with crypto is that, if most people took some infected water they might suffer a bout of watery diarrhoea.

'But because those groups are vulnerable, that's why we have these boil notices. In the USA, not Ireland, it has resulted in the deaths of people who had underlying conditions.

'As there is no medicine for it, you can hydrate and go on a drip, but it has to work itself out of your system.'

What precautions do they have to take?

Householders will be instructed to boil any water that will be used for: drinking, making drinks, preparing of salads and similar foods that are not cooked prior to eating, brushing teeth and making ice.

Water should be brought to the boil to make sure the parasite is killed and then left to cool. Dr. Lucy says: 'Boiling water works 100 per cent.

'If the disease is brought into a house or a school, it can spread on towels and so on. It goes human to human and you have to be very careful.'

Cryptosporidium became a notifiable disease in 2004.

How does it get into the water?

Cryptosporidium originates from human or animal waste and is potentially present in any water supply from rivers or lakes and in groundwater supplies in limestone areas like Roscommon.

Dr. Lucy said: 'There are two main sources. One is agriculture – particularly during spring peak, typically because of association with lambs and calves who get scours (diarrhoea) which is then present in the slurry.

'The other is human sewage, which can get into the water in a number of ways – as a result of septic tanks, particularly during times of flooding.'

How can it be removed?

Chlorine, the standard disinfectant for drinking water, does not kill the parasite so it is necessary to have a physical filter to remove the parasite or to kill it with ultraviolet light.

Professor Jenni Colbourne, the UK's chief inspector of drinking water, said: 'An ultraviolet light effectively uses UV radiation which attacks the DNA of the organism. It inactivates the cryptosporidium – it's like sunlight enhanced.

'Filtration works with a whole range of different filters, but all are physical barriers that stop the cryptosporidium from getting through.'

What is a cryptosporidium breakthrough?

A breakthrough is a crack or