

**Annual Report on
Drinking-water Quality
2010–2011**

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Key findings

This report describes drinking-water quality for all registered community drinking-water supplies that served populations of more than 100 people from 1 July 2010 to 30 June 2011, except for 10 supplies that were affected by the Christchurch earthquakes and were exempt from the annual survey. It describes how registered community drinking-water supplies met the requirements of the Drinking-water Standards for New Zealand (the Standards) and their progress towards meeting the requirements of the Health Act 1956.

Approximately 97 percent of New Zealanders (3,309,000 people) on registered community drinking-water supplies serving more than 100 people received bacteriologically-compliant drinking-water (compared with 96 percent reported in the 2009–2010 reporting period). Protozoal compliance was achieved for 79 percent of the population (compared with 78 percent in the 2009–2010 reporting period), and 97 percent of the population on registered community drinking-water supplies that served populations of more than 100 people received chemically-compliant water (compared with 96 percent in the 2009–2010 reporting period). Overall, 78 percent of New Zealanders (2,670,000 people) on registered community drinking-water supplies serving more than 100 people received drinking-water that met all of the requirements of the Standards in the 2010–2011 reporting period. Overall compliance with the Standards has increased by 2 percent in population terms in the 2010–2011 reporting period, compared with the 2009–2010 reporting period. As was expected, compliance with the Standards was generally highest in the large supplies and lowest in the small supplies. The exception to this was that small supplies showed the greatest chemical compliance, because they are not required to be assessed for chemical contamination, so they comply by default.

The provisions of the Health Act 1956 take effect progressively over the next few years, starting on 1 July 2012 for large supplies. As part of these provisions, water suppliers will be required to prepare public health risk management plans. Overall, distribution zones serving 27 percent of the population (32 percent of zones) had implemented their public health risk management plans by the end of the reporting period. Zones serving a further 69 percent of the population (44 percent of zones) were preparing their plans. All of the large drinking-water suppliers had either implemented their plans or they were at various stages of plan preparation. The rate of development and implementation decreased as population size decreased. Thirty-four percent of the smaller suppliers had not started preparing their public health risk management plans, but smaller suppliers have longer to comply with the provisions of the Health Act 1956.

During the 2010–2011 reporting period, a number of other actions were carried out by water suppliers. These are described below.

- **Monitoring:** Overall, distribution zones serving 97 percent of the population (85 percent of zones) met the monitoring requirements of the Standards. All large- and medium-sized supplies, serving a total of 2,863,000 people, met the *E. coli* monitoring requirements, with small supplies monitoring the least.
- **Adequacy of supply:** Overall, distribution zones serving 83 percent of the population (91 percent of zones) met the requirement for adequacy of supply during the reporting period, with 72 percent of large supplies and 95 percent of small supplies meeting the adequacy of supply requirement. This may be due, in part, to information being received from only 54 of 69 large supplies. However, even if expressed as a percentage of the supplies from which information was received, the percentage of large supplies

meeting the requirement (93 percent) is less than the reported rate of 98 percent for all small supplies that provided information.

- Source protection: Overall, distribution zones serving 86 percent of the population (88 percent of zones) met this requirement. Source protection generally increased as the size of the zone population decreased. If only supplies that responded to the survey are included, the rates in terms of zones are 96 percent, 100 percent, 97 percent and 94 percent for large, medium, minor and small classes of supply, respectively. This may be due to the low response rate by large supplies to this survey, which are counted as not meeting this requirement.
- Records: Adequate records were maintained for distribution zones supplying 99.5 percent of the population (94 percent of zones).
- Complaints: Overall, distribution zones serving 99.7 percent of the population (97 percent of zones) investigated complaints.
- Remedial action: Almost all supplies undertook remedial action in response to transgressions. Zones serving 2 percent of the population (4 percent of distribution zones) did not take remedial action when necessary.

By the end of the 2010–2011 reporting period, all size categories of drinking-water supply had reported good progress towards meeting the legislative requirements of the Health Act 1956. Water suppliers are moving towards a more proactive approach to protect health. In general, the larger suppliers have a greater level of compliance with their current requirements than smaller categories of supplies.

While drinking-water suppliers are not yet expected to meet the requirements of sections 69S to 69ZC of the Health Act 1956, including the requirements regarding monitoring, adequacy of supply, source protection and public health risk management plans, most drinking-water supplies met these requirements. Overall, water suppliers are meeting their current requirements and many are meeting their future requirements. There is a tendency for fewer smaller supplies to have met their current requirements under the Health Act 1956 than the larger supplies. Many supplies already meet the requirements of the aspects of the Health Act 1956 that are being phased in, and many others are making progress towards meeting these requirements.

Christchurch water supplies

Christchurch was struck by earthquakes of magnitude 6.3 or greater that damaged the drinking-water infrastructure on three occasions during the 2010–2011 survey period. Although some *Escherichia coli* transgressions occurred following the earthquakes, the council's actions controlled the elevated risks caused by earthquake damage and minimised the health risk posed by the drinking-water. The best measure that we have of the success of the public health response is the lack of a recorded increase in potentially waterborne diseases in the periods following the earthquakes. Christchurch City Council, Civil Defence and Emergency Management and the public health services are commended for their responses to the extreme risks that the earthquakes presented to the drinking-water supply infrastructure.

Introduction

This report describes drinking-water quality for all registered community drinking-water supplies that served populations of more than 100 people from 1 July 2010 to 30 June 2011, except for 10 supplies that were affected by the Christchurch earthquakes and were exempt from the annual survey. It describes how drinking-water supplies met the requirements of the Drinking-water Standards for New Zealand (the Standards)¹ and their progress towards meeting the requirements of the Health Act 1956².

In addition, the report meets the requirement of the Health Act 1956 for the Director-General to prepare and publish a report on drinking-water each year that includes information about the quality of drinking-water and compliance of drinking-water suppliers with the Standards and the Health Act 1956.

In 2009, the requirement for each category of water supplier to comply with sections 69S to 69ZC of the Health Act 1956 (relating to drinking-water) was deferred for three years. These requirements will come into force on staggered dates beginning on 1 July 2012 and proceeding as follows:

- large drinking-water supplies (more than 10,000 people) from 1 July 2012
- medium drinking-water supplies (5001 to 10,000 people) from 1 July 2013
- minor drinking-water supplies (501 to 5000 people) from 1 July 2014
- small drinking-water supplies (101 to 500 people) from 1 July 2015
- neighbourhood drinking-water supplies (25 to 100 people) from 1 July 2016
- rural agricultural drinking-water supplies from 1 July 2016 or the date on which the Standards are amended to include them, whichever is later.

The delay was to enable councils and other drinking-water suppliers to assess the impact of the current economic climate on their operations. It also enabled councils to consider the implications of the legislation on their Long Term Council Community Plans. It is the Government's expectation that water suppliers will continue to plan for compliance. The changes did not affect the existing legal requirements for suppliers to keep records, investigate complaints and take remedial action if they became aware of contamination in their water supplies.

This report describes the methods used to gather the data and the caveats on the data and its interpretation. The report then presents the findings regarding compliance with the Standards and meeting the legislative requirements of the Health Act 1956 for each of the four size categories of the drinking-water supplies, and describes the earthquake-related drinking-water monitoring in Christchurch. This is followed by a discussion and an interpretation of the findings.

¹ Water suppliers may elect to comply with either the Drinking-water Standards for New Zealand 2000 or the Drinking-water Standards for New Zealand 2005 (Revised 2008) (Ministry of Health).

² As amended by the Health (Drinking-water Amendment) Act 2007.

Methods

Information on drinking-water quality was obtained from drinking-water assessors employed by District Health Board public health units, using questionnaires that sought data relating to water supply quality, monitoring and management. The information was collected at the level of distribution, that is, the quality of water supplied to consumers.

