

**Annual Report on  
Drinking-Water  
in New Zealand  
2009–2010**

Citation: Ministry of Health. 2011. *Annual Report on  
Drinking-Water in New Zealand 2009–2010*.  
Wellington: Ministry of Health.

Published by the Ministry of Health in June 2011  
PO Box 5013, Wellington, New Zealand

ISSN 1176-1424 (Print)  
ISSN 1179-2604 (Online)  
HP 5370

This document is available on the Ministry of Health's website:  
[www.moh.govt.nz/water](http://www.moh.govt.nz/water)



MANATŪ HAUORA

## **Ministry of Health Disclaimer**

The data and analyses contained in the *Annual Report on Drinking-Water in New Zealand 2009–2010* have been supplied to the Ministry of Health by the Institute of Environmental Science and Research Limited (ESR). The Ministry of Health cannot confirm the accuracy of the data and the analyses and accepts no liability or responsibility for any acts or omissions, done or omitted in reliance, in whole or in part, on the data or the analyses.

All local authorities and bulk water suppliers and relevant government agencies were given the opportunity to comment on and check this document for accuracy prior to publication. The Ministry of Health has endeavoured to ensure that the feedback has been included in this published report.

## **ESR Disclaimer**

This report or document (the Report) is given by the Institute of Environmental Science and Research Limited (ESR) solely for the benefit of the Ministry of Health, Public Health Service Providers and other Third Party Beneficiaries as defined in the Contract between ESR and the Ministry of Health and is strictly subject to the conditions laid out in that Contract.

Neither ESR nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for use of the Report or its contents by any person or organisation.

## **Acknowledgements**

The *Annual Report on Drinking-Water in New Zealand 2009–2010* was largely prepared for the Ministry of Health as part of a contract for scientific services by Andrew Ball, Jacqui Ritchie, Alan Ferguson and Chris Nokes. The authors are grateful for the efforts of District Health Board Public Health Unit drinking water assessors and local authority personnel who gathered the data and completed the questionnaire forms for this survey and, in particular, to those who took the time to provide useful feedback about the questionnaire.

The care taken by the staff of the Ministry of Health, David Wood and Hilary Michie in reviewing the report and providing valuable comment was also very much appreciated.

## 1.0 Key Issues

A number of issues have emerged from this review.

- Overall microbiological compliance has increased by 4% in population terms during 2009–2010. Approximately 94% of people on registered supplies have bacteriologically-compliant drinking-water and protozoal-compliance was achieved in supplies serving 75% of the population.
- Of the 72 large supplies (ie, serving 10,000 or more people), two did not achieve bacteriological compliance and 15 did not achieve protozoal compliance in the survey year.
- Seven of the eight hospitals with their own water supplies were bacteriologically compliant during 2009–2010, with the monitoring programme of the Ashburton Hospital supply requiring improvement. However, protozoal compliance was only achieved by four of the hospitals. Protozoal treatment is presently inadequate for the Ashburton, Kaeo and Princess Margaret hospitals and the Te Puia Springs Hospital and Village supply.
- The improvement in compliance of school supplies has continued, with 26% of schools complying during 2009–2010.
- Monitoring for *E. coli* ceased in 38 community and school supplies during the 2009–2010 period.
- During 2009–2010, 30 LA-run zones did not follow up bacteriological transgressions with adequate corrective action
- 125 community- and school- supplies, (including 54 LA-run zones) that achieved bacteriological compliance in 2008–2009, did not achieve compliance in 2009–2010..
- One zone showed discrepancies between the results of bacteriological monitoring by the water supplier and bacteriological surveillance by the DWA during 2009–2010.
- Plumbosolvency warnings were not given to 156,000 people in 40 zones during 2009–2010. Water suppliers should give plumbosolvency warnings to consumers in supplies serving 500 or more people unless the absence of plumbosolvency can be demonstrated.

## 2.0 Introduction

This annual report on New Zealand's drinking-water spans the period July 2009 to June 2010. This is the fourth year for which the *Drinking-Water Standards for New Zealand: 2005* (DWSNZ 2005)<sup>1</sup> could be used to assess the microbiological and chemical quality of drinking-water. As the transition from the *Drinking-Water Standards for New Zealand: 2000* (DWSNZ 2000) to the DWSNZ 2005 is scheduled to take several years and drinking-water suppliers may elect which of these they are to operate under, compliance is assessed against the standard which the supplier has chosen to comply with. These standards are referred to collectively as DWSNZ.

