

**Annual Review of
Drinking-Water Quality
In New Zealand
2007/8**

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National Summary

Background

This report spans the period July 2007 to June 2008 and covers the second year of reporting by financial year rather than calendar year. This is also the second year for which the *Drinking-Water Standards for New Zealand: 2005* (DWSNZ:2005) could be used to assess the microbiological and chemical quality of drinking-water. However, 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; a summary of the nation's drinking-water quality, with supplies separated into local authority (LA)-operated supplies, school- and early childhood centre (ECC)- operated supplies; an overview of drinking-water quality in each DHB area; a summary of the quality of drinking-water in each LA area; Appendix 1 (microbiological and chemical compliance with the DWSNZ of individual water supplies); Appendix 2 (supplies that ceased to be monitored in 2007/8); Appendix 3 (supplies with inadequate corrective action); Appendix 4 (LA-run supplies serving 500 or more people that were technically non-compliant); Appendix 5 (supplies in which bacteriological compliance ceased); Appendix 6 (waterborne outbreaks summary); Appendix 7 (Public Health Service Providers); Appendix 8 (compliant zones with excessive *E. coli* transgressions at the treatment plant); and, Appendix 9 (supplies in which anomalies occurred between monitoring and surveillance results).

The information on the quality of drinking-water was obtained through the public health units of the DHBs using questionnaires that sought data concerning surveillance and monitoring programmes carried out by DHBs and water suppliers, respectively. Water suppliers fall into two groups: LAs, including commercial water supply companies contracted by LAs, and private organisations or communities responsible for the operation of their own drinking-water supplies, of which schools have been considered separately. Water suppliers are responsible for water quality monitoring, whereas the DHBs 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 sought information about the water treatment processes in use and the means used to demonstrate compliance with the DWSNZ.

To evaluate the public health significance of the water quality data contained in this report, the data are expressed primarily in terms of the population affected rather than the numbers of water supplies involved because of the different-sized populations served by different water supplies. The distribution zone figures refer to the percentage of the total population of New Zealand. However, because of the double-counting caused by many treatment plants supplying multiple zones, the plant

percentages are estimates of the percentage of the population served by registered supplies.

The 2008 *Register of Community Drinking-water Supplies in New Zealand* (the Register) contained 2,302 distribution zones and 2,259 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. Information was received from Drinking Water Assessors (DWAs) about all supplies, but 114 water suppliers could not be contacted and a further 25 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*. The chemical health risk for selected supplies was assessed with respect to those specifically-assigned chemical determinands which required monitoring.

The complete report can be viewed on the Ministry of Health website (<http://www.moh.govt.nz>).

Key findings

The overall level of drinking-water quality in 2007/8 was as follows:

E. coli compliance

| | |
|---|-----|
| Percentage of New Zealand population served by registered reticulated drinking-water supplies known to 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.] | 83% |
| Percentage of New Zealand population served by reticulated 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.] | 8% |
| Percentage of New Zealand population not served by registered reticulated drinking-water supplies. [In most instances these people are in buildings that are self supplied with drinking-water eg. from a roof tank or bore.] | 9% |

Protozoal compliance

| | |
|--|-----|
| Percentage of New Zealand population served by registered reticulated drinking-water supplies known to comply with the protozoan requirements of the DWSNZ. [These are generally located in towns with populations in excess of 5,000 people.] | 76% |
| 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.] | 15% |
| Percentage of New Zealand population not served by registered reticulated drinking-water supplies. [In most instances these people are in buildings that are self supplied with drinking-water eg. from a roof tank or bore.] | 9% |

During 2007/8, water supplies to 83% of New Zealanders were served by community drinking-water supplies that complied with the *E. coli* criteria of the DWSNZ. This represents an improvement of 3% since 2006/7.

Most large communities were served by water supplies which demonstrated microbiological compliance with the DWSNZ during 2007/8. However, many smaller communities were supplied with microbiologically non-compliant drinking-water.

