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Site menu

Drinking water regulation and consumer choice

Paper by Michael Rouse, Chief Inspector, Drinking Water Inspectorate to
The UK bottled Water Conference on 17 November 1999

Introduction

1. It is considered that in the developed world, people consume too little water with the result that they become dehydrated, not critically so but sufficiently so to affect their general well-being. All of us should be encouraging the consumption of water. Whether that is tap or bottled water or both should be a matter of informed consumer choice.
2. In preparing this paper I have noted my own water drinking habits. When I am at home I drink tap water, generally straight from the tap because it arrives at a pleasant cool temperature but on occasions after having been cooled in the refrigerator. In the office I drink tap water which is taken from a cooler which does not have a filter. By preference I drink water frequently with the occasional coffee and tea when joining others. At a restaurant in this country I will ask for a jug of tap water without the slice of lemon. When travelling in this country, which I do every working day on the train, I drink still bottled water. I do not like fizzy water. When outside the developed world I buy bottled water and add a disinfectant or boil the water.
3. In this paper, in explaining how tap water quality is regulated I give some results, discuss risk and absolute safety, some similarities and differences between tap and bottled water, and consider taste and other factors. I begin with some views on the 'market' and consumer choice.

The Market and Consumer Choice

4. As perhaps is illustrated by my own water drinking habits I believe in consumer choice. I drink a lot of water because I like it and the choice I exhibit depends upon availability, my views on quality, both taste and safety, and cost. I am fortunate because I have good information on the quality of water, I am able to put risks of drinking both tap and bottled water in context, I have more knowledge than the media who run scare stories, so I am able to make an informed choice. Unfortunately it is more difficult for those not closely involved to know what to believe. They have to decide how much faith they can put in the 'authorities', such as the Drinking Water Inspectorate even if they are aware we exist, whether to take media articles at face value and whether to be influenced by the advertising of bottled water. They are further confused by advertisements for a whole range of filters for use in the home. They are also influenced by some misconceptions about chlorine and taste and mineral content. Perhaps we all have a responsibility to assist consumers in making an informed choice.

5. I have no difficulty with consumers choosing to buy bottled water if they have a preference for it providing they can sensibly afford it. Two litres of bottled water, depending upon the brand, costs around £200 a year whereas the average water bill is around £100 for which the average household takes around 400 litres a day. The additional cost of bottled water would be a significant increase in expenditure for people on lower incomes. I do become concerned if they end up paying a significant proportion of their available money on bottled water because of unfounded concerns over the safety of tap water. It is important that they are well informed on the safeguards on tap water quality through standards, monitoring and the audit and enforcement activities of DWI.

Tap Water Regulation

6. The standards are set down in the Water Supply (Water Quality) Regulations 1989 as amended which include the required compliance monitoring frequencies. Recently the Water Supply (Water Quality) (Amendment) Regulations 1999, which deal with cryptosporidium, have been added. The former incorporate all of the requirements of the European Drinking Directive, a new version of which will become UK law by December 2000 with the new standards required to be met by December 2003. The numerical standards include both health and aesthetic standards and are mandatory. The water supplied is carefully monitored; the results are audited and made available on public records. DWI produces an annual report which summarises the detailed results together with enforcement actions which have been taken when there have been exceedances. I will return to the results later.

7. The water is sampled at the treatment works, at service reservoirs and at consumers' taps for bacteriological quality. The reason for multiple sampling is that it is necessary to know whether consumers are receiving water which may have been contaminated but also important to pick up earlier indications so that action can be taken to deal with the potential sources of contamination. For other parameters the sampling points depend upon whether the quality can change during distribution. For example for pesticides, the tests are on samples taken at the works because that will be unchanged throughout distribution. However testing for lead is at the tap because any lead will have been picked

up by the water in contact with lead service pipes. The sampling regime is based on the need to know the quality of water being delivered to consumers at the point of consumption. Each year, throughout England and Wales, there are around 3 million tests for compliance. The water companies carry out this testing themselves as that avoids duplication with its associated high cost. DWI checks that the companies meet the sampling and analysis requirements so that we can be confident that the results are a true record of actual water quality.

The DWI audits cover the following

- Analysis of the compliance data for completeness and consistency
- Audit trails to check the sampling, analysis and recording process
- Inspection of laboratories by Inspectors or third party accreditors to check that the required methods of analysis are being used competently by trained staff
- Inspection of treatment works, service reservoirs and water distribution operations to check that other regulations are being met
- Follow up of incidents to check that action has been taken on recommendations.