The report comprises the following sections: a general overview of the quality of drinking-water of all supplies within New Zealand and a summary of drinking-water quality, with supplies separated into local authority (LA)-operated supplies (including commercial water supply companies contracted by LAs) and private organisations or communities responsible for the operation of their own drinking-water supplies, which are split into school supplies and other supplies. The report also contains appendices as follows: Appendix 1 National Drinking-Drinking Overview; Appendix 2 Microbiological and Chemical Compliance of Individual Water Supplies with the DWSNZ; Appendix 3 Waterborne Disease Outbreaks Summary.

The information on the quality of drinking-water was obtained from District Health Board drinking water assessors (DWAs) using questionnaires that sought data concerning surveillance and monitoring programmes. Water suppliers are responsible for water quality monitoring, whereas the DWAs carry out surveillance of the management of drinking-water quality in their health districts.

The survey sought information about both distribution zones and water treatment plants. In addition to microbiological and chemical quality information, the questionnaire collected information about the water treatment processes in use and the means used to demonstrate compliance with the DWSNZ. Information was also gathered about the status of the Public Health Risk Management Plan (PHRMP) for each supply.

To evaluate the public health significance of the water quality data they are expressed primarily in terms of the population affected rather than the numbers of water supplies involved because different-sized populations are served by different water supplies.

It has become apparent that the way zone populations were managed has resulted in a distortion of the national compliance stated in previous reports. This resulted in an apparent decline in compliance being reported in the *Annual Review of Drinking-Water Quality in New Zealand 2008/09*. However, this was mostly an artefact caused by the zone populations not being updated by water suppliers, particularly those in the larger communities. As the population attributed to non-registered supplies was derived from the difference between the New Zealand population and the total population served by registered supplies, failure to update zone populations effectively shifted people on complying supplies to unregistered supplies.

---

<sup>1</sup> The original version of the *Drinking-Water Standards for New Zealand: 2005* and its 2008 revision are referred to collectively as the DWSNZ 2005.

In this report, the denominator of population reporting has been changed from the total Census population to the population served by registered drinking-water supplies. National compliance for previous years has been recalculated on this basis to allow trends in compliance to be reported. This method is intended to be used to report compliance nationally from hereon.

The 2010 *Register of Community Drinking-water Supplies in New Zealand* (the Register) contained 2,321 distribution zones and 2,258 water treatment plants and covered an estimated 91% of the New Zealand population. The microbiological and chemical quality of drinking-water was assessed against the DWSNZ using a survey of all treatment plants and distribution zones. The version of the DWSNZ being used by water suppliers as a measure of compliance is progressing from the DWSNZ 2000 towards the DWSNZ 2005, these being applied in 657 and 990 distribution zones, respectively, with the remainder not applying the DWSNZ. Information was received from DWAs about all supplies reported on, but 159 water suppliers could not be contacted or were either unable or unwilling to provide monitoring data.

The microbiological health risk was assessed using compliance criteria based on two main microbiological reference organisms: *Escherichia 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*. The chemical health risk for selected supplies was assessed with respect to those specifically-assigned chemical determinands that required monitoring.

### 3.0 Summary of findings

#### 3.1 Microbiological compliance

The overall level of drinking-water quality in 2009–2010 was as follows:

##### ***E. coli* compliance**

Percentage of the population served by registered drinking-water supplies that comply with the distribution zone <i>E. coli</i> requirements of the DWSNZ. [These are generally located in towns with populations in excess of 5,000 people.]	94%
Percentage of the population served by registered drinking-water supplies <u>not</u> compliant with the distribution zone <i>E. coli</i> requirements of the DWSNZ. [These are generally located in towns with populations of less than 5,000 people.]	6%

