Also available on the Web site is information describing the *Capacity Building: Mastering the Art of the Invisible* colloquium. The colloquium, held at Sydney University on the 6th of March this year, brought together over 100 researchers, practitioners and policy makers from across Australia. The key presenters included Professor Stephen Leeder, Dr Penny Hawe, Dr Robert Bush, Associate Professor Hal Swerissen, and Robert Fitzgerald, NSW Community Services Commissioner.

The major outcomes from the day were:

- a shared understanding of the various ways of thinking about capacity building
- a clear direction for further work in capacity building.

Transcriptions from the presentations, discussions and questions to the panel are all available on the Web site. ⊞

A DRINKING WATER INVESTIGATION

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The aim of this investigation was to ascertain whether untreated water drawn from rivers, springs and rainwater tanks, and which is intended for drinking purposes in rural accommodation establishments (such as caravan parks, wilderness resorts, 'country retreat' and bed and breakfast style accommodation), complied with the *Australian Drinking Water Guidelines*. For a description of the guidelines and how they were applied to this investigation see page 126. The investigation revealed that the majority of premises did not have water treatment systems installed, and where they were installed they were inadequately maintained. At the time of the investigation there was no legislation through which such premises could be directed to treat

drinking water. This article describes the potential public health implications of guests consuming untreated water from these establishments.

BACKGROUND

In November 1996, the Hunter Public Health Unit began a program to sample the drinking water provided by a number of rural accommodation establishments in the Williams, Allyn and Chichester River Catchments. The program followed a reported outbreak of diarrhoea and vomiting among guests of a rural accommodation establishment, where one guest reportedly attended hospital. Following this notification, the premises were inspected by Food Surveillance Officers and Environmental Health Officers from the Hunter Public Health Unit. Food hygiene practices at the establishment were reported by the Food Surveillance Officers as being of a poor standard. However, due to previous problems

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TABLE 3

LEVELS OF FAECAL COLIFORMS, *E. COLI* AND TOTAL COLIFORMS IN WATER SAMPLES: WILLIAMS, ALLYN AND CHICHESTER RIVER CATCHMENTS, NOVEMBER 1996

Site	Location	Faecal coliforms	*E. coli*	Total coliforms	Water treated
1a	External Tap	<1	<1	<2	yes
1b	Kitchen Tap	<1	<1	<2	yes
1c	Draw off	120	120	150	no
2a	Kitchen Tap	<1	<1	<2	no
2b	Draw off	94	94	460	no
3a	Restaurant	31	16	62	no
3b	Guest Lodge	<1	<1	<2	no
3c	Staff tap	2	2	4	no
4a	External Tap	20	20	47	no
4b	Draw off	140	140	540	no
5a	Lodge Tap	<1	<1	<2	no
5b	Staff tap	2	2	10	no
6a	External tap	<1	<1	<2	partially
7a	Kitchen Tap	<1	<1	<2	partially
8a	Staff tap	8	8	120	no

NOTE: Australian Drinking Water Guidelines for faecal coliforms, *E. coli* and total coliforms are zero per 100mL sample.

with drinking water in this particular catchment area, it was considered important that water samples were also taken.

Examination of the water sample from the initial investigation indicated that the river water, water storage tanks and reticulated supply to the kitchen and guest rooms all failed to meet the standards set out by the *Australian Drinking Water Guidelines.* This untreated water was used for food preparation in the main kitchen, to make water-based drinks, and was reticulated to all guest rooms. Fifty-four questionnaires were issued to guests of the accommodation establishment who were present at the time of the outbreak. Forty questionnaires were returned, with twenty-two respondents reporting diarrhoea and vomiting. The questionnaire responses indicated that the highest attack rate (91 per cent) was among guests who consumed water or ice. No faecal specimens were obtained because the guests were dispersed over long distances and there was delay in notification.

METHODS

On the 4th and 5th of November 1996, 15 water samples were collected from eight separate rural accommodation establishments, and sent to the Division of Analytical Laboratories (DAL) in Lidcombe to be analysed for the presence of faecal coliforms, total coliforms and *Escherichia coli* (*E. coli*). The samples were stored under refrigeration until they were transferred to DAL in an insulated container. All samples from taps were taken using a standard procedure to ensure that they were not contaminated by bacteria living in or around the taps. This procedure involved heating the taps under a naked flame for about 30 seconds and allowing water to run through taps for 15 seconds so that a representative sample of water flowing through the system was obtained, rather than sampling water that was stored in or close to the tap.