Two surveys were used to gather information from registered community drinking-water supplies that served populations of more than 100 people from 1 July 2010 to 30 June 2011. The first survey sought information about the microbiological and chemical quality of the drinking-water, water treatment processes in use, the means used to demonstrate compliance with the Standards, as well as the status of public health risk management plans. This survey utilised the online Water Information New Zealand (WINZ) database.

The second survey was new for the 2010–2011 reporting period and sought information relating to the management of drinking-water supplies by drinking-water suppliers in terms of the requirements of the Health Act 1956 that will eventually apply to water suppliers. An Excel spreadsheet was designed to collect the information and was completed by drinking-water assessors in discussion with water suppliers. The completed spreadsheets were returned to ESR for compilation and analysis.

The following caveats apply for the purposes of data interpretation:

- the report includes all community drinking-water supplies that served more than 100 people, based on the information contained in the *Register of Community Drinking-water Supplies* as at 30 June 2011, except for 10 supplies that were affected by the Christchurch earthquakes and were granted an exemption from the annual survey
- the population figures used in this report have been taken from the distribution zone populations as recorded in WINZ. It is not possible to determine the accuracy of the population figures. Furthermore, it is likely that the WINZ population figures include residents only in some zones and residents and non-residents in other zones
- it is likely that some of the community supplies are misclassified as self-supplies and vice versa. Obvious apparent discrepancies (eg, distribution zones where the name does not seem to fit the supply classification) have been queried with the drinking-water assessors, but these are not always apparent
- for the purposes of the Standards' compliance statistics, supplies that achieved compliance part way through the survey period as a result of improving treatment processes or monitoring programmes, have been marked as compliant for that aspect. These supplies can be identified in Appendix 2A
- overall adequacy of monitoring has been assessed on the basis of *Escherichia coli* and chemicals. There is no requirement to monitor for protozoa in the Standards
- protozoal compliance is assessed at the treatment plant and not at the distribution zone. However, because the unit of analysis for this report is the distribution zone, it was necessary to allocate protozoal compliance to each distribution zone. A zone was determined to be compliant with the Standards if all of the treatment plants supplying

the zone were protozoal-compliant. A few treatment plants were unused during the survey period – these were omitted from the report

- a small number of drinking-water suppliers did not respond to the surveys. These zones that did not provide data have been marked as non-compliant for the purposes of this report
- the acceptable answers to the questions about the legislative requirements included “not applicable” (N/A). The percentage of supplies meeting the requirements of the legislation was calculated as the percentage of zones that answered “yes” or “N/A”
- the percentage figures used for compliance with the Standards and meeting the requirements of the Health Act 1956 were calculated using the number of zones or populations in the zones reported in the WINZ survey
- all percentage figures in this report are rounded. Accordingly, totals may not add up to 100 percent.

Data quality assurance was built into all stages of the process, from data collection to reporting. A number of checks, including peer reviewing and duplicate analysis, were employed to ensure the reported data reflected the information collected by the surveys. Additional checks of the data were made by the drinking-water assessors and water suppliers who reviewed drafts of the zone-level data reported in the appendices. Overall, there was a higher level of quality assurance for information collected in the survey assessing compliance with the Standards than for the survey assessing compliance with the requirements of the Health Act 1956, due to ESR’s greater familiarity with the WINZ survey module and the comprehensive data collection approach utilised in the module.

Findings

This report covers the 653 registered community drinking-water supply zones that served populations of more than 100 people in the 2010–2011 reporting period, and covers a total population of 3,401,403 people.

The report does not include the drinking-water supplies affected by the three major earthquakes that occurred in Christchurch during the reporting period. There were 10 zones affected, serving 400,020 people. Earthquake-related drinking-water monitoring in Christchurch is described at the end of this section.

Table 1 summarises compliance with the Standards for the 2010–2011 reporting period. Table 2 summarises the status of public health risk management plans, according to the size of the zone, and Table 3 summarises to what extent supplies met legislative requirements of the Health Act 1956. Detailed results of drinking-water quality monitoring and compliance for individual water supplies are shown in Appendices 1 and 2.

Table 1: Compliance with the Standards for the 2010–2011 reporting period

		Size of supply				
		Large (over 10,000 people)	Medium (5001– 10,000 people)	Minor (501–5000 people)	Small (101–500 people)	Total
No. of zones		69	36	243	305	653
Registered Population		2,601,040	262,005	457,499	80,859	3,401,403
No. of complying zones (% of complying zones within band)						
Bacteriological compliance	Zones	69 (100%)	34 (94.4%)	212 (87.2%)	211 (69.2%)	526 (80.6%)
	Population	2,601,040	243,305	406,284	58,589	3,309,218 (97%)
Protozoal compliance	Zones	57 (82.6%)	17 (47.2%)	73 (30%)	52 (17%)	199 (30.5%)
	Population	2,376,175	127,978	170,732	15,609	2,690,494 (79%)
Chemical compliance	Zones	66 (95.7%)	33 (91.7%)	218 (89.7%)	303 (99.3%)	620 (95%)
	Population	2,558,415	244,509	419,617	79,968	3,302,509 (97%)
Overall compliance	Zones	57 (83%)	16 (44%)	67 (28%)	46 (15%)	186 (28%)
	Population	2,376,175	118,443	161,191	13,840	2,669,649 (78%)

As the transition from the 2000 Standards to the 2005 Standards is scheduled to take several years and drinking-water suppliers may elect which of these Standards they operate under, compliance is assessed against the Standard the supplier has chosen to comply with. Of the 653 registered community drinking-water supply zones serving more than 100 people, 196 and 436 zones chose the 2000 Standards and the 2005 Standards, respectively, and the remaining 21 zones did not apply the Standards. Where information was not received, these supplies were deemed to be non-compliant with the Standards.

Microbiological compliance is based on two main microbiological reference organisms, *E. coli* and *Cryptosporidium*. Bacteriological compliance is determined primarily using *E. coli*

monitoring, whereas protozoal compliance is based on monitoring the effectiveness of the treatment processes used to remove or disinfect *Cryptosporidium*.

Chemical compliance was assessed for those supplies that have been identified as containing chemicals that require monitoring (known as Priority 2 (P2) determinands³). A water supply is shown as compliant if it has no P2 determinands or has been adequately monitored and shown that any P2 chemicals present are within acceptable levels.

The following four sections cover the findings for drinking-water supplies according to the size of the supply (large, medium, minor and small).

Large water supplies (more than 10,000 people)

Maximum acceptable values in the Standards – bacteriological, protozoal and chemical:

From 1 July 2012, large drinking-water suppliers will have to take all practicable steps to comply with the Standards. During the reporting period (1 July 2010 to 30 June 2011), compliance by large supplies with the Standards was achieved for 91 percent (2,376,000 people) of the population served by 83 percent (57) of the large supply zones. All large supplies achieved bacteriological compliance. Protozoal compliance was achieved for 91 percent (2,376,000 people) of the population served by 83 percent (57) of the large supply zones. Chemical compliance was achieved for 98 percent (2,558,000 people) of the population served by 96 percent (66) of the large supply zones.

Monitoring requirements in the Standards: From 1 July 2012, large drinking-water suppliers will need to meet the monitoring requirements in the Standards. During the reporting period (1 July 2010 to 30 June 2011), distribution zones serving 99 percent (2,576,000 people) of the population on 97 percent (67) of the large supply zones met the monitoring requirements in the Standards. All large supplies were adequately monitored for *E. coli*, whereas 99 percent (2,576,000 people) of the population on 99 percent (67) of the large supply zones had adequate chemical monitoring.