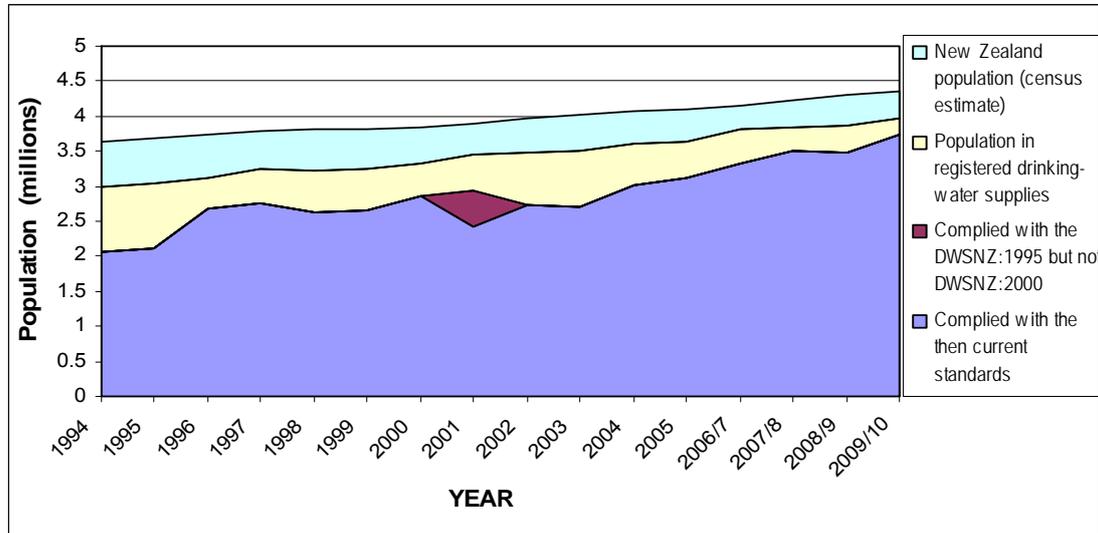
##### **Protozoal compliance**

Percentage of the population served by registered drinking-water supplies that comply with the protozoan requirements of the DWSNZ. [These are generally located in towns with populations in excess of 5,000 people.]	75%
Percentage of New Zealand population served by reticulated drinking-water supplies <u>not</u> compliant with the protozoan requirements of the DWSNZ. [These are generally located in towns with populations less than 5,000 people.]	25%

During 2009–2010, 94% of New Zealanders on registered supplies were served by community drinking-water supplies that complied with the *E. coli* criteria of the DWSNZ. This represents an increase of 4% from the previous survey.

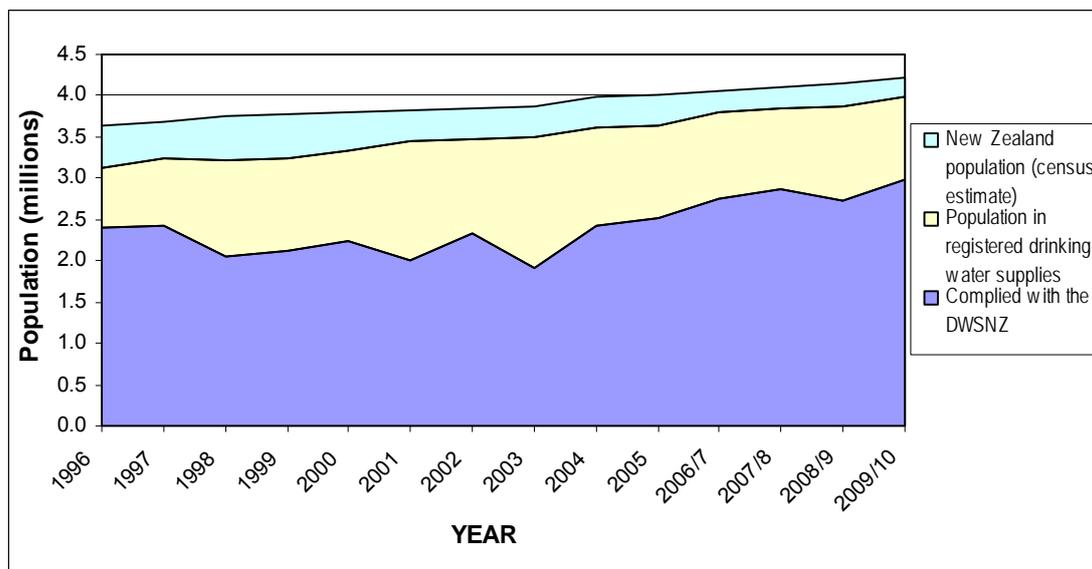
The general trend in bacteriological compliance is best assessed at the distribution zone and is shown in Figure 1 which shows the changes since the Ministry of Health drinking-water quality surveys commenced in 1994.