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 1.

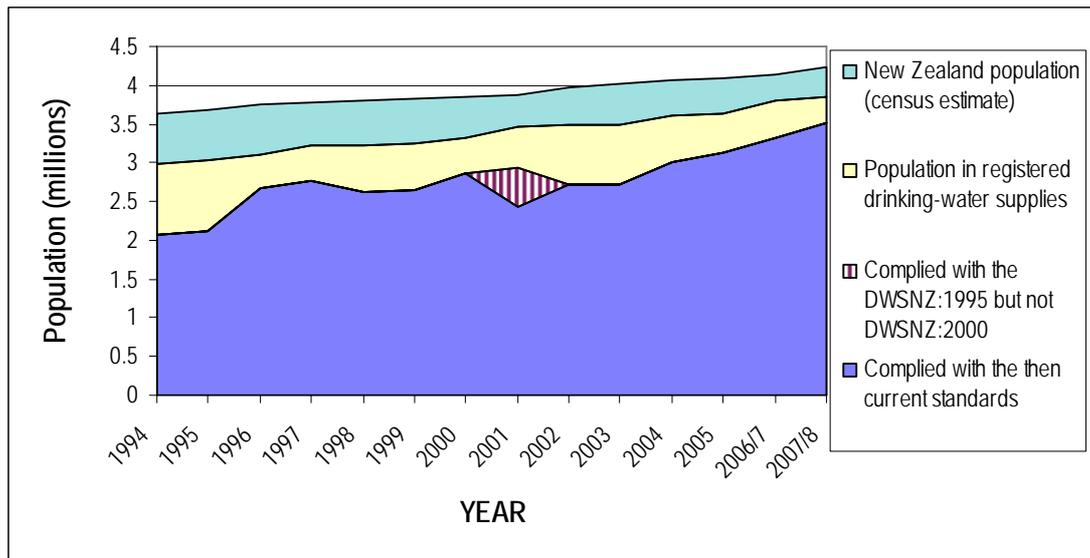


Figure 1: Trend in bacteriological compliance at the distribution zone

The general trend in protozoal compliance is assessed at treatment plants only and is shown in Figure 2. The proportion of the population supplied by DWSNZ-compliant plants has increased by 1% to 76% since 2006/7.