Public health risk management plans: From 1 July 2012, large drinking-water suppliers have to have prepared public health risk management plans for their water supplies. The plan must be submitted to a drinking-water assessor for approval by 1 July 2013, and the supplier must begin to implement the plan within one month of it being approved. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to 60 percent (1,555,000 people) of the population on 45 percent (31) of the large supply zones were drafting their plans; water suppliers to 5 percent (130,000 people) of the population on 9 percent (6) of the zones had submitted their plans for approval or were redrafting them; water suppliers to 10 percent (264,000 people) of the population on 9 percent (6) of the zones had their plans approved; and

³ Chemical substances or determinands that are present in the water leaving the treatment plant or in the distribution zone at potentially health-significant concentrations (usually greater than 50% of their maximum acceptable value) are the only chemical determinands that must be monitored to comply with the Standards. These chemicals are known as Priority 2 (P2) determinands. At present, P2 classifications are only notified in the *Register of Community Drinking-water Supplies* for populations of 500 or more people. Water supplies that have not been assigned a P2 determinand are classed as compliant. Where a supply has no P2 assignation, because the supply has not been assessed for that chemical, the safety of the supply with respect to chemical determinands is uncertain. The relative softness of New Zealand's water sources results in a general tendency for our drinking-waters to dissolve metals from plumbing fittings, a property termed 'plumbosolvency'. All drinking-waters are designated as plumbosolvent unless the water supplier can show they are not. Metals arising from plumbosolvency do not have to be monitored, provided the public is advised to flush their taps before drawing water for consumption.

water suppliers to 25 percent (652,000 people) of the population on 38 percent (26) of the zones had started implementing their plans.

Adequacy of supply: From 1 July 2012, large drinking-water suppliers will need to take all practicable steps to ensure an adequate supply of drinking-water is provided to each point of supply. Interruptions may occur for planned maintenance, improvements or for emergency repairs. However, if the interruptions are likely to exceed eight hours, the water supplier needs to have prior approval from the medical officer of health and to have taken all practicable steps to warn affected people. If the supply is interrupted in an emergency, the supplier has up to 24 hours to inform the medical officer of health. During the reporting period (1 July 2010 to 30 June 2011), the water suppliers to 82 percent (2,127,000 people) of the population on 72 percent (50) of the large supply zones reported adequacy of supply.

Source protection: From 1 July 2012, large drinking-water suppliers will need to take steps to protect their water sources from contamination and pollution. These steps may include making submissions on district plans, resource consent applications or sanitary service assessments. Source protection may also include contributing to catchment management. During the reporting period (1 July 2010 to 30 June 2011), water suppliers undertook activities to protect the water sources for supplies serving 86 percent (2,225,000 people) of the population on 75 percent (52) of the large supply zones.

Records: From 1 July 2008, large drinking-water suppliers have been required to keep records of their water supplies to enable a drinking-water assessor to ascertain whether the water supplier is meeting the requirements of the Health Act 1956. During the reporting period (1 July 2010 to 30 June 2011), water suppliers kept appropriate records for all large supply zones, and the records were available to drinking-water assessors, as required.

Complaints: From 1 July 2008, large drinking-water suppliers have been required to record and investigate complaints about their water supplies. During the reporting period (1 July 2010 to 30 June 2011), water suppliers investigated all complaints they received about the drinking-water they supplied to large supply zones.

Remedial steps: From 1 July 2008, all drinking-water suppliers have been required to take remedial action if their water supply is not meeting the Standards. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to supplies serving 99 percent (2,573,000) of the population on 97 percent (67) of the large zones were reported to have taken adequate remedial steps. Corrective actions were inadequate or not carried out in two large zones for chemical transgressions.

Medium water supplies (5001 to 10,000 people)

Maximum acceptable values in the Standards – bacteriological, protozoal and chemical: From 1 July 2013, medium drinking-water suppliers will have to take all practicable steps to comply with the Standards. During the reporting period (1 July 2010 to 30 June 2011), compliance by medium supplies with the Standards was achieved for 45 percent (118,000 people) of the population served by 44 percent (16) of the medium supply zones. Bacteriological compliance was achieved for 93 percent (243,000 people) of the population served by 94 percent (34) of the medium supply zones. Protozoal compliance was achieved for 49 percent (128,000 people) of the population served by 47 percent (17) of the medium supply zones. Chemical compliance was achieved for 93 percent (245,000 people) of the population served by 92 percent (33) of the medium supply zones.

Monitoring requirements in the Standards: From 1 July 2013, medium drinking-water suppliers will need to meet the monitoring requirements in the Standards. During the reporting period (1 July 2010 to 30 June 2011), distribution zones serving 98 percent (256,000 people) of the population on 97 percent (35) of the medium supply zones met the monitoring requirements in the Standards. All medium supplies were adequately monitored for *E. coli*, whereas 97 percent (256,000 people) of the population on 97 percent (35) of the medium supply zones had adequate chemical monitoring.

Public health risk management plans: From 1 July 2013, medium drinking-water suppliers have to have prepared public health risk management plans for their water supplies. The plan must be submitted to a drinking-water assessor for approval by 1 July 2014, and the supplier must begin to implement the plan within one month of it being approved. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to 21 percent (55,000 people) of the population on 22 percent (8) of the medium supply zones were drafting their plans; water suppliers to 20 percent (51,000 people) of the population on 19 percent (7) of the zones had submitted them for approval or were redrafting them; water suppliers to 18 percent (46,000 people) of the population on 19 percent (7) of the zones had their plans approved; and water suppliers to 37 percent (97,000 people) of the population on 33 percent (12) of the zones had started implementing their plans.

Adequacy of supply: From 1 July 2013, medium drinking-water suppliers will need to take all practicable steps to ensure an adequate supply of drinking-water is provided to each point of supply. Interruptions may occur for planned maintenance, improvements or for emergency repairs. However, if the interruptions are likely to exceed eight hours, the water supplier needs to have prior approval from the medical officer of health and to have taken all practicable steps to warn affected people. If the supply is interrupted in an emergency, the supplier has up to 24 hours to inform the medical officer of health. During the reporting period (1 July 2010 to 30 June 2011), the water suppliers to 79 percent (206,000 people) of the population on 81 percent (29) of medium supply zones reported adequacy of supply.

Source protection: From 1 July 2013, medium drinking-water suppliers will need to take steps to protect their water sources from contamination and pollution. These steps may include making submissions on district plans, resource consent applications or sanitary service assessments. Source protection may also include contributing to catchment management. During the reporting period (1 July 2010 to 30 June 2011), water suppliers undertook activities to protect the water sources for supplies serving 79 percent (206,000 people) of the population on 81 percent (29) of the medium supply zones.

Records: From 1 July 2008, medium drinking-water suppliers have been required to keep records of their water supplies to enable a drinking-water assessor to ascertain whether the water supplier is meeting the requirements of the Health Act 1956. During the reporting period (1 July 2010 to 30 June 2011), water suppliers kept appropriate records for all of the 36 medium supplies, and the records were available to drinking-water assessors, as required.

Complaints: From 1 July 2008, medium drinking-water suppliers have been required to record and investigate complaints about their water supplies. During the reporting period (1 July 2010 to 30 June 2011), medium water suppliers investigated all complaints they received about the drinking-water they supplied.

Remedial steps: From 1 July 2008, all drinking-water suppliers have been required to take remedial action if their water supply is not meeting the Standards. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to supplies serving 96 percent (251,000 people) of the population on 94 percent (34) of the medium supply zones were reported to have taken adequate remedial steps. Corrective actions were inadequate or not carried out in two medium water supplies, following chemical transgressions.

Minor water supplies (501 to 5000 people)

Maximum acceptable values in the Standards – bacteriological, protozoal and chemical:

From 1 July 2014, minor drinking-water suppliers will have to take all practicable steps to comply with the Standards. During the reporting period (1 July 2010 to 30 June 2011), compliance by minor supplies with the Standards was achieved for 35 percent (161,000 people) of the population served by 28 percent (67) of the minor supply zones. Bacteriological compliance was achieved for 89 percent (406,000 people) of the population served by 87 percent (212) of the minor supply zones. Protozoal compliance was achieved for 37 percent (171,000 people) of the population served by 30 percent (73) of the minor supply zones. Chemical compliance was achieved for 92 percent (420,000 people) of the population served by 90 percent (218) of the minor supply zones.

