



Failing the Drinking water standards

A paper presented by **Barry Mattingley, David Wood and Chris Nokes**, (ESR) at the 2017 Water New Zealand conference. This is an introduction to its tasks and findings and the full paper can be viewed at www.waternz.org.nz. This paper also won a silver award in the Hynds Paper of the Year Award at the 2017 Water New Zealand conference.

Each year ESR, the Crown Research Institute that specialises in science relating to people and communities, surveys all networked water suppliers that provide water to more than 100 people for information on their achievement of the Drinking-water Standards for our country.

This information is used to prepare the Annual Report on Drinking-water Quality for the Ministry of Health. The latest study analysed four years of survey data 2010-2014 (341 zones), with a focus on those zones that did not achieve the Standards for *E. coli* or chemicals. Its aim is to better understand the reasons for non-achievement to help improve risk management.

The study found the main reason for zones failing to meet the *E. coli* and chemical requirements of the Standards was too many transgressions (maximum acceptable value exceedences). Almost all zones with an excessive number of transgressions, for both *E. coli* and chemicals, served populations in the 501-5000 bracket. Corrective actions were considered adequate in 91 percent of zones with *E. coli* transgressions, despite repeated failures over the four years. In contrast, in 23 percent of zones with chemical transgressions, corrective actions were considered adequate.

Actions are currently being taken to address both bacteriological and chemical non-achievement in some zones that are expected to improve levels of achievement when treatment upgrades take effect.

KEY FINDINGS

Too many transgressions during a reporting year was the prime cause of the non-achievement of the Standards for both *E. coli* and chemical determinands.

Despite excessive numbers of *E. coli* transgressions repeatedly causing non-achievement in some zones, corrective actions to address the transgressions were, in the great majority of cases, considered adequate by those completing the Survey.

The great majority of corrective actions in response to chemical transgressions were considered inadequate. Effective corrective actions for addressing chemical transgressions present water suppliers with a difficult problem because they cannot generally be implemented immediately and they can be expensive.

Treatment plant upgrades to UV irradiation was planned for many of the zones in which there had been repeated *E. coli* transgressions. This should provide a barrier to

pathogens entering the distribution zone, but provides no means of controlling post-treatment bacterial contamination of the water.

Improvements in levels of E. coli and chemical achievement can be expected when planned treatment upgrades are commissioned and teething troubles being presently experienced are overcome. The ability and willingness of water suppliers to fund the necessary improvements in their water supplies will determine the extent and rate at which levels of achievement will improve.

The benefits of water supply upgrades may not be fully realised if capital expenditure cannot be matched by appropriate levels of operational expenditure, eg, staffing levels and staff training.

Some water supplies appear to have made a decision not to carry out the monitoring required for achievement of the Standards, particularly for chemical determinands. This may be because of the expense of the analyses. Non-achievement in these zones can be expected to continue.

IMPROVING LEVELS OF STANDARDS

In relation to achievement of the E. coli and chemical standards the study suggests:

Water safety plans include a requirement to investigate the cause of transgressions and that measures to address the

causes are implemented. The need for investigation of E. coli transgressions is made clear in the Standards.

Good evidence is needed before concluding that sample contamination is the reason for E. coli detection in a sample. When sample contamination is the cause, actions, such as sampler training, need to be taken to prevent recurrence.

Water suppliers should seek help from their drinking-water assessor if they encounter difficulties with their investigation.

Where source water turbidity may rise with rainfall, ensure filtration is installed as part of treatment plant upgrades to guard against the efficacy of the disinfection processes being compromised. This should ensure that the water quality leaving the treatment plant is satisfactory.

Where repeated non-achievement of the E. coli standards occurs because of transgressions, take steps to maintain a disinfecting residual in the zone.

The relatively inexpensive measure of introducing a residual disinfectant into zones that presently contain no residual provides a means of helping to control the risk to public health of low-level post-treatment contamination.

Communities that are opposed to chlorination need to be informed of the potential consequences of this decision to ensure they are fully aware of its ramifications.