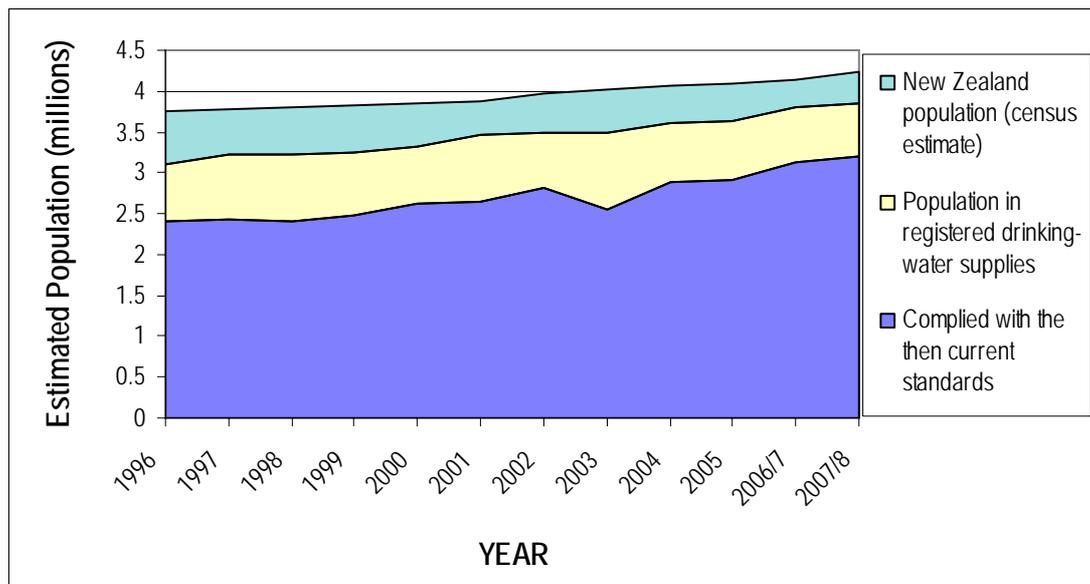


Figure 2: Trend in protozoal compliance at the treatment plant

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 712,000 (17%)¹ of New Zealanders were supplied with drinking-water that either failed to comply bacteriologically with the criteria of the DWSNZ or for which there are no data because they were self-supplied. The causes of non-compliance and the number of people affected are listed below:

- 118,000 (3%) were served by registered supplies with unacceptable levels of *E. coli*.
- 45,000 (1%) were served by registered supplies where water suppliers failed to take appropriate corrective action once *E. coli* had been found.
- 69,000 (2%) were served by registered supplies where *E. coli* monitoring was either not carried out or where monitoring data were not available.
- 194,000 (5%) 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.
- 4,600 (0.1%) were served by registered supplies that did not comply bacteriologically because the compliance testing was not analysed by a laboratory registered by the Ministry of Health for drinking-water compliance testing.
- 382,000 (9%) were self-supplied (*ie.* not from registered supplies).

The number of people in zones with unacceptable levels of *E. coli*, monitored by laboratories not recognised by the MoH, or that were not or were inadequately monitored fell since 2006/7. However, in 2007/8 there was an increase in the number of people in supplies where there were inadequate corrective actions following bacteriological transgressions and so the water suppliers failed to adequately protect consumers at times when the drinking-water was known to be contaminated.

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 faecally-contaminated and so will contain the faecal indicator bacterium *E. coli* unless the water is adequately treated. To discourage the practice by some water suppliers of attempting to avoid scrutiny by ceasing monitoring, details of the 78 supplies that ceased monitoring in 2007/8 are given in Appendix 2.

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 increased markedly between 2006/7 and 2007/8. This is of 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. Details of the LA-run supplies that failed to take

¹ Some people supplied with water that failed to comply bacteriologically with the DWSNZ fell into more than one of the non-compliance categories.

appropriate corrective action in 2007/8 are given in Appendix 3. Of these 38 LA-run supplies, eight were also reported for the same practice in the previous review. Marlborough, Hurunui, Selwyn and Waitaki District Councils should urgently review and improve their corrective action procedures following bacteriological transgressions.

A further 372,000 people were supplied with drinking-water from 105 zones that failed to comply bacteriologically with the criteria of the DWSNZ for technical reasons. These fell into two groups. Supplies serving less 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:2005. 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. Details of the latter group are given in Appendix 4.

There were 156 supplies, serving a total of approximately 104,000 people, that complied bacteriologically in 2006/7 but not in 2007/8. Details of these supplies are given in Appendix 5.

The overall level of compliance with the chemical criteria of the DWSNZ for those distribution zones where Priority 2 (P2) chemical determinands (other than fluoride) have been assigned has improved substantially over 2006/7. Compliance was achieved for approximately 147 (49%) of the 300 assignments; the figure for 2006/7 was 34%.

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.