Monitoring requirements in the Standards: From 1 July 2014, minor drinking-water suppliers will need to meet the monitoring requirements in the Standards. During the reporting period (1 July 2010 to 30 June 2011), distribution zones serving 89 percent (406,000 people) of the population on 87 percent (212) of the minor supply zones met the monitoring requirements in the Standards. Adequate *E. coli* monitoring occurred in supplies serving 93 percent (424,000 people) of the population on 92 percent (224) of the minor supply zones, whereas 95 percent (437,000 people) of the population on 94 percent (228) of the minor supply zones had adequate chemical monitoring.

Public health risk management plans: From 1 July 2014, minor drinking-water suppliers have to have prepared public health risk management plans for their water supplies. The plan must be submitted to a drinking-water assessor for approval by 1 July 2015, and the supplier must begin to implement the plan within one month of it being approved. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to 30 percent (138,000 people) of the population on 30 percent (73) of the minor water supply zones were drafting their plans; water suppliers to 7 percent (32,000 people) of the population on 6 percent (14) of the zones had submitted them for approval or were redrafting them; water suppliers to 13 percent (58,000 people) of the population on 13 percent (31) of the zones had their plans approved; and water suppliers to 34 percent (154,000 people) of the population on 32 percent (77) of the zones had started implementing their plans.

Adequacy of supply: From 1 July 2014, minor drinking-water suppliers will need to take all practicable steps to ensure an adequate supply of drinking-water is provided to each point of supply. Interruptions may occur for planned maintenance, improvements or for emergency repairs. However, if the interruptions are likely to exceed eight hours, the water supplier needs to have prior approval from the medical officer of health and to have taken all practicable steps to warn affected people. If the supply is interrupted in an emergency, the supplier has up to 24 hours to inform the medical officer of health. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to 91 percent (417,000 people) of the population on 93 percent (225) of the minor supply zones reported adequacy of supply.

Source protection: From 1 July 2014, minor drinking-water suppliers will need to take steps to protect their water sources from contamination and pollution. These steps may include making submissions on district plans, resource consent applications or sanitary service assessments. Source protection may also include contributing to catchment management. During the reporting period (1 July 2010 to 30 June 2011), water suppliers undertook activities to protect the water sources for supplies serving 89 percent (405,000 people) of the population on 90 percent (218) of the minor supply zones.

Records: From 1 July 2008, minor drinking-water suppliers have been required to keep records of their water supplies to enable a drinking-water assessor to ascertain whether the water supplier is meeting the requirements of the Health Act 1956. During the reporting period (1 July 2010 to 30 June 2011), water suppliers kept appropriate records for supplies serving 98 percent (446,000 people) of the population on 95 percent (232) of the minor supply zones, and the records were available to drinking-water assessors, as required.

Complaints: From 1 July 2008, minor drinking-water suppliers have been required to record and investigate complaints about their water supplies. During the reporting period (1 July 2010 to 30 June 2011), water suppliers investigated the complaints they received about the drinking-water they supplied in supplies serving 99 percent (451,000 people) of the population on 98 percent (238) of minor supply zones.

Remedial steps: From 1 July 2008, minor drinking-water suppliers have been required to take remedial action if their water supply is not meeting the Standards. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to supplies serving 95 percent (435,000 people) of the population on 94 percent (229) of the minor supply zones were reported to have taken adequate remedial steps. Corrective actions were inadequate or not carried out in five minor water supplies, following detection of *E. coli* in the water. Corrective actions were inadequate or not carried out in nine minor water supplies, following chemical transgressions.

Small water supplies (101 to 500 people)

Maximum acceptable values in the Standards – bacteriological, protozoal and chemical: From 1 July 2015, small drinking-water suppliers will have to take all practicable steps to comply with the Standards. During the reporting period (1 July 2010 to 30 June 2011), compliance by small supplies with the Standards was achieved for 17 percent (14,000 people) of the population served by 15 percent (46) of the small supply zones. Bacteriological compliance was achieved for 72 percent (59,000 people) of the population served by 69 percent (211) of the small supply zones. Protozoal compliance was achieved for 19 percent (16,000 people) of the population served by 17 percent (52) of the small supply zones. Chemical compliance was achieved for 99 percent (80,000 people) of the population served by 99 percent (303) of the small supply zones.

Monitoring requirements in the Standards: From 1 July 2015, small drinking-water suppliers will need to meet the monitoring requirements in the Standards. During the reporting period (1 July 2010 to 30 June 2011), distribution zones serving 81 percent (65,000) of the population on 79 percent (241) of the small supply zones met the monitoring requirements in the Standards. Adequate *E. coli* monitoring occurred in zones serving 81 percent (66,000 people) of the population on 79 percent (242) of the small supply zones, whereas 99.5 percent (80,000 people) of the population on 99.7 percent (304) of the minor supply zones had adequate chemical monitoring.

Public health risk management plans: From 1 July 2015, small drinking-water suppliers have to have prepared public health risk management plans for their water supplies. The plan must be submitted to a drinking-water assessor for approval by 1 July 2016, and the supplier must begin to implement the plan within one month of it being approved. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to 16 percent (13,000 people) of the population on 16 percent (49) of the small supply zones were drafting their plans; water suppliers to 6 percent (4500 people) of the population on 5 percent (15) of the zones had submitted them for approval or were redrafting them; water suppliers to 13 percent (10,000 people) of the population on 13 percent (39) of the zones had their plans approved; and water suppliers to 34 percent (28,000 people) of the population on 32 percent (97) of the zones had started implementing their plans.

Adequacy of supply: From 1 July 2015, small water suppliers will need to take all practicable steps to ensure an adequate supply of drinking-water is provided to each point of supply. Interruptions may occur for planned maintenance, improvements or for emergency repairs. However, if the interruptions are likely to exceed eight hours, the water supplier needs to have prior approval from the medical officer of health and to have taken all practicable steps to warn affected people. If the supply is interrupted in an emergency, the supplier has up to 24 hours to inform the medical officer of health. During the reporting period (1 July 2010 to 30 June 2011), the water suppliers to 95 percent (77,000 people) of the population on 95 percent (289) of the small supply zones reported adequacy of supply.

Source protection: From 1 July 2015, small drinking-water suppliers will need to take steps to protect their water sources from contamination and pollution. These steps may include making submissions on district plans, resource consent applications or sanitary service assessments. Source protection may also include contributing to catchment management. During the reporting period (1 July 2010 to 30 June 2011), water suppliers undertook activities to protect the water sources for supplies serving 92 percent (74,000 people) of the population on 90 percent (275) of the small supply zones.

Records: From 1 July 2008, small drinking-water suppliers have been required to keep records of their water supplies to enable a drinking-water assessor to ascertain whether the water supplier is meeting the requirements of the Health Act 1956. During the reporting period (1 July 2010 to 30 June 2011), water suppliers kept appropriate records for supplies serving 92 percent (75,000 people) of the population on 91 percent (277) of the small supply zones, and the records were available to drinking-water assessors, as required.

Complaints: From 1 July 2008, small drinking-water suppliers have been required to record and investigate complaints about their water supplies. During the reporting period (1 July 2010 to 30 June 2011), water suppliers investigated the complaints they received about the drinking-water they supplied in supplies serving 96 percent (78,000 people) of the population on 96 percent (292) of the small supply zones.

Remedial steps: From 1 July 2008, all drinking-water suppliers have been required to take remedial action if their water supply is not meeting the Standards. During the reporting period (1 July 2010 to 30 June 2011), water suppliers to supplies serving 97 percent (78,000 people) of the population on 96 percent (294) of the small supply zones were reported to have taken adequate remedial steps. Corrective actions were inadequate or not carried out in 11 small water supplies, following detection of *E. coli* in the water.