The complete details of distribution zone compliance for each health district are given in Appendix 2.



**Figure 1: Trend in bacteriological compliance at the distribution zone**

The general trend in protozoal compliance is assessed at treatment plants and is shown in Figure 2. The estimated proportion of the population in registered supplies supplied by plants that comply with the protozoa standard (75%) has increased by about 4% since the previous survey.



**Figure 2: Trend in protozoal compliance at the treatment plant**

There was a general trend for the percentage of distribution zones complying bacteriologically within a population band to decrease as the population of the band decreased (ie, the smaller the community water supply, the less likely it is to comply with the DWSNZ).

Approximately 251,000 (6%)<sup>2</sup> of people on registered supplies were supplied with drinking-water that failed to comply bacteriologically with the criteria of the DWSNZ. The causes of non-compliance and the number of people affected are listed below.

- 72,000 (2%) were served by registered supplies with unacceptable levels of *E. coli*.
- 21,000 (0.5%) were served by registered supplies where water suppliers failed to take appropriate corrective action once *E. coli* had been found.
- 74,000 (2%) were served by registered supplies where *E. coli* monitoring was either not carried out or where monitoring data were not available.
- 123,000 (3%) were served by registered supplies that did not comply bacteriologically with the DWSNZ because the frequency of sampling during the year was insufficient to demonstrate *E. coli* compliance according to the DWSNZ.
- 1,100 (0.03%) were served by registered supplies that did not comply bacteriologically because the compliance testing was not analysed by a laboratory recognised by the Ministry of Health for drinking-water compliance testing.

An estimated 385,000 or 9%<sup>3</sup> of New Zealanders have unregistered supplies (ie, dwellings that are not connected to a registered drinking-water supply). Those on non-reticulated supplies are only required to be registered if the supply is to a community purpose building.

The number of people in zones with unacceptable levels of *E. coli*, inadequate corrective actions following bacteriological transgressions, that were not monitored or inadequately monitored, or that were monitored by laboratories not recognised by the Ministry of Health fell markedly since the 2008–2009 survey.

There is a perception that water that is shown to contain *E. coli* is a greater risk to public health than water that is not tested. The reality is that, apart from groundwater from a confined aquifer, all source waters are likely to be faecally-contaminated and so will contain the faecal indicator bacterium *E. coli* unless the water is adequately treated.

One of the reasons for monitoring is to identify hazards and remedy them rapidly if they occur. The number of people served by supplies in which *E. coli* transgressions occurred and that were not appropriately followed up by immediate corrective action decreased between 2008–2009 and 2009–2010. Although a decrease occurred, this issue remains a concern because failure to remedy the cause of a transgression subjects the population to prolonged exposure to faecally-contaminated drinking-water and imposes an unacceptable risk of waterborne disease on the community.

Of the 30 LA-run-supplies that failed to take appropriate corrective action in 2009–2010, 10 had been reported for the same practice in the review carried out from 2008–2009. Otorohanga, Marlborough, Buller and Waitaki District Councils should urgently review and improve their corrective action procedures following bacteriological transgressions. It is acknowledged that some of these supplies are

---

<sup>2</sup> Some people supplied with water that failed to comply bacteriologically with the DWSNZ fell into more than one of the non-compliance categories.

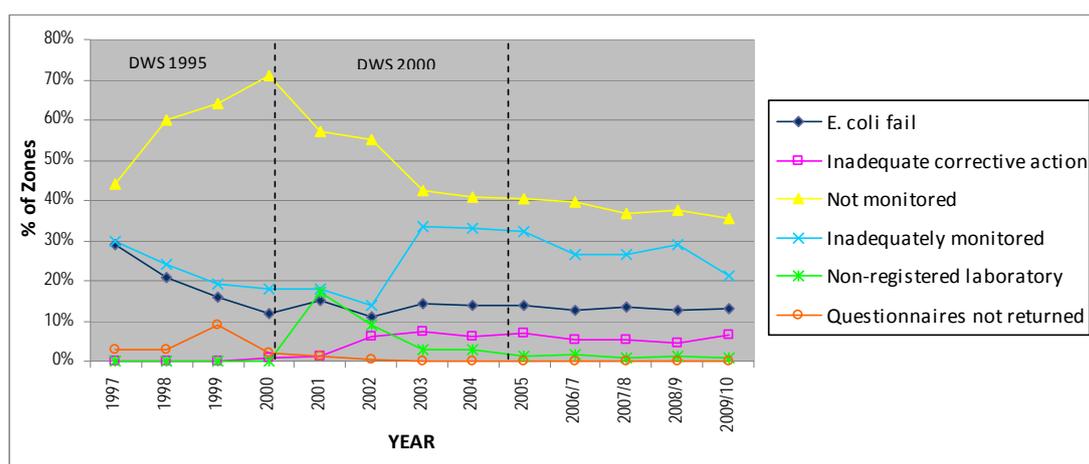
<sup>3</sup> Derived from the difference between the Census estimate and the population in registered supplies. This estimate is subject to error if the Register contains inaccurate or out-of-date population data.