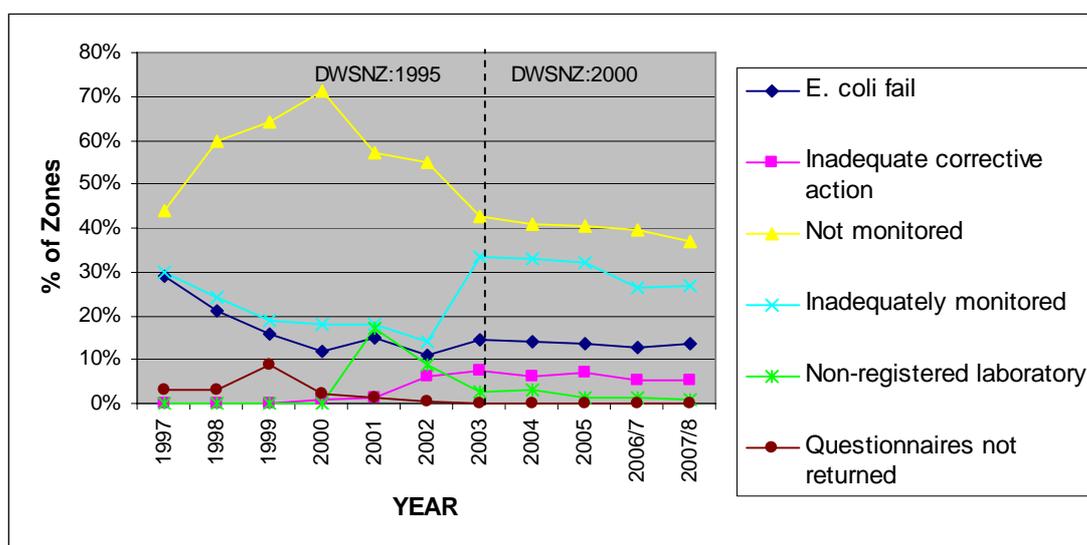


Figure 3: Trend in the causes of distribution zone non-compliance

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 to the requirements of the DWSNZ:1995, particularly regarding the minimum days-of-the-week and maximum interval between successive samples criteria. 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 establishment of the Drinking-Water Assistance Programme (DWAP) is expected to reduce the number of water suppliers who are unfamiliar with the requirements of the DWSNZ. The inclusion of the DWSNZ in the Health (Drinking-water Amendment) Act 2007 is likely to be an effective incentive for water suppliers who have been reluctant to update their monitoring programmes. However, this improvement may be delayed because most of the supplies with inadequate compliance monitoring serve fairly small populations that are not yet required to update to the DWSNZ:2005 monitoring schedule.

All of the trends show a consistent improvement in compliance, as evidenced by the similarity of the slopes since 2001. The failure to take appropriate corrective action immediately following *E. coli* transgressions is a serious cause of concern because of the grave 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 do not drink unboiled 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. Numerous waterborne disease outbreaks have occurred in New Zealand in recent years. During 2007/8, 15 waterborne outbreaks involving 205 cases were recorded (see Appendix 6), of which untreated or contaminated supplies were identified as a contributing factor in most of them. It is unlikely that this situation will change appreciably while so many drinking-water supplies, particularly those serving small communities, do not employ adequate risk management practices including treatment.

All P2² chemical determinand assignments (apart from intentionally-added fluoride) that were monitored, except one, were monitored using Ministry of Health-recognised laboratories.

Approximately 34% of the Priority 2b (P2b) chemical determinand assignments were not monitored at all, or were inadequately monitored. While this is a significant

² Chemical substances or determinands that are present in a water supply at potentially health-significant concentrations (usually greater than 50% of their MAV) 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.

improvement from the 49% recorded last year, unsatisfactory monitoring remains a major reason for non-compliance with the chemical criteria of the DWSNZ.

Exceedences of the maximum acceptable values (MAVs) were reported in 19% of P2b chemical determinand assignments, and the DWAs considered corrective actions to be inadequate for 56% of these assignments. This was a slight improvement on the figure for 2006/7 (59%).

Monitoring for fluoride as a Priority 2a (P2a) determinand was required at 51 treatment plants where fluoride was intentionally added — these treatment plants supplied a combined population of approximately 2,220,000 people. Water from treatment plants complying with the fluoride MAV specified in the DWSNZ was provided to almost 100% of this population.

Detailed summary of survey data

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. Since expression of the zone numbers may be of more value for regulation and water supply management, data are summarised in both ways.