Earthquake-related drinking-water monitoring in Christchurch

Several serious earthquakes occurred in Canterbury during the reporting period (1 July 2010 to 30 June 2011). These seismic events damaged much of the water reticulation system in Christchurch and in some of the surrounding areas, and impacted on water quality and the ability of the water suppliers, Christchurch City Council, Selwyn District Council and Waimakariri District Council, to comply with the Standards. Drinking-water suppliers were given the opportunity to be exempted from the part of the annual survey that addresses compliance with the Standards. Of those drinking-water suppliers offered this exemption, Christchurch City Council accepted for the following distribution zones: Brooklands/Kainga, Central Christchurch, Parklands, Riccarton, Rocky Point, West Christchurch, Diamond Harbour, Governors Bay, Lyttelton and North-West Christchurch. The combined registered population served by these zones is 400,020. The decision to exempt these supplies from the part of the *Annual Report on Drinking-water Quality 2010–2011* that addresses compliance with the Standards, was taken by the Ministry of Health, Community and Public Health and Christchurch City Council. This section reports on bacteriological monitoring and transgressions of the bacterial maximum acceptable value in the Standards for those distribution zones that are otherwise not included in the *Annual Report on Drinking-water Quality 2010–2011*. Adherence of the population to the ‘boil water’ advisories that were issued immediately following the three major earthquakes, is also reported.

After each significant earthquake in September 2010, February 2011 and June 2011, a ‘boil water’ advisory was implemented, the council’s programme of routine monitoring was suspended and intensive sampling of the water supplies was initiated the day after each event (Figure 1). The post-earthquake sampling programmes were extensive and covered all areas where reticulated water was available. After each of these earthquakes, the numbers of samples taken and tested for *E. coli* significantly increased above the numbers of samples normally taken. Examination of the combined water sampling data for the affected water supplies revealed that there were 176 *E. coli* transgressions within the 17,301 samples collected over the reporting period (1 July 2010 to 30 June 2011). *E. coli* transgressions were clustered in areas where damage had occurred. Any *E. coli* transgressions were re-sampled according to the Standards with follow-up including a sanitary survey, investigation of potential cause(s) of contamination, remediation and sampling, until the required three days of clear samples were obtained.

Christchurch City Council reacted swiftly to the effects of the earthquakes, and it issued a precautionary notice, jointly with the medical officer of health, for consumers to boil their water, and it arranged for water to be transported by tanker in from unaffected areas. The notice to boil both reticulated and tanker water, and ongoing broadcasting of messages to manage public health risks continued until the medical officer of health was satisfied that the integrity of the water supplies had been restored through the work undertaken on the infrastructure and the analysis of the sampling results. A decision was taken to add a disinfection barrier through chlorination to parts of the city.

As part of the public health response after the February earthquake, the Ministry of Health, on behalf of Community Public Health, commissioned a series of computer-assisted telephone interview health surveys⁴. Three of the surveys took place from 9 March 2011 to 3 April 2011, while the boil water notice was still in effect. Each survey targeted 500 households in the Christchurch and Lyttelton areas. The survey provided information about the source(s) of

⁴ Paine, S. and A. Bissielo, July 2011. *Final Report: The Christchurch health survey following the February 2011 earthquake (09 March–16 April 2011)*. Wellington: Institute of Environmental Science and Research Ltd (ESR).

drinking-water being used and whether households were treating the water. The results showed that ‘overall, the usual town supply water was the most used, followed by bottled drinking-water, private bore water, water from other sources and tankered drinking-water’. There was variation in the sources of drinking-water used. In the four weeks after the quake, ‘the more affected areas in the eastern suburbs of Christchurch relied more on bottled or tankered drinking-water, while the less affected areas were able to use their usual town supply’. The survey also noted that while the boil water notice was in effect, ‘most households surveyed (90.4%) were boiling water prior to consumption’.

Although some *E. coli* transgressions occurred following the earthquakes, the council’s actions controlled the elevated risks caused by earthquake damage and minimised the health risk posed by the drinking-water. Further details of the response can be found in Appendix 3 of this report. The best measure that we have of the success of the public health response is the lack of recorded increases in potentially waterborne diseases in the periods following the earthquakes. Christchurch City Council, Civil Defence and Emergency Management and the public health services are commended for their responses to the extreme risks that the earthquakes presented to the drinking-water supply infrastructure.

Christchurch *E. coli* monitoring and results for 1 July 2010 to 30 June 2011

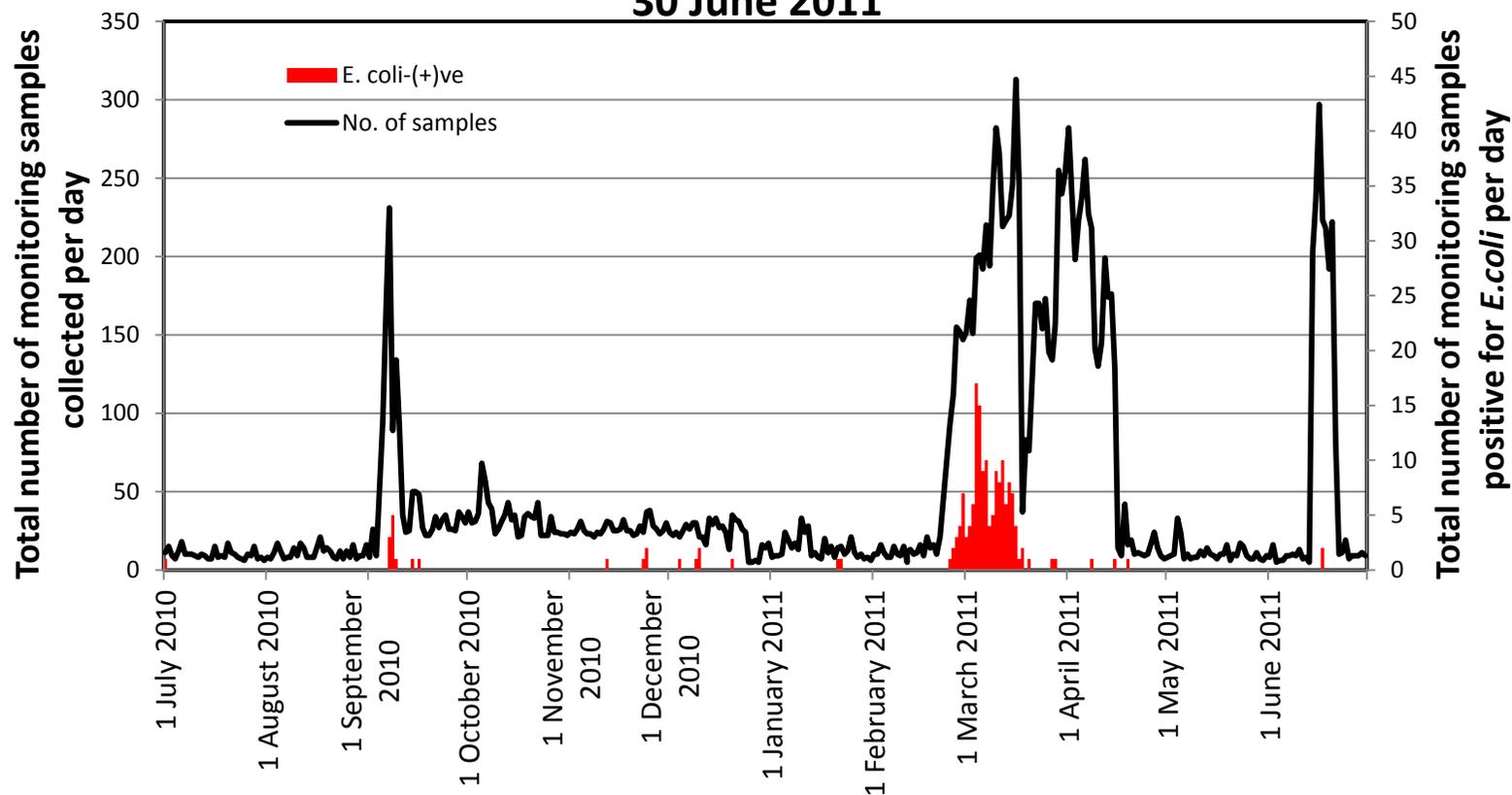


Figure 1. *Escherichia coli* monitoring and results for 10 Christchurch drinking-water zones during the legislative compliance reporting year, 1 July 2010 to 30 June 2011. Note the two different scales for the axes.