subject to permanent boil water notices; however, this is not an appropriate long-term solution.

A further 184,000 people were supplied with drinking-water from 82 zones that failed to comply bacteriologically with the criteria of the DWSNZ for technical reasons. These fell into two groups. Supplies serving fewer than 500 people that failed only to comply with the minimum number of days-of-the-week sampling requirement of the DWSNZ 2000 were deemed to comply because there is no such requirement in the DWSNZ 1995. Supplies serving communities of 500 or more people that were adjudged by the DWA to have addressed the deficiency were deemed to have complied with the DWSNZ.

There were 125 zones, serving a total of approximately 78,000 people that complied bacteriologically in 2008–2009, but not in 2009–2010. Of these zones, 54 were run by LAs.

The trends in the causes of bacteriological non-compliance of distribution zones are displayed in Figure 3. Overall, there is a steady downward trend in the number of zones that are not monitored or are inadequately monitored and those that use non-recognised laboratories for compliance monitoring. The former reflects the slow but sustained updating of monitoring programmes to comply with the procedures specified in the DWSNZ.



**Figure 3: Trends in the causes of distribution zone non-compliance**

The large increase in the number of inadequately monitored supplies between 2000 and 2001 was caused by the increased stringency in monitoring requirements prescribed in the DWSNZ 2000 compared with the requirements of the DWSNZ 1995, particularly criteria regarding the minimum days-of-the-week and maximum interval between successive samples. While this aspect of compliance has steadily improved since 2001, many water suppliers have still not yet updated their monitoring programmes.

This survey cannot distinguish between the two main reasons for inadequate monitoring: poor understanding of the DWSNZ monitoring requirements, or a reluctance to address the monitoring deficiencies.

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 elevated 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 is indicative either of the failure of the water supplier to recognise this issue or to accept that it poses a potentially serious health risk. During 2009–2010, 37 waterborne outbreaks involving 154 cases were recorded<sup>4</sup> (see Appendix 3), of which untreated or contaminated supplies were identified as a contributing factor in most of them.

### 3.2 Chemical compliance

During 2009–2010, approximately 3,834,000 people were supplied by water that met the chemical requirements of the DWSNZ. This is 96% of the population in registered water supplies, unchanged from 2008–2009<sup>5</sup>. Included in this count are those people receiving water from distribution zones to which Priority 2 (P2) determinands<sup>6</sup> have not been assigned (chemically compliant by default), and those drawing water from distribution zones to which P2 determinands have been assigned and that have demonstrated compliance through monitoring.

P2 determinands were assigned to 204 distribution zones, supplying water to 2,589,000 people. Zones with P2 assignments that demonstrated chemical compliance provided water to approximately 2,446,000 people. Distribution zones in which a maximum acceptable value MAV was exceeded, supplied water to approximately 101,000 people. Unsatisfactory monitoring remains a major reason for non-compliance with the chemical criteria of the DWSNZ.

## 4.0 Drinking-Water Zones

To evaluate the public health significance of the water quality data contained in this report, summary statistics are expressed in terms of the population affected and in terms of the zones affected.

Information was received for each of the 2,321 distribution zones and 2,258 water treatment plants listed in the Register, as at June 2010, covering approximately 3,977,000 people. During 2009–2010, the number of registered zones decreased by 18, and the number of people served by registered supplies rose by 117,000. The increased population was largely due to the additional effort made to update the zone

---

<sup>4</sup> Note: As most cases of gastrointestinal disease are sporadic and not related to outbreaks, and the proportion of cases that are notified is very small, this figure will greatly underestimate the prevalence of waterborne disease.