Information was received for each of the 2,302 distribution zones and 2,259 water treatment plants listed in the Register as at June 2008 covering approximately 3,845,000 people. The remaining 389,000 people were not connected to a registered supply. During 2007/8, the number of registered zones remained virtually unchanged, and the number of people served by registered supplies rose by 39,000 due to revised distribution zone population estimates.

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 2007/8, 98% of the population served by registered supplies lived in distribution zones where some monitoring was conducted. This situation has not changed since 2006/7.

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 | 299 | 115,384 | 14% | 81% | 298 | 79% | 94% | 4% | 82% |
| Auckland | 292 | 1,308,134 | 28% | 98% | 269 | 35% | 99% | 5% | 98% |
| Waikato | 193 | 286,945 | 35% | 78% | 186 | 31% | 77% | 2% | 42% |
| Tauranga | 55 | 135,269 | 20% | 94% | 57 | 67% | 99% | 19% | 98% |
| Whakatane | 64 | 47,569 | 22% | 74% | 62 | 31% | 20% | 0% | 0% |
| Rotorua | 87 | 103,147 | 46% | 96% | 84 | 56% | 44% | 0% | 0% |
| Gisborne | 56 | 34,359 | 7% | 91% | 57 | 74% | 3% | 2% | 47% |
| Taranaki | 78 | 86,175 | 36% | 95% | 69 | 88% | 86% | 6% | 63% |
| Hawke's Bay | 163 | 136,258 | 15% | 85% | 183 | 40% | 97% | 14% | 96% |
| Wanganui | 58 | 58,565 | 36% | 97% | 55 | 71% | 94% | 11% | 67% |
| Manawatu | 93 | 144,187 | 34% | 95% | 95 | 66% | 87% | 8% | 82% |
| Hutt Valley | 63 | 385,252 | 65% | 100% | 43 | 53% | 100% | 19% | 98% |
| Wairarapa | 34 | 36,621 | 26% | 77% | 39 | 49% | 75% | 3% | 35% |
| Nelson | 65 | 68,678 | 48% | 91% | 71 | 41% | 48% | 4% | 41% |
| Marlborough | 80 | 37,403 | 14% | 90% | 82 | 29% | 83% | 0% | 0% |
| West Coast | 76 | 26,598 | 25% | 57% | 72 | 47% | 42% | 3% | 1% |
| Canterbury | 245 | 513,576 | 39% | 88% | 258 | 39% | 84% | 12% | 61% |
| S. Canterbury | 62 | 54,653 | 31% | 86% | 62 | 55% | 72% | 2% | 45% |
| Otago | 158 | 153,937 | 36% | 84% | 141 | 66% | 90% | 3% | 75% |
| Southland | 81 | 112,775 | 63% | 74% | 76 | 61% | 77% | 8% | 44% |
| All Regist * | 2,302 | 3,845,485 | 30% | 91% | 2,259 | 52% | 91% | 6% | 83% |
| All NZ ‡ | | 4,227,240 | | 83% | | | 83% | | 76% |

[#] For details of names and locations of the DHBs in each health district see Appendix 7.

* Populations as served by Registered community drinking-water supplies.

‡ Populations as per New Zealand Census estimate.

Water supplied to 85% of the New Zealand population, or 36% of distribution zones, was adequately monitored as per the requirements of the DWSNZ. This represents an improvement of 3% in population terms since 2006/7.

During 2007/8, 83% of the population lived in distribution zones supplied with drinking-water that complied with the distribution zone *E. coli* criterion, a 3% increase since 2006/7 (Table 1). By the end of the 2007/8 period there were 166 graded supplies listed in the Register.

Treatment plant microbiological compliance

An estimated 75% of the population, supplied by 6% of treatment plants³ was supplied with drinking-water that fully complied with the microbiological criteria of the DWSNZ during 2007/8. Bacteriological compliance was unchanged in 2007/8 with 52% of treatment plants demonstrating *E. coli* compliance. In terms of the population served there was a little change with an estimated 83% of the population served by bacteriologically-compliant treatment plants. *Cryptosporidium* compliance was demonstrated in 6% of treatment plants supplying an estimated 76% 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 (Appendix 8). While it is possible for this to be accurate, it indicates a possible problem with the sampling and/or accuracy of the data and warrants further investigation.