Interpretation and discussion

Introduction

The Health Act 1956 aims to protect public health by ensuring that communities are provided with a safe, wholesome and adequate supply of drinking-water. To do this, the Health Act 1956 embraces risk management concepts to promote proactive measures to protect drinking-water quality through the development and use of public health risk management plans and it includes appropriate monitoring of drinking-water quality. This monitoring checks the extent to which maximum acceptable values are not exceeded and, by implication, the effectiveness of the public health risk management plans.

This section discusses bacteriological, protozoal and chemical compliance with the Standards, progress in public health risk management plan preparation and use, and the public health significance of these findings. The discussion considers compliance in terms of size of supply. The extents to which other requirements of the Health Act 1956 were met during the reporting period (1 July 2010 to 30 June 2011) are also discussed individually – the category of supply determining when various aspects of the Health Act 1956 come into force.

Greater discussion is provided about the public health significance of the exceedences of chemical maximum acceptable values than the exceedences of the microbiological maximum acceptable values because concentrations of the chemicals of concern were measured and the quantitative toxicological basis for the maximum acceptable value is usually known. Microbiological compliance does not provide information about the concentrations of disease-causing microorganisms (pathogens) in the water.

Overall compliance with the Standards

Overall compliance with the Standards requires a water supply to meet the requirements for bacteriological, protozoal and chemical compliance. During the reporting period (1 July 2010 to 30 June 2011), 78 percent of the population on registered community drinking-water supplies serving more than 100 people received drinking-water from a fully compliant water supply. This compares with the same period in the previous year, when 76 percent of the population on community drinking-water supplies serving more than 100 people received drinking-water from fully compliant supplies. In terms of bacteriological, protozoal and chemical compliance:

- 97 percent of people received water that met the bacteriological standards (96 percent in 2009–2010)
- 79 percent of people received water that met the protozoal standards (78 percent in 2009–2010)
- 97 percent of people received water that met the chemical standards (96 percent in 2009–2010).

Figure 2 shows rates of compliance with the Standards in 2010–2011.

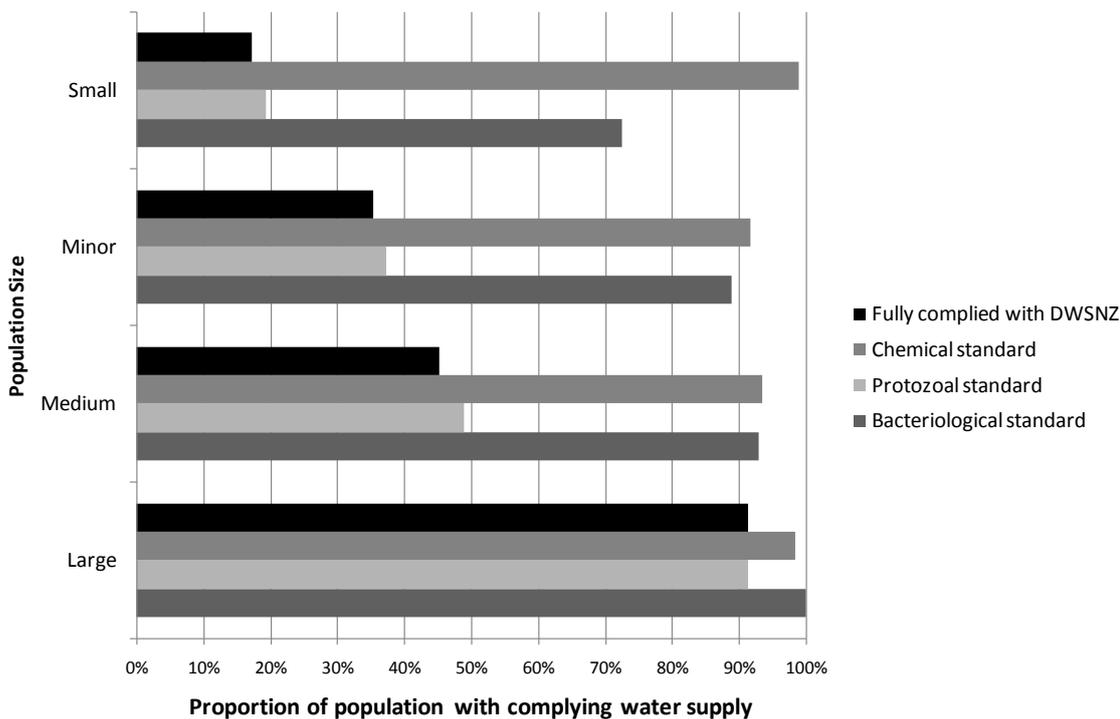


Figure 2. Compliance with the Standards from 2010 to 2011

While only 28 percent of the drinking-water distribution zones were fully compliant (27 percent in 2009–2010) with the Standards, the level of compliance was highest in supplies serving large populations and lowest in those serving small populations.

Of the fully compliant zones, bacteriological and chemical compliance were achieved to the greatest degree, followed by protozoal compliance. The high level of chemical compliance is most likely the result of P2 determinands not being assigned to small supplies, hence their compliance by default.

Exceedence of a microbiological maximum acceptable value is generally of greater concern than the exceedence of a chemical maximum acceptable value because of the timescales over which their adverse effects are likely to be experienced. Pathogens can cause illness rapidly following a single contamination event. Chemicals, unless present at extraordinarily high concentrations, will generally have adverse effects only after decades of exposure. For these reasons, immediate remedial action is more important in response to microbiological than chemical exceedences.

Bacteriological compliance

Approximately 97 percent (3,309,000 people)⁵ of the population on small to large community drinking-water supplies were supplied with drinking-water that complied bacteriologically with the Standards (Table 1). Percentage compliance increases with the size of the population served by a supply. Bacteriological compliance in the

⁵ Some people supplied with water that failed to comply bacteriologically with the Standards fell into more than one of the non-compliance categories.

reporting period (1 July 2010 to 30 June 2011) was achieved in all large supplies, 94 percent of the medium supplies, 87 percent of the minor supplies and 69 percent of the small supplies. This is possibly a reflection of the increasing per capita cost of effective bacteriological treatment as the community population decreases.

Maximum acceptable value exceedences

A sample transgresses (exceeds) the bacteriological standard when *E. coli* is detected in a 100 mL sample of water⁶. Approximately 3 percent (92,000 people)⁷ of the population served by small to large community drinking-water supplies was supplied with drinking-water that failed to comply bacteriologically with the Standards. Of the 92,000 people served by bacteriologically non-compliant supplies, 52,000 (2 percent of the total population) were served by supplies with unacceptable numbers of *E. coli* transgressions.

Public health significance of exceedences

The presence of *E. coli* in water indicates that the water has been contaminated with faeces. This may be the result of the raw water being contaminated and the water being inadequately treated, or it may result from contamination of the water after treatment, during distribution to the community. In either case, although *E. coli* itself may or may not present a threat to health, its presence means that pathogens also present in the faeces could also be present in the water. Although the concentrations of these organisms are not monitored, their possible presence must be assumed, and consequently the detection of *E. coli* in the water must be regarded as serious risk to public health.