8. The routine inspections are announced but from time to time DWI carries out unannounced visits. It is important that companies recognise that a DWI Inspector could turn up at any works at any time. If regulations are not being met DWI takes enforcement action which requires the companies to take the necessary action to rectify the deficiency in the fastest practical time. There have been around 1850 enforcement actions since 1990.

9. As well as the audit function DWI investigates incidents which affected drinking water quality or could have affected it. Water companies are required to notify DWI of any events which could be classed as incidents. In 1998 there were around 300 notifications of which 120 were classed as incidents. This is a good illustration of the open reporting with companies being willing to notify minor events which turn out not to affect drinking water quality. Most of the 120 were minor but a few were more serious largely involving incidents in the distribution system resulting in the supply of rusty water. Each incident is investigated and if 'water unfit for human consumption' was supplied and we judge that it should have been avoided the company is prosecuted. With the combination of enforcement and prosecution powers the water companies of England and Wales operate within the toughest drinking water quality regulatory regime in the world. I believe it is also the most open and probably the most effective in protecting consumers.

Compliance Results

10. As already mentioned the results are made available on public records so that consumers can obtain the data for the zone in which their property is supplied. Consumers are able to see the results of tests taken from a random sample of properties in their area. In addition to our Annual Report, DWI produces leaflets giving both the national picture and a summary of results for each water company. The full summary data is available on the website.

11. In 1998, 99.78% of around 2.8 million tests met the required standards. The number of tests not meeting the standards in 1998 was just one eighth of the figure in 1992. This demonstrates the effectiveness of the enforcement regime. Most of the current failures are associated with the distribution system, the solution of which will take another 5-10 years depending on the amount of work required to be done by each water company. The rehabilitation of distribution systems to solve the quality problems has already cost £3 billion and a further £2.5 billion is required. In the meantime DWI is keeping the pressure on water companies to operate their systems with care to avoid the iron deposits from being 'picked up' by the water and transmitted to consumers.

Risks and Absolute Safety

12. It is important to recognise, and educate the general public that absolute safety is not possible. This is true in all aspects of life from walking downstairs, travelling in a car, eating food, or in drinking either tap or bottled water. Clearly, we could live in a bungalow, never leave the house (but watch out for a fire or something dropping on it), but we need food and water for survival. All very obvious but how often do people say that whatever 'it' is, it must be totally safe. We also hear the words 'it must never happen again'. These reactions are understandable but absolute safety is unachievable.

13. That doesn't mean that we should not strive for increased safety. Of course we must work continuously to improve safety, and if something has gone wrong, we must learn from it and minimise the chances of it happening again. That is very different from pretending that absolute safety can be achieved. Let us look at what this means for drinking water.

14. The regulations I have described above set health protection and aesthetic standards for tap water. The regulations require careful monitoring and a drinking water inspectorate exists to check that the requirements are being met. Occasionally something goes wrong and the reasons are investigated. When something is discovered either from an incident, or from research, further measures are taken. In the case of cryptosporidium new regulations which make it a criminal offence to fail to treat the water effectively have been introduced. The associated monitoring equipment provides the practical means for improved monitoring, the offence provides an added incentive should one be necessary. The result of these new regulations, when implemented, will be that the chance of a waterborne outbreak of cryptosporidiosis, already a rare event, will be minimised within our current understanding. Although the likelihood will become remote there will always be some risk, however small. Research continues and further safeguards will be introduced, either as operational improvements or backed by legislation as new knowledge is obtained. It is a continuous improvement process and consumers, quite rightly, expect it.

15. The same applies to bottled water. Great care is taken to protect sources. Some waters receive disinfection. Quality systems aim to achieve protection at bottling plants. Quality checks are made on each batch with a satisfactory analysis required before despatch. However, it is not possible to be sure that a contaminated bottled hasn't got through the

processes. Checks on bottles taken from retail outlets provide some additional safeguards but there is a low probability that they would pick up the 'rogue' bottles.

16. However, in this country, the chances of becoming ill from drinking either tap or bottled water are extremely low. So low that most people hardly ever think about it, that is until something goes wrong. An incident, whether microbiological contamination of tap water, or chemical contamination of a batch of bottled water, is exaggerated by the media and many people become frightened. We all work to minimise the occurrence and the impact of such incidents.