Surveillance

Surveillance is carried out by DHBs either by auditing or surveillance testing of selected water supplies. During 2007/8, *E. coli* was detected by surveillance testing in three supplies (Appendix 9) that were reported by the water supplier as bacteriologically compliant with the DWSNZ. This is indicative of a likely problem with some aspect of zone monitoring and should be investigated by the water supplier. However, this aspect has much improved since 2006/7, when 25 zones showed discrepancies of this nature.

Validity of compliance monitoring

All compliance testing for LA-run supplies is now being carried out by Ministry of Health-recognised laboratories. However, 17 non-LA supplies are still using other laboratories to analyse compliance samples. Laboratories seeking to be included on this register should apply to:

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

³ A treatment plant is defined as the point where water enters the distribution system, irrespective of whether the water is treated or not.

Use of non-recognised laboratories will result in the water supply not being in compliance with the DWSNZ. If the water supplier cannot access a recognised laboratory, the DWA should be consulted about possible options.

School and early childhood centre drinking-water supplies

Compliance with the DWSNZ at school and ECC supplies was about the same as in 2006/7. The 590 school/ECC supplies comprised approximately one-quarter of all registered drinking-water supplies in 2007/8. During 2007/8, 421 (71%) of the schools/ECCs with their own water supplies conducted some bacteriological monitoring, eight more than in 2006/7. Of these, 103 supplies (17%) complied with the bacteriological criteria of the DWSNZ, 1% more than in 2006/7.

Many of the schools have installed ultraviolet (UV) treatment in conjunction with cartridge filtration in recent years. Most UV treatment devices used provide adequate treatment to kill bacteria and therefore reduce the likelihood of bacteriological transgressions. However, a greater dose of UV is required to kill some viruses and protozoan parasites. At present, none of the school supplies achieve protozoal compliance.

It is possible that some of the UV devices installed will not be adequate to comply with the new drinking-water standards for protozoa.

Private drinking-water supplies

There were 1,021 distribution zones designated as private supplies during 2007/8, supplying water to approximately 141,000 people. Of these, 12%, serving 34% of people connected to private supplies complied bacteriologically with the DWSNZ. This represents a significant improvement in the previous 12 months.

Hospital and health services drinking-water supplies

At the end of the 2007/8 period, 10 hospitals and health services were not connected to municipal drinking-water supplies. All of these complied bacteriologically with the DWSNZ.

Corrective actions

The DWSNZ prescribes that any transgression is immediately followed by a corrective action and is documented.

Corrective actions following transgressions in 61 zones were inadequate and/or tardy and were probably not carried out in a further 65 zones. This aspect has not improved since 2006/7.

Note: Section 69ZF of the Health (Drinking Water) Amendment Act 2007 requires the drinking-water supplier to take remedial (corrective) action if drinking-water standards are breached.

At least one water supplier has been reporting bacteriological transgressions only after detecting *E. coli* in a repeat sample, supposedly on the misconceived notion that a single transgression followed by a clear sample indicates *sample* contamination. This practice is not allowed (refer to Figures 4.1 and 4.2 in the DWSNZ:2005). Taken to the extreme, this could result in a supply that contains *E. coli* in 50% of samples (*ie.* every second sample) being classified as bacteriologically compliant. Micro-organisms are not evenly distributed in water, so at fairly low concentrations one

would normally expect to find a reasonably high proportion of 100 mL samples to be negative. This is the reason for the small proportion of transgressions allowed before a supply becomes bacteriologically non-compliant.