As well as indicating a risk to public health, the detection of *E. coli* shows that there has been a failure in the barriers between contaminants and the community. Consequently, all *E. coli* transgressions must be immediately investigated and corrective action implemented. Depending on the result of the investigation, modification of the supply's public health risk management plan may also be needed.

During the reporting period (1 July 2010 to 30 June 2011), 0.3 percent of the population (12,000 people) was served by supplies in which *E. coli* transgressions occurred and that were not appropriately followed up by immediate corrective action.

The failure to take appropriate corrective action immediately following *E. coli* transgressions is a serious cause of concern, because of the public health consequences that could follow if the failure coincided with raised pathogen concentrations in the source water. Failure to reduce this risk by increased disinfection or by taking appropriate steps to reduce the hazard (ie, closing or changing the supply) or exposure (ie, recommending that people boil all drinking-water) increases the likelihood of waterborne disease. Inadequate corrective action indicates that the water supplier has either failed to recognise this issue or to accept that it poses a potentially serious health risk.

⁶ A small proportion of transgressing samples may not result in non-compliance provided that a large enough number of samples were tested during the compliance period and each transgression was followed by appropriate remedial action.

⁷ Some people supplied with water that failed to comply bacteriologically with the Standards fell into more than one of the non-compliance categories.

Other causes of non-compliance

Of the total population, 0.2 percent (7900 people) was served by supplies where *E. coli* monitoring was either not carried out or where monitoring data were unavailable. Approximately 1 percent of the population (41,000 people) was served by supplies that were inadequately monitored.

Protozoal compliance

There is a clear trend in protozoal compliance with population size where the drinking-water received by larger populations showed greater compliance with the Standards. Protozoal compliance in the reporting period (1 July 2010 to 30 June 2011) was achieved in 83 percent of the large supplies, 47 percent of the medium supplies, 30 percent of the minor supplies and 17 percent of the small supplies.

Protozoal non-compliance does not necessarily mean that pathogenic protozoa (*Giardia* sp. and *Cryptosporidium* sp.) were present in the water. Water suppliers are not required to monitor the water for pathogenic protozoa. Protozoal compliance is based on the likelihood that the treatment processes in operation will adequately protect the community if pathogenic protozoa were present in the source. To achieve this, the water supplier must do two things. First, they must have treatment processes in operation that the Standards state can remove or inactivate an adequate percentage of any protozoa that are present in the raw water. Second, the water supplier must be able to show that they are operating the treatment processes well enough to meet the target percentage removal.

The trend of decreasing protozoal compliance with decreasing supply size is possibly a reflection of the large cost of effective protozoal treatment, which is less able to be borne by smaller communities. It is also possible that the operators of treatment plants supplying smaller communities do not have the same level of expertise as those operating larger systems.

Chemical compliance

Approximately 3 percent of the population (99,000 people) was supplied with drinking-water from a supply that was non-compliant with chemical requirements of the Standards during the reporting period (1 July 2010 to 30 June 2011). Chemical determinands were assigned to 187 distribution zones, supplying drinking-water to 75 percent (2,563,000 people) of the population. Zones to which chemical determinands were assigned and that demonstrated chemical compliance, provided water to approximately 72 percent of the population (2,464,000 people).

Fluoride was added to the drinking-water received by 68 percent of the population (2,329,000 people) in 115 zones. It is cost effective to fluoridate zones serving more than 1000 people (Wright et al 1999)⁸. Of the 255 zones serving 1000 or more people, 39 percent (99) were fluoridated in the reporting period (1 July 2010 to 30 June 2011).

Maximum acceptable value exceedences

Drinking-water supplies to around 59,000 people (17 zones) exceeded the maximum acceptable values for at least one chemical during the reporting period (1 July 2010 to

⁸ Wright, JC; Bates, MN; Cutress, T; Lee, M. 1999. *The Cost-effectiveness of Fluoridating Water Supplies in New Zealand*. ESR Report for the Ministry of Health, Wellington.

30 June 2011). All zones were in separate communities, with the exception of two which were in the same community. Zones with exceedences were located in both islands, but with the majority being in the North Island. The chemicals for which the maximum acceptable values were exceeded were: arsenic, boron, dichloroacetic acid, total haloacetic acids, fluoride, lead, manganese and nitrate. All zones with arsenic exceedences were located in the volcanic areas of the North Island.

Frequency and extent of maximum acceptable value exceedences

The frequency at which maximum acceptable values were exceeded in monitoring samples ranged from seldom (1 or 2 samples out of 40 or 50) in some zones, to zones in which a chemical always, or almost always, exceeded its maximum acceptable value. The highest chemical concentrations reported ranged from concentrations that barely exceeded the maximum acceptable value to concentrations 12 times the maximum acceptable value. High frequencies and large exceedences did not occur together. The greatest exceedences of maximum acceptable values were reported in zones in which the frequency of exceedence was low (7 percent or less).

The maximum acceptable value for fluoride was exceeded by up to 20 percent in one zone (4000 people) in 2 of 52 samples.

Public health significance of exceedences

The greatest exceedences of maximum acceptable values were found for lead, but in these zones, the frequencies of exceedence were low. Such cases are unlikely to be of public health significance for two reasons. First, maximum acceptable values are calculated to provide satisfactory protection against adverse health effects for a lifetime (70 years) of drinking-water consumption. Consequently, infrequent exceedences of the maximum acceptable concentration will not result in an unsafe level of exposure. Second, the primary sources of lead in New Zealand's drinking-waters are taps, or plumbing fittings close to the tap. As a result, only the small volume of water that has been standing in the tap contains the high lead concentration. In zones in which the water is plumbosolvent (water likely to dissolve metals from fittings), the water supplier should be advising consumers to reduce their intake of lead further by briefly flushing the tap before drawing water for drinking, cooking or cleaning teeth.

The zones in which exceedences are of public health significance are those in which the concentrations of a chemical frequently exceed its maximum acceptable value. This situation was found for arsenic in two zones (from the same community, combined population of 2700 people) that reported exceedences in more than 90 percent of the monitoring samples. Exceedences by arsenic of its maximum acceptable value are of greater public health significance than the exceedences by other chemicals of their maximum acceptable values. The level of acceptable risk used to set the maximum acceptable value for most carcinogens is 1 in 10^5 . For arsenic, the maximum acceptable value of 0.01 mg/L cannot be lowered, because of analytical and treatment limitations. This equates to a level of risk of 1 in 1700 (the Standards).

Two other zones reported exceedences by chemicals of their maximum acceptable values in more than 50 percent of the monitoring samples, but these are of lesser public health significance than the arsenic exceedences. Nitrate exceeded its

maximum acceptable value in almost 80 percent of samples collected in one zone (population 10,500). The maximum acceptable value for nitrate is intended to protect bottle-fed infants. Although formula for infants should not be prepared using this water, it does not represent a health threat to other age groups. Boron was the chemical of concern in the other zone in which the maximum acceptable value was exceeded in more than 50 percent of the monitoring samples. Despite these exceedences, this is not a public health concern. The most recent edition of the World Health Organization's *Guidelines for Drinking-water Quality* (2011)⁹ has increased the boron guideline to 2.4 mg/L, a value well above the highest concentration found in this zone.

Monitoring

Unsatisfactory monitoring remains a major reason for non-compliance with the chemical criteria of the Standards. Without this information, the water supplier is unable to make well-informed decisions about the actions to take to achieve compliance, and the health significance of chemicals assigned to a distribution zone cannot be readily assessed.

Status of public health risk management plans

Monitoring water quality alone is not a satisfactory approach to water supply management. In most instances, test results will arrive too late to prevent contaminated water reaching a community. The Health Act 1956 requires water suppliers to move beyond reliance on monitoring. Public health risk management plans are fundamental to the water supplier being able to produce safe water and having confidence that the water is safe at times when monitoring samples are not available to confirm its quality.