<sup>5</sup> A typographical error in the previous report recorded this figure of 96% as 86%.

<sup>6</sup> 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 MAV (maximum acceptable value)) are the only chemical determinands that must be monitored to comply with the chemical criteria of the DWSNZ 2005. These chemical determinands are known as Priority 2 (P2) determinands and are of two types: determinands introduced in treatment chemicals, including intentionally-added fluoride, (P2a); and determinands from any other source (P2b). At present, P2 classifications are only notified in the Register for distribution zones with populations of 500 or more people. Water supplies that have not been assigned a P2 determinand are classed as compliant with the chemical requirements of the DWSNZ 2005. Where a supply has no P2 assignment because the supply has not been assessed with respect to its chemical contaminants 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 in the DWSNZ 2005. 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.

populations this year and which was done in response to the lag in updating zone populations observed in the previous survey period.

#### 4.1 Distribution zone bacteriological monitoring and compliance

Less bacteriological monitoring was carried out in smaller supplies than in larger supplies, both in terms of the percentage of zones monitored and the percentage of zones adequately monitored.

During 2009–2010, 98% of the population served by registered supplies lived in distribution zones where some monitoring was conducted. Water supplied to 95% of the population on registered supplies, or 43% of distribution zones, was adequately monitored as per the requirements of the DWSNZ. This represents a 4% increase in population terms over the past 12 months.<sup>7</sup>

Compliance at the distribution zone and treatment plant is shown in the following two tables. Table 1 groups the supplies by health district, whereas Table 2 groups the supplies based on the different population bands.

**Table 1: Summary of microbiological compliance in distribution zones and treatment plants for all health districts**

Health District	Distribution Zones				Treatment Plants				
	No. Zones	Total Pop.	<i>E. coli</i> complied		No. TPs	<i>E. coli</i> complied		Protozoa complied	
			zones	Pop.		TPs	Pop.	TPs	Pop.
Northland	313	115,817	13%	82%	311	73%	91%	4%	62%
Auckland	267	1,375,371	36%	99%	244	28%	98%	5%	95%
Waikato	198	289,344	50%	83%	191	53%	67%	6%	51%
Tauranga	55	135,369	31%	98%	56	34%	98%	21%	97%
Whakatane	67	46,626	31%	73%	64	47%	69%	3%	45%
Rotorua	76	102,378	50%	94%	74	47%	21%	0%	0%
Gisborne	59	34,471	39%	96%	59	59%	5%	3%	89%
Taranaki	75	94,775	37%	97%	66	92%	99%	20%	70%
Hawke's Bay	150	135,104	27%	94%	157	57%	88%	22%	85%
Wanganui	59	55,243	29%	84%	58	62%	96%	21%	75%
Manawatu	120	144,458	32%	96%	121	46%	83%	12%	58%
Hutt Valley	63	416,176	62%	99%	42	64%	100%	19%	97%
Wairarapa	35	36,467	40%	83%	40	60%	84%	10%	52%
Nelson	65	70,771	45%	92%	71	44%	77%	6%	64%
Marlborough	80	37,552	16%	90%	82	27%	90%	4%	1%
West Coast	74	27,892	23%	52%	70	54%	82%	3%	2%
Canterbury	242	524,660	51%	91%	258	62%	90%	23%	70%
S. Canterbury	61	55,081	52%	94%	59	44%	87%	8%	7%
Otago	172	167,575	39%	93%	149	63%	92%	8%	74%
Southland	90	111,942	48%	84%	86	71%	90%	6%	1%
<b>All Regist *</b>	<b>2,321</b>	<b>3,977,072</b>	<b>36%</b>	<b>94%</b>	<b>2,258</b>	<b>55%</b>	<b>89%</b>	<b>10%</b>	<b>75%</b>

\* Populations as served by registered community drinking-water supplies.

<sup>7</sup> Note that the compliance figures in previous reports were calculated using the Census population as the denominator. For the reasons explained on page 2, equivalent calculations used in this report use the population served by registered water supplies as the denominator. Comparisons made between 2009–2010 and 2008–2009 are done on the basis of the registered population.

