Issue 3: Drinking-water safety and compliance levels in New Zealand

Reporting and Compliance with the Drinking Water Standards for New Zealand

The Health Act 1956 defines a drinking-water supplier as a person who supplies drinking water to people in New Zealand or overseas from a drinking-water supply including networked suppliers (a piped supply to one or more properties), water carriers, designated ports and airports, and bulk suppliers. It does not include temporary suppliers or self–suppliers.

The Act categorises supplies into Large (those serving greater than 10,001 people), Medium (serving 5,001 to 10,000), Minor (501 to 5,000), Small (101 to 500), Neighbourhood (25 to 100), and Rural Agricultural (one in which 75% or more of the water is used for agriculture and is not drunk by people or used for food preparation).

All suppliers of a neighbourhood supply or larger must take all practicable steps to comply with the Drinking-water Standards. This obligation was introduced progressively from 1 July 2012 (large supplies) to 1 July 2016 (neighbourhood and rural agricultural supplies).

The Director-General of Health must publish annually a report on compliance or non-compliance with the standards for each drinking water supplier other than neighbourhood supplies.

In effect this means that although all supplies serving more than 25 people are required to meet the standards, statistics providing a national picture of compliance are only available for supplies serving 101 or more people.

Compliance by population

The table below shows the population serviced by drinking water that complies with the bacteriological, protozoa and chemical requirements of the Drinking-water Standards for the period 2009 until 2016. These figures are extracted from the annual reports on drinking water but the figures for 2009/10 and 2010/11 have been adjusted to exclude smaller supplies to enable comparison with subsequent years for which data was only reported for supplies that serve more than 101 people.

National: Supplies serving more than 101 people (compliance required in all by 1 July 2015)[1]

Period	Population	Bacteriological	Protozoa	Chemical	Fully[2]	Percent Fully	Change
2009/10	3,820,000	3,676,000	2,973,000	3,683,000	2,917,000	76.3	
2010/11	3,402,000	3,309,000	2,690,000	3,303,000	2,671,000	78.5	2.2
2011/12	3,807,000	3,648,000	3,039,000	3,645,000	2,920,000	76.7	-1.8
2012/13	3,810,000	3,684,000	3,017,000	3,631,000	2,930,000	76.9	0.2
2013/14	3,829,000	3,723,000	3,093,000	3,728,000	3,023,000	79.0	2.1

[1] In 2015/16 there were 496 supplies serving more than 100 people each.

[2] A supply is considered fully compliant if it meets the bacteriological, protozoal and chemical standards.

2014/15	3,787,000	3,666,000	3,030,000	3,737,000	3,008,000	79.4	0.4
2015/16	3,791,000	3,699,000	3,109,000	3,732,000	3,032,000	80.0	0.6

From the above it can be seen that although the compliance timetable was established in 2007 (and extended in 2009) there are still 759,000 people (20% of the serviced population) supplied by supplies where the water was not demonstrably safe to drink. Of these 92,000 are at risk of bacterial infection, 681,000 of protozoal infection and 59,000 at risk from the long-term effects of exposure to chemicals.

There has been a very gradual improvement in overall compliance of 3.7% in the last seven years, with a 2.0% improvement in both bacteriological and chemical compliance and a 4.0% improvement in protozoal compliance over the same period. Although direct comparison with earlier years is not possible, as both the standards and the questionnaire used to assess compliance have changed, in the 2005 calendar year the overall compliance rate was 80%. This suggests that in the period 2005 to 2016 no progress at all has been made in compliance with the relevant standards applicable at the time.