Disinfection

Several methods of drinking-water disinfection have been reported in New Zealand, comprising chlorination, ozonation and UV irradiation. Chlorination remains the most popular means of drinking-water disinfection and served an estimated 79% of people connected to registered drinking-water supplies or 24% of treatment plants. Secure groundwater supplies are used by an estimated 14% 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 an estimated 94% of the population on chlorinated supplies or 58% of treatment plants using chlorination. This represents a slight improvement since 2006/7. Most of the non-compliance in chlorinated supplies was caused by lack of monitoring, although 48 were contaminated with *E. coli* during 2007/8, which is four less than in 2006/7.

The number of treatment plants using UV treatment increased by 37 during 2007/8. UV treatment is particularly popular for treating small community supplies, particularly schools, probably because of the low costs associated with its installation and operation. Of the 719 UV-treated supplies, 55% complied bacteriologically with the DWSNZ. This represents a no change in bacteriological compliance of UV-treated supplies compared with 2006/7. Non-compliance mostly resulted from inadequate or no monitoring, although *E. coli* were detected in 17 of these supplies during 2007/8, three less than in 2006/7. In excess of 100 treatment plants were reported to use UV without filtration. While this can be acceptable treatment it is unusual for UV disinfection to be effective unless the water is filtered. Consequently, it is likely that many of these plants will have been either misreported or require filtration.

Seven of the 23 treatment plants using ozone treatment complied microbiologically with the DWSNZ during 2007/8, with lack of monitoring being the cause of non-compliance in all cases. The percentage of plants using ozone that complied microbiologically⁴ with the DWSNZ decreased from 38% in 2006/7 to 30% in 2007/8.

P2 chemical determinand monitoring

The population supplied by distribution zones that complied with the chemical requirements of the DWSNZ has increased by two percentage points since 2006/7. Since 2002, the number of zones that were either not monitored or inadequately monitored for their assigned P2 determinands has fallen markedly from 72% to 29%.

Compliance with the requirements of the DWSNZ for chemical determinands (including fluoride) was achieved by distribution zones supplying *ca.* 3,468,000

⁴ The term *microbiological* compliance includes both bacteriological and protozoal compliance. The term *bacteriological* compliance is used when it is not appropriate to use microbiological compliance (*eg.* in relation to UV and chlorine, which are effective treatments for bacteria but not protozoa).

people or 82% of the population⁵. Approximately 2,714,000 people lived in distribution zones to which P2 chemical determinands were assigned and which required monitoring according to the DWSNZ. Fifty-two percent of the distribution zones to which P2 chemical determinands were assigned complied with the chemical criteria of the DWSNZ, which represents a combined population of approximately 2,379,000 people. Inadequate, or no, monitoring continues to be major reason for distribution zones not complying with the chemical criteria of the DWSNZ, but the percentage of zones that are adequately monitoring is increasing.

P2 determinands (including intentionally-added fluoride) were assigned to 245 distribution zones. However, as more than one P2 determinand can be assigned to a distribution zone, a total of 494 P2 determinand assignments were made to water supplies throughout the country. Three hundred of these were made for P2b determinands; the remaining assignments were for intentionally-added fluoride. The P2b chemical determinands were mostly heavy metals and disinfection by-products⁶. Of the P2b chemical determinand assignments, a total of 70 (29%) were not monitored at all, or inadequately monitored. The remaining assignments were adequately monitored, although they may have failed to comply for other reasons. Non-compliance with the DWSNZ also resulted from the MAV for some P2 chemical determinands being exceeded. This occurred for 19% (57) of the P2b chemical determinand assignments and potentially affects 201,900 people. DWAs considered corrective actions to be inadequate in 56% of assignments in which the MAV for P2b determinands was exceeded.

Monitoring for fluoride as a P2a chemical determinand was required at 51 treatment plants that add fluoride intentionally, of which 31 (61%) complied. These 51 treatment plants provided water to 124 distribution zones supplying a combined population of approximately 2,220,000 people. Inadequate monitoring was the main reason for non-compliance, but exceedence of the MAV was the reason for non-compliance in three treatment plants serving approximately 5,900 people.