**Table 2: Summary of microbiological compliance in distribution zones and treatment plants for the different water supply population categories**

Water supply population category	Distribution Zones				Treatment Plants				
	No. Zones	Total Pop.	<i>E. coli</i> complied		No. TPs	<i>E. coli</i> complied		Protozoa complied	
			zones	Pop.		TPs	TPs	Pop.	TPs
Large	72	3,035,387	97%	99%	85	80%	95%	71%	88%
Medium	33	236,603	88%	87%	38	84%	85%	26%	49%
Minor	270	496,299	79%	85%	274	70%	77%	22%	36%
Small	578	142,817	51%	56%	524	38%	43%	9%	12%
Neighbourhood	1,368	65,966	17%	19%	1,337	56%	57%	4%	4%
<b>All Regist*</b>	<b>2,321</b>	<b>3,977,072</b>	<b>36%</b>	<b>94%</b>	<b>2,258</b>	<b>55%</b>	<b>89%</b>	<b>10%</b>	<b>75%</b>

Population categories: large (>10,000), medium (5,001–10,000), minor (501–5,000), small (101–500), neighbourhood ( $\leq$ 100, or has an annual usage of at least 6,000 person-days).

During 2009–2010, 94% of the population on registered supplies received drinking-water that complied bacteriologically with the DWSNZ, an increase of 4% since 2008–2009 (Table 1). As can be seen in Table 2, the degree of compliance increased with increasing population. This is expected because suppliers of water to larger communities are mostly LAs.

#### 4.2 Treatment plant microbiological compliance

An estimated 74% of the population on registered supplies, supplied by 10% of treatment plants<sup>8</sup> was supplied with drinking-water that fully complied with the microbiological criteria of the DWSNZ during 2009–2010. Bacteriological compliance increased slightly during 2009–2010 with 55% of treatment plants demonstrating *E. coli* compliance. In terms of the population served by registered supplies, 89% of the population was served by bacteriologically-compliant treatment plants. *Cryptosporidium* compliance increased by 3% to 10% of treatment plants supplying 75% of the population on registered water supplies (Table 1).

Treatment plants serving small supplies tended to be less adequately monitored and a smaller proportion complied with the DWSNZ.

A number of zones were reported as being *E. coli*-compliant when the treatment plants were bacteriologically non-compliant due to excessive *E. coli* transgressions.

#### 4.3 Surveillance

Surveillance is carried out by DWAs either by auditing or surveillance testing of selected water supplies. During 2009–2010, *E. coli* was detected by surveillance testing in a single zone that was reported by the water supplier as bacteriologically compliant with the DWSNZ. This situation has improved since 2008–2009, when six zones showed discrepancies of this nature.

#### 4.4 Validity of compliance monitoring

Almost all compliance testing is now being carried out by Ministry of Health-recognised laboratories. However, 20 water suppliers used non-recognised laboratories to analyse compliance samples. Laboratories seeking to be included on the register of recognised laboratories should apply to:

<sup>8</sup> A treatment plant is defined as the point where water enters the distribution system, irrespective of whether the water is treated or not.

International Accreditation New Zealand  
Private Bag 28908  
Remuera, Auckland 1136  
Ph: (09) 525 6655  
Fax: (09) 525 2266  
Email: info@ianz.govt.nz

Use of non-recognised laboratories will result in the water supply not being in compliance with the DWSNZ.

#### **4.5 School and early childhood centre drinking-water supplies**

Compliance with the DWSNZ at school- and early childhood centre (ECC)- supplies increased significantly during the past year. The 588 school/ECC supplies comprised one-quarter of all registered drinking-water supplies in 2009–2010. During this survey year, 466 (79%) of the schools/ECCs with their own water supplies conducted some bacteriological monitoring, an increase of 9% since the 2008–2009 survey year. Of these, 155 schools (26%) complied with the bacteriological criteria of the DWSNZ, 6% more than in 2008–2009.

The number of schools to achieve protozoal compliance increased from four to 14 during the past year.

#### **4.6 Hospital drinking-water supplies**

At the end of the 2009–2010 survey period, eight hospitals were not connected to municipal drinking-water supplies. All of these were bacteriologically compliant with the DWSNZ except Ashburton Hospital, which was inadequately monitored. However, only four of the hospital supplies complied with the protozoal standard. Protozoal treatment is presently inadequate for the Ashburton, Kaeo and Princess Margaret hospitals and the Te Puia Springs Hospital and Village supply.

#### **4.7 Corrective actions**

The DWSNZ requires any transgression to be immediately followed by a corrective action and that the action is documented.