17. There are some specific situations in the house where consumers should take care. Although water storage tanks in houses should be properly sealed and the water safe to drink I always advise people to take water for drinking only from taps which are fed directly from the water mains. This is normally the cold kitchen tap although in some areas all cold water supplies are taken directly from the mains.

18. Use of in house filters can be of concern if consumers do not follow manufacturers' recommendations on maintenance and on replacement of filter elements. It is also very important to know what the filter is expected to achieve and indeed whether it is necessary and effective. If filters are not replaced regularly there is the risk of accumulation of substances and the breakthrough of high concentrations with the attendant risk. The advice of DWI is that in-house filters are not necessary but that if consumers wish to fit them they should check carefully which type they buy and ensure that they follow the supplier's instructions. Filters are not necessary to remove traces of chlorine as it will dissipate by itself if the water is stored in a jug, preferably in a refrigerator, for a couple of hours.

19. Another concern is the use of large water containers which cannot be refrigerated. As these take several days to consume, there is the risk of microbiological contamination and the subsequent growth in the number of organisms before they are replaced.

20. Everything I have said about risk has been related to the majority of people who have normal immune systems. The situation for the immunocompromised is very different. Exposure to certain bacteria, which even might be desirable for most people to maintain immunity, does not apply to the immunocompromised. Any water from any source could be a risk to the immunocompromised. They must drink only water which has been boiled whether from a tap or bottled.

Similarities and Differences

21. It is worthwhile looking at some of the similarities between tap and bottled water, and some of the differences. They assist us in understanding consumer behaviour and choice. Both tap water and bottled water make an important contribution to health. Both are required to meet stringent standards and are subject to regulation on quality. Although, overall, it can be expected that mineral waters have a higher mineral content than tap water, often they are similar. See the table below showing the figures for calcium and

magnesium. The tap water figures are for the whole of England and Wales in 1998. The mineral water figures are taken from the National Mineral Water Association data sheet, December 1996, covering 20 brands.

			Tap Water	Mineral Waters
Calcium (mg/l Ca)	Max		188	
	Mean		67	
	Range			2-461
Magnesium (mg/l Mg)	Max		54	
	Mean		6	
	Range			1-83

22. What about the differences. When measured by volume, bottled water costs around 400-1000 times that of tap water depending upon brand. Bottled water has to be carried home, tap water appears at the sink. Tap water quality is monitored at the point of consumption; some bottled waters are monitored at retail outlets. Tap water quality checks are required by law to be placed on a public record. Some tap waters arrive at the tap with evident traces of chlorine. Tap water is not immediately mobile, bottled waters are purchased in convenient containers for travelling. Consumers do not have a choice of tap water whereas supermarkets stock many different brands of bottled water.

Taste and Other Factors

23. Taste is a highly individual thing. Some people won't drink tap water unless they can smell chlorine because they then feel it is safe. Conversely, most people dislike chlorine. I dislike the taste of chlorine myself, other than very low levels which I do not notice. (Equally I dislike lemon being added to jugs of water and prefer the water as it is.) Some people are more sensitive to chlorine than others. The chlorine taste problem is easily solved by putting a clean jug of water in the refrigerator for about two hours after which the chlorine will have disappeared. The water will then also be at a nice cool drinking temperature, indeed the same temperature at which bottled water will be stored. There have been a number of blind tastings when panels have been unable to distinguish between tap and bottled water. After chlorine, temperature is probably the most important factor in the taste of tap water.

24. Another important factor is hardness, which is largely associated with mineral content. I have noticed that people who grow up in areas where the tap water is soft tend to prefer soft waters. Equally, me included, those who have grown up in hard areas prefer hard water and find soft water much less pleasant to drink. Some studies have suggested that there is less heart disease in hard water areas but it is not understood whether that is due to the beneficial effects of the minerals in hard water or some other factors. However, on a precautionary basis, this is one of the reasons why DWI advises that consumers should avoid drinking softened water.

Some concluding points

25. There are good health reasons for people to drink more water, whether tap or bottled. What water they drink is a matter of consumer choice, but that should be informed choice. The information on water quality, for both tap and bottled water, should be easily available and in a form which a lay consumer can understand. The Drinking Water Inspectorate has an important role in this respect as also has the bottled water industry.

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