



Risk behaviour and compliance following