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Variations noted in aluminum levels

Some water readings astonishingly high, can vary with seasons, geography, expert says

BY WALLACE IMMEN
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TORONTO – The amount of aluminum in municipal water supplies can vary dramatically, figures being reported to federal health officials show.

Studies of memory loss due to aluminum suggest that 70 years of drinking water with levels above 200 micrograms per litre (parts per billion) might raise the risk of memory loss in old age consistent with Alzheimer's disease.

But in 1993, one plant in Ontario turned out water with 20 times that much.

"Some readings are astonishingly high, over 1,000 micrograms per litre," said Dr. Barry Thomas, head of the federal Health Department section that is planning to set national standards for aluminum in drinking water.

Seasonal variations can affect aluminum levels. Experts say levels tend to be higher during winter and summer as well as after storms, which stir up sediment in rivers and lakes that supply water for cities. Hydrated aluminum sulphate, or alum, is added to remove silt and harmful bacteria from water during treatment. Some aluminum remains in the water piped out to consumers.

The major problem may be in hot weather, said John McGrackan, mechanical assessment officer for Ontario's Environment Ministry. "Treatment plants have to produce more water in less time during peak summer demand." Adding more alum speeds the clarification process.

Geography also plays a role. Dr. Thomas

said that, in general, the Maritimes report low aluminum levels because most towns use ground water not treated with alum. Cities on the Prairies appear to have the most consistent problem. More of the aluminum salts used to clarify water must be added to overcome high natural levels of lime that makes water harder.

Saskatoon reported levels as high as 700 in its water, said Blaine Ganong, acting director of the municipal branch of Saskatchewan's Environment Department.

Aluminum added in treatment, known as inorganic or free aluminum, is considered the biggest health risk because new studies in Canada and Australia show it has an ability to reach the brain, where it collects in cells responsible for memory.

An Australian study found that free aluminum at the level of 100 micrograms per litre accumulated in significant amounts in the brains of six of eight rats after being injected with the equivalent of just one glass of water.

Drinking Aluminum

Amounts under 200 micrograms per litre of water are safe but 1993 testing showed many communities with much higher levels

Community	Maximum	Minimum	Average
Ajax	220	55	136
Bracebridge*	44	30	34
Gravenhurst	690	120	317
Hamilton	120	49	81
Kingston	250	53	144
Metro Toronto (Harris Plant)	240	81	134
Metro Toronto (Clark Plant)	110	65	83
Ohswegen	4,350	66	1,088
Ottawa	220	57	115
Port Dover	389	78	189
Rainy River	1,530	170	623
Sudbury*	19	7	11
Windsor	230	60	117

*Bracebridge and Sudbury do not treat with aluminum

Ohswegen's phenomenally high peak reading of 4,350 was the result of mechanical problems at the federally operated treatment plant, officials say

The article EM9509 reprinted above is used in Figure 15.1 of the STAT 231 Course Materials.