Water from the Williams, Allyn and Chichester catchments was included in the study and samples were taken from raw water (untreated) draw off, domestic and drinking sources at the accommodation establishment (Table 3). The sources of the water samples were: one from a natural spring, two were from the Allyn River, two from the Chichester Dam, five from rainwater tanks and five from the Williams River. Two samples were taken from a source at the main water supply from Chichester Dam, which received only partial treatment (low-level chlorination, not filtered). Two samples were taken from a source which treated the water by filtration, chlorination and ultra-violet disinfection.

RESULTS

All four water samples taken from treated supply sources met the bacteriological standards for drinking water as recommended by the *Australian Drinking Water Guidelines.* Of the remaining 11 samples taken from untreated supplies, only three samples met the bacteriological standard of the guidelines. Therefore, 73 per cent of the raw water supplies failed to meet the bacteriological standards for drinking water.

FOLLOW-UP STUDY

In December 1996, a follow-up round of 13 samples was taken. Again four samples taken from treated water supplies met the bacteriological standard recommended by the *Australian Drinking Water Guidelines.* Of the remaining nine samples, seven failed to meet the bacteriological standard for drinking water. This represents a 78 per cent failure rate for raw (untreated) water (Table 4).

DISCUSSION

The *Australian Drinking Water Guidelines* state that where drinking water supplies are not protected and effectively treated, outbreaks of infectious disease, particularly diseases of the intestine, may occur. This potential public health risk has been supported by this investigation, with a high percentage of samples from untreated water supplies not meeting the bacter-iological criteria for drinking water.

Notifications to the Hunter Public Health Unit over the past five years indicate that tourists living in this type of accommodation regularly report gastrointestinal illnesses. It is likely that the cause of these illnesses relates to drinking untreated water. While rural accommodation establishments continue to provide untreated drinking water, the health of guests will be at risk.

Since the conclusion of this investigation the Public Health Act, 1991 has been amended. While at the time of the investigation general powers existed that allowed for the closure of a water supply, the recent amendment strengthens the powers of the Chief Health Officer in relation to drinking water. In addition to this all councils in NSW have been requested to supply details of commercial premises that have an untreated drinking water supply.

ACKNOWLEDGEMENT

REFERENCES

1. National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand. *Australian Drinking Water Guidelines*. Canberra, AGPS, 1996.
2. NSW Department of Health. Procedures for the submission of samples for testing. Sydney: NSW Department of Health, Division of Analytical Laboratories, 1995. ▦

NATIONAL WATER QUALITY GUIDELINES AND HOW THEY WERE APPLIED TO THIS INVESTIGATION

The *Australian Drinking Water Guidelines* describe drinking water as 'water intended primarily for human consumption which also has other domestic uses'. It may be consumed directly from the tap, or indirectly in beverages or foods prepared with water. Drinking water should be safe to use and aesthetically pleasing, clear, colourless, well aerated, with no unpalatable taste or odour and should contain no suspended matter, harmful chemical substances or pathogenic organisms. Appearance and taste are usually the characteristics by which the public judges water quality; however water which is cloudy or coloured or has an objectionable taste may not be unsafe to drink. The safety of water in public health terms is determined by its microbiological, physical, chemical and radiological quality. Of these parameters, the *Australian Drinking Water Guidelines* state that microbiological quality is usually the most important.[1]

The guidelines state that no drinking water sample should contain faecal coliforms or *Escherichia coli* (*E. coli*). Performance is satisfactory if over a 12 month period at least 98 per cent of scheduled samples contain no thermotolerant coliforms, and at least 95 per cent of samples contain no coliforms. A higher level of contamination may be tolerated in a particular area under certain conditions. These conditions are:

- the water system meets the guideline value for thermotolerant coliforms
- the water authority can satisfy the appropriate health authority that the coliforms are unlikely to be of faecal origin
- there is a level of monitoring sufficient to detect any change in the pattern of coliform occurrence
- there is direct monitoring of the occurrence of pathogenic micro-organisms as the health authority may select to ensure the coliform level does not represent a risk to public health
- agreed levels of service for total coliforms are negotiated with the appropriate authority and the consumers.[1]

These conditions apply to the quality of water at the point of use (for example, kitchen tap or shower) and apply to reticulated water at the consumers' tap, at a rainwater tank tap, and to source water if water is to be used without prior treatment. It should be emphasised that these conditions define water which, based on current knowledge, is safe to drink over a lifetime and therefore constitutes no significant risk to public health.[1]

These conditions are the minimum requirement for drinking water from a public health viewpoint. As the microbiological quality of water is considered to be the most important factor in determining the safety of water supplies, the chemical and radiological quality of the water was not analysed in this investigation.

In a situation where a small supply is serving an isolated establishment such as the accommodation establishments sampled in this study, absolute implementation of these requirements may be unrealistic. For these situations, it is recommended that as a minimum, microbiological characteristics should be monitored. However, if this is not possible, the public should be advised to boil water before it is consumed, or to use bottled water.