Corrective actions following transgressions were inadequate in 47 zones compared to 39 zones in 2008–2009, and were probably not carried out in a further 102 zones compared to 62 in 2008–2009.

#### **4.8 Disinfection**

Several methods of drinking-water disinfection have been reported in New Zealand, including chlorination, ozonation or UV treatment. Chlorination remains the most popular means of drinking-water disinfection and served 78% of people connected to registered drinking-water supplies or 26% of treatment plants. Secure groundwater supplies are used by 16% of people connected to registered drinking-water supplies; these comply with the DWSNZ without the need for disinfection.

Bacteriological compliance was demonstrated in supplies to 97% of the population on chlorinated supplies or 65% of treatment plants using chlorination, which is about the same as for the previous year. Most of the non-compliance in chlorinated supplies was caused by lack of monitoring, although 46 were contaminated with *E. coli* during 2009–2010, 23 fewer than in 2008–2009.

The number of treatment plants using UV disinfection increased by 21 during 2009–2010. This is a particularly popular form of treatment for small community supplies,

especially schools. Of the 784 UV-treated supplies, 60% complied bacteriologically with the DWSNZ. This represents a slight decline in bacteriological compliance of UV-treated supplies since the 2008–2009 survey. Non-compliance mostly resulted from inadequate or no monitoring. *E. coli* were detected in 23 supplies during the 2009–2010 survey, the same as in the 2008–2009 survey.

Sixteen of the 23 treatment plants using ozone treatment complied microbiologically with the DWSNZ during 2009–2010. Non-compliance mostly resulted from inadequate or no monitoring. This represents an increase from 13% to 70% since 2008–2009 (but this figure is distorted by the low number of treatment plants using ozone disinfection). *E. coli* were detected in one ozonated plant during 2009–2010.

#### **4.9 Priority 2 chemical determinand monitoring**

During 2009–2010, 204 distribution zones had P2 assignments, supplying water to approximately 2,589,000 people. A total of 16 different chemical determinands were monitored. Zones with P2 assignments that demonstrated chemical compliance provided water to approximately 2,446,200 people.

During the survey period there was a total of 367 new and existing P2 assignments<sup>9</sup>. Excluding the fluoride assignments, the majority are for heavy metals or disinfection by-products (a total of 153 for these two classes of determinand). Compliance was achieved for 281 of the assignments. Non-compliance resulted from: inadequate or no, monitoring (60 assignments); use of a laboratory that was not Ministry of Health-recognised (1); concentrations exceeding a MAV (29); inadequate corrective action in the event of a MAV being exceeded (22). Distribution zones in which a MAV was exceeded supplied water to about 101,000 people. As has been observed in previous years, no or inadequate monitoring was the primary reason for non-compliance.

Forty-eight treatment plants monitor for fluoride.. These provided water to approximately 2,352,000 people in 122 distribution zones. No fluoridating treatment plant recorded a fluoride concentration exceeding its MAV.

The DWSNZ 2005 (2008 revision) requires water supplies with plumbosolvent water serving more than 500 people to advise their consumers to flush their taps before drawing water to drink. 382 water suppliers were required to provide plumbosolvency advice to consumers in 2009–2010. Of these, 314 (82%) reported they had advised their consumers to flush their taps.

### **5.0 Status of Public Health Risk Management Plans**

Following the passing of the Health (Drinking Water) Amendment Act in October 2007, the Health Act 1956 will require each water supply serving more than 25 people to have a public health risk management plan which identifies and manages potential risks to the water supply. This requirement is being phased-in between 2012 and 2016, depending on the population served by the supply.

By the end of the 2009–2010 survey period, work had been initiated on 774 PHRMPs. Of these, 549 had been submitted and 228 of those had been implemented.

Water suppliers will be required to submit draft PHRMPs as follows:

- Large supply (serving >10,000 people): 1 July 2012

---

<sup>9</sup> The number of assignments is greater than the number of zones to which assignments were made because more than one determinand may be assigned to a zone, either directly or through the treatment plant feeding the zone.

- Medium supply (serving 5,001–10,000 people): 1 July 2013
- Minor supply (serving 501–5,000 people): 1 July 2014
- Small supply (serving 101–500 people): 1 July 2015
- Neighbourhood supply (serving 25–100 people): 1 July 2016.