Supplies with plumbosolvent water serving 1,000 or more people are required to advise their consumers to flush their taps before drawing water to drink. Of the 277 supplies in this category, approximately 67% reported they had advised their consumers to flush their taps. The reason for the low percentage is unclear. It may arise in part because of water suppliers with metals assigned as P2 determinands still believing that they are only required to undertake monitoring of the metals. Advice to consumers to flush sufficient water from the tap to eliminate metals leached from the fittings needs to be provided by all suppliers, unless they have undertaken the necessary testing to show their water is not plumbosolvent. In supplies where metals have been assigned as P2 determinands, the supplier should seek advice from a DWA to determine the protocol for showing the metal is due to plumbosolvency so that monitoring can cease.

⁵ This includes registered zones that have no P2 assignments and those with assignments that have demonstrated compliance.

⁶ Substances formed as a result of the disinfection process

Status of Public Health Risk Management Plans

Public Health Risk Management Plans (PHRMPs) are recommended for reasons of good practice. Following the passing of the Health (Drinking Water) Amendment Act in October 2007, the Health Act 1956 included a provision to require each water supply serving more than 500 people to be covered by a quality assurance programme in the form of a PHRMP. This requirement was to be phased-in between 2009 and 2013, depending on the population served by the supply.

By the end of the 2007/8 period, work had been initiated on 532 PHRMPs, which comprised 23% of supplies. Of these, 217 (9%) had been submitted and 160 of those approved or implemented.

As at 30 June 2008, the end of the 2007/8 survey period, none of the supplies were required to have implemented their PHRMPs. The legislation required that PHRMPs for large supplies (*ie.* those serving more than 10,000 people) would need to be implemented by 31 July 2010. However, this timetable has been amended to give water suppliers a further three years

The new deadline for water suppliers to submit draft PHRMPs for the different-sized supplies are as follows:

- Large supply (serving >10,000): 1 July 2012
- Medium supply (serving 5,001 – 10,000): 1 July 2013
- Minor supply (serving 501 - 5,000): 1 July 2014
- Small supply (serving 101 - 500): 1 July 2015
- Neighbourhood supply (serving 25 - 100): 1 July 2016

Key Issues

A number of important issues are highlighted in this review. These are listed below.

- Overall compliance has increased by 3% in population terms during 2007/8. Approximately 83% of New Zealanders have bacteriologically-compliant drinking-water and protozoal-compliance was achieved in supplies serving 76% of the population.
- All of the hospital supplies complied bacteriologically during 2007/8. However, most do not comply with the protozoal requirements.
- The improvement in compliance of school supplies has continued, with 17% of schools complying in 2007/8.
- Some water suppliers could avoid the need to undertake monitoring for P2 heavy metals by sampling to show the metals arise from the plumbosolvency of the water, and are not present in the water supplied to the consumer. DWAs can advise on the protocol required.
- Monitoring for *E. coli* ceased in a further 78 water supplies during the 2007/8 period (Appendix 2).
- During 2007/8, the number of LA-run zones in which bacteriological transgressions were not followed up with adequate corrective action increased sharply to 38 (Appendix 3) from 26 in 2006/7. This needs urgent attention.
- Bacteriological compliance was lost in 156 zones, including 80 LA-run zones, between 2006/7 and 2007/8 (Appendix 5).
- Zones recorded as compliant but served by one or more treatment plants that did not comply bacteriologically because of excessive *E. coli* transgressions warrant further investigation (Appendix 8).
- Discrepancies between the results of bacteriological monitoring by the water supplier and bacteriological surveillance by the DWA occurred in only three zones during 2007/8 (Appendix 9). This situation has improved greatly since 2006/7.
- It is evident that a small number of water suppliers are not reporting *E. coli* transgressions when the repeat sample is negative. This practice is not allowed by the DWSNZ and should be discontinued immediately.