The non-compliance is higher in the smaller supplies as set out in the tables below:

Large Supplies – Supplies serving greater than 10,001 each (compliance required by 1 July 2012)[3]

Period	Population	Bacteriological	Protozoa	Chemical	Fully	Percent Fully	Change
2009/10	3,035,000	3,009,000	2,675,000	2,963,000	2,630,000	86.6	
2010/11	*2,601,000	2,601,000	2,376,000	2,558,000	2,376,000	91.4	4.8
2011/12	2,992,000	2,947,000	2,694,000	2,890,000	2,611,000	87.3	-4.1
2012/13	2,989,000	2,960,000	2,653,000	2,902,000	2,591,000	86.7	-0.6
2013/14	3,002,000	2,977,000	2,692,000	2,976,000	2,667,000	88.9	2.2
2014/15	2,940,000	2,914,000	2,599,000	2,940,000	2,599,000	88.4	-0.5
2015/16	2,947,000	2,922,000	2,650,000	2,932,000	2,610,000	88.6	0.2

*In 2010/11 data for Christchurch was not collected due to the Canterbury Earthquakes

Overall improvement in compliance 2009 to 2016: **2.0%.**

Medium Supplies – Supplies serving 5,001 to 10,000 each (compliance required by 1 July 2013)[4]

Period	Population	Bacteriological	Protozoa	Chemical	Fully	Percent Fully	Change
2009/10	237,000	206,000	115,000	218,000	115,000	48.6	
2010/11	262,000	243,000	128,000	245,000	118,000	45.2	-3.4
2011/12	268,000	237,000	140,000	242,000	116,000	43.1	-2.1
2012/13	264,000	250,000	150,000	223,000	142,000	53.6	10.5

[3] In 2015/16 there were 42 large supplies serving greater than 10,001 people each.

[4] In 2015/16 there were 24 supplies serving 5,001 to 10,000 people each.

2013/14	270,000	264,000	155,000	237,000	143,000	52.9	-0.7
2014/15	274,000	254,000	173,000	261,000	165,000	60.2	7.3
2015/16	280,000	280,000	189,000	274,000	183,000	65.2	5.0

Overall improvement in compliance 2009 to 2016: **16.6%**

Minor Supplies – Supplies serving 501 to 5,000 each (compliance required by 1 July 2014)[5]

Period	Population	Bacteriological	Protozoa	Chemical	Fully	Percent Fully	Change
2009/10	465,000	405,000	169,000	420,000	158,000	34.1	
2010/11	457,000	406,000	171,000	420,000	162,000	35.5	1.4
2011/12	464,000	409,000	187,000	431,000	176,000	38.0	2.5
2012/13	474,000	415,000	194,000	427,000	179,000	37.8	-0.2
2013/14	477,000	424,000	228,000	437,000	197,000	41.2	3.4
2014/15	494,000	440,000	238,000	457,000	228,000	46.1	4.9
2015/16	489,000	439,000	248,000	453,000	221,000	45.1	-1.0

Overall improvement in compliance 2009 to 2016: **11.0%**

Small Supplies – Supplies serving 101 to 500 each (compliance required by 1 July 2015)[6]

Period	Population	Bacteriological	Protozoa	Chemical*	Fully	Percent Fully	Change
2009/10	83,800	56,300	14,600	82,300	13,600	16.2	
2010/11	81,700	58,600	15,600	80,800	13,800	16.9	2.2
2011/12	82,100	56,200	18,700	81,300	16,800	20.4	3.5
2012/13	81,700	59,100	19,600	79,100	17,900	21.9	1.5
2013/14	79,700	57,200	18,800	77,500	16,500	20.7	-1.2
2014/15	78,800	58,800	19,700	78,000	16,600	21.0	0.3
2015/16	74,600	58,100	21,900	73,200	18,700	25.0	4.0

*Small supplies are not necessarily required to be assessed for chemical constituents and so gained compliance by default unless there was a known non-compliance

Overall improvement in compliance 2009 to 2016: **8.8%**

It can be seen that compliance by population reduces from 88.8% for large supplies to 25.0% for small supplies, although the greatest progress in making improvements has been in the medium supplies (16.6% compared with 2.2 % for large ones).

[5] In 2015/16 there were 195 supplies serving 501 to 10,000 people each.

[6] In 2015/16 there were 235 supplies serving 101 to 500 people each.

With the exception of medium supplies, which showed a 10.5% increase in 2012/13, there is no evidence that compliance has improved significantly in the period leading up to the time by which compliance was required.

Of note is that bacteriological compliance for small supplies was only 78% in 2015/16, compared with 67% in 2009/10.