Preparing a public health risk management plan requires a water supplier to review the whole of their water supply from the raw water (and possible contaminant sources), through the treatment processes, to the pipe network that carries the water out into the community. During this review, possible causes of contamination are identified and measures put in place to reduce the likelihood of these events happening. The plan also states what remedial actions need to be taken should a contamination event occur, despite the preventive measures.

Table 2 shows progress with developing and implementing public health risk management plans for the classes of supply covered by this report.

Overall, zones serving 27 percent of the population (32 percent of zones) have implemented their public health risk management plans. Zones serving a further 69 percent of the population (44 percent of zones) were preparing their plans prior to implementation. All of the large supplies had either implemented their plans or were at various stages of plan preparation. The rate of development and implementation of the plans decreased with reducing population size, for example, 34 percent of smaller supplies had not started preparing their public health risk management plans, but smaller supplies have longer to comply.

⁹ WHO. 2011. *Guidelines for Drinking-water Quality*. Geneva: World Health Organization.

Table 2: Status of public health risk management plans

Plan Status	Size of supply				Total
	Large (over 10,000 people)	Medium (5001– 10,000 people)	Minor (501–5000 people)	Small (101–500 people)	
	No. of complying zones (% of complying zones within band)				
Plan not started ¹	-	2 (6%)	48 (20%)	105 (34%)	155 (24%)
Plan being drafted	31 (45%)	8 (22%)	73 (30%)	49 (16%)	161 (25%)
Plan submitted ²	6 (9%)	7 (19%)	14 (6%)	15 (5%)	42 (6%)
Plan approved	6 (9%)	7 (19%)	31 (13%)	39 (13%)	83 (13%)
Plan implemented	26 (38%)	12 (33%)	77 (32%)	97 (32%)	212 (32%)

¹ Includes *Not planned* and *Not started*

² Includes *Submitted* and *Redrafting*

Note. Totals may not add up to 100% due to rounding.

Meeting legislative requirements

The Health Act 1956 places some specific duties, considered key to protecting the safety of drinking-water supplies, on water suppliers. Some of these are contained in the Standards (such as monitoring) or should be included in public health risk management plans (such as source protection, keeping records and remedial actions). Others, such as handling complaints, may not so evidently appear in other tools used in water supply management.

Table 3 summarises, as a function of the size of the supply, the extent to which supplies have met each of these key requirements.

Table 3: Meeting legislative requirements

		Size of supply				Total
		Large (over 10,000 people)	Medium (5001– 10,000 people)	Minor (501–5000 people)	Small (101–500 people)	
No. of zones		69	36	243	305	653
Registered population		2,601,040	262,005	457,499	80,859	3,401,403
Monitoring requirements	Zones	97%	97%	87%	79%	85.1%
	Population	99%	98%	89%	81%	97.1%
Adequacy of supply	Zones	72%	81%	93%	95%	90.8%
	Population	82%	79%	91%	95%	83.1%
Source protection	Zones	75%	81%	90%	90%	87.9%
	Population	86%	79%	89%	92%	85.6%
Records	Zones	100%	100%	95%	91%	94.0%
	Population	100%	100%	98%	92%	99.5%
Complaints	Zones	100%	100%	98%	96%	97.2%
	Population	100%	100%	99%	96%	99.7%
Remedial steps	Zones	97%	94%	94%	96%	95.6%
	Population	99%	96%	95%	97%	98.1%

While drinking-water suppliers are not yet expected to meet the requirements of sections 69S to 69ZC of the Health Act 1956, including the requirements regarding monitoring, adequacy of supply, source protection and public health risk management plans, most suppliers met these requirements. Overall, water suppliers are meeting their current requirements, and many are meeting their future requirements. There is a tendency for fewer smaller drinking-water suppliers to have met their current requirements under the Health Act 1956 than the larger drinking-water suppliers, but smaller suppliers have several more years before compliance is required. Many drinking-water suppliers already meet the requirements of the aspects of the Health Act 1956 that are being phased in, and many others are making progress towards this achievement.

Monitoring requirements (Section 69Y)

Sole reliance on monitoring is an unsatisfactory basis for managing drinking-water quality. However, the Health Act 1956 will require water suppliers to monitor water quality (as required in the Standards) because it is still a key component in managing drinking-water supplies. It is necessary as a check that the public health risk management plan is operating satisfactorily and to indicate whether remedial action is required. Further, it allows the water supplier to determine whether the drinking-water quality meets that required by the Standards.

Overall, zones serving 97 percent of the population (85 percent of zones) met the monitoring requirements. All large- and medium-sized supplies serving a total of 3,307,000 people met the *E. coli* monitoring requirements, with small supplies monitoring least.

Adequacy of supply (Section 69S)

Insanitary conditions can arise when a community is without water, and consumers can seek other, possibly unsafe, sources of water. To avoid such eventualities, drinking-water suppliers will be required to take all practicable steps to ensure the adequacy of supply and in the event of an interruption, planned or otherwise, will be required to undertake certain steps.

Overall, zones serving 83 percent of the population (91 percent of zones) met this requirement during the reporting period, with the lowest recorded level of meeting this requirement, at 72 percent, being for the large supplies. This may have resulted from information being received from only 54 of 69 large supplies. However, even if expressed as a percentage of the supplies from which information was received, the level of meeting the requirement (93 percent) is less than the reported rate of 98 percent for all small supplies that provided information.

This may reflect the greater difficulties associated with ensuring the integrity and continuous, satisfactory operation of a large reticulation system compared with a small system. As reticulation infrastructure ages, water suppliers may experience greater difficulty in maintaining adequacy of supply.

Source protection (Section 69U)

The protection of the quality of source waters is probably the most important component of the multi-barrier approach to drinking-water supply management encouraged by the Standards. Protection of source waters reduces the numbers and

concentrations of contaminants that the water treatment system has to deal with. Further, the consequences for public health in the event of treatment failure will be reduced.

Overall, zones serving 86 percent of the population (88 percent of zones) met this requirement. Source protection generally increased with decreasing population size. If only suppliers that responded to the survey are included, the rates in terms of zones are 96 percent, 100 percent, 96 percent and 94 percent for large, medium, minor and small classes of supply, respectively. This may be due to the low response rate by large suppliers to this survey, which are counted as not meeting this requirement.

Records (Section 69ZD)

The maintenance of records assists drinking-water assessors in their job of determining whether a supply meets the requirements of the Health Act 1956 and complies with the Standards. It also ensures that people unfamiliar with a supply, such as a new employee, are better informed about the way the supply should be operated and what operational parameters have been typical. In the event of a waterborne disease outbreak or other incident resulting from system failure, well-kept records may assist in understanding what has gone wrong and how this could be prevented in future.

Overall, zones serving 99.5 percent of the population (94 percent of zones) kept records.

Complaints (Section 69ZE)

Complaints about drinking-water quality most often relate to the aesthetic properties of the water (taste, odour, appearance). In some cases, our senses of taste and smell are better able to identify a problem than instrumentation. Complaints need to be investigated, because they potentially inform the water supplier of a problem about which they may not otherwise be aware. Consumer concerns about the taste and odour of water, if sufficiently severe, may lead to the consumer seeking another source of drinking-water. While the new source may not have the aesthetic problems associated with the first, it may contain contaminants that cannot be detected by our senses.

Overall, zones serving 99.7 percent of the population (97 percent of zones) investigated complaints.

Remedial steps (Section 69ZF)

The Health Act 1956 requires drinking-water suppliers to take remedial actions in the event that monitoring reveals contamination of the water and that the Standards are breached. Prompt action is required when the contaminants are microbiological, because pathogens can rapidly cause disease. Although the Standards set out specific remedial actions for particular situations, the absence of instructions for a specific situation should not prevent drinking-water suppliers from seeking a way of remedying a fault they have identified in their system, which may adversely affect the safety of the supply.

Almost all supplies undertook remedial actions in response to transgressions. Zones serving 2 percent of the population (4 percent of zones) did not take remedial actions when necessary.