Compliance by treatment plant

The registration of water supplies in the 'Register of Drinking Water Supplies for New Zealand' breaks down a supply by source, treatment plant and zone. A supply may have multiple zones, treatment plants and sources. A treatment plant is the location where disinfection occurs, however if the water is not disinfected or treated in another way, the supply will have a registered treatment plant, even if is it only a notional one. A treatment plant may have multiple sources including several bores in a well field.

ESR provided the Inquiry with data on the compliance by treatment plant for the period 2009 to 2016.

This data shows that there are currently 573 'treatment plants' serving large, medium, minor and small supplies, of which 123 have no treatment. Those without treatment serve a population of 640,625.

Of the 123 without treatment, 67% complied with the bacteriological standards, 59% with the protozoal standards, and 100% with chemical standards, giving an overall compliance of 52.8% in 2015/16 This compares with an overall compliance of 29.3% in 2009/10 when there were 167 'plants'.

Compliance for all 573 plants was 69% bacteriological, 41% protozoal, and 99% chemical with an overall compliance of 38.2% in 2015/16 compared with 21.7% in 2009/10 when there were 607 plants.

Analysis of the supply sizes show the highest compliance for large supplies (80.8%) reducing to 57.7% for medium supplies, 43.3% for minor and 25.2% for small ones. There is also a trend towards fewer treatment plants indicating interconnection of supplies to large plants.

Waterborne disease statistics

The New Zealand notifiable disease database (EpiSurv) records the following diseases which can be transmitted by the consumption of contaminated water. Records for the period 2008- 2016 are shown below. Not all acute cases of gastroenteritis are notifiable, only those where there is a suspected common source or from a person in a high risk category e.g. a food handler or childcare worker, or single cases of chemical, bacterial or toxic food poisoning.

Disease	Campylobacteriosis	Cryptosporidiosis	Gastroenteritis	Giardiasis	**Total**
2008	6,694	764	686	1,660	**9,804**
2009	7,177	854	712	1,639	**10,382**
2010	7,346	954	493	1,985	**10,778**
2011	6,686	610	567	1,934	**9,797**

2012	7,016	877	735	1,714	**10,342**
2013	6,837	1,348	557	1,729	**10,471**
2014	6,782	584	756	1,709	**9,831**
2015	6,218	696	503	1,510	**8,927**
2016	7,456	1062	512	1,616	**10,646**
Totals	**62,212**	**7,749**	**5,521**	**15,496**	**90,978**

While the diseases above have been associated with outbreaks in New Zealand, the majority of cases are not likely to be due to water sources. For example in 2015 only 50 of the 1,510 cases of giardiasis (3.3%); 23 of the 6,218 of campylobacteriosis (0.4%); and 5 of the 696 of cryptosporidiosis (3.3%) were reported as part of a waterborne disease outbreak.

A common cause of infection of all the above diseases is from untreated water supplies serving individual dwellings, but also ingestion while swimming for giardiasis and contact with farm animals and attending day-care centres for cryptosporidiosis. Infection rates are seasonal and in the case of animal contact increase at times of lambing and calving.

Boil Water Notices

As part of the annual report into drinking water compliance, information on Boil Water Notices is collected, but not published, for all networked supplies serving over 100 people. The survey does not specifically record information on the reasons for each notice being issued, nor the duration for temporary notices.

The table below lists the population affected by such notices for the period 2009 – 2016.

	Population affected by Boil Water Notices			
Period	Survey population	Temporary	Permanent	Temporary and Permanent
2009/10	3,820,000	55,000	9,200	64,000
2010/11	3,402,000	84,000	8,100	92,000
2011/12	3,807,000	*272,000	9,300	281,000
2012/13	3,810,000	52,000	9,100	62,000
2013/14	3,829,000	37,000	6,200	43,000
2014/15	3,787,000	63,000	5,000	68,000
2015/16	3,791,000	8,100	7,200	15,000

*Includes large parts of Christchurch after the earthquakes

In 2015-16 44 supply zones had Boil water Notices issued, of which 26 were permanently in place, serving a population of 7,200 people. With the data available it is not possible to derive an estimate of a combined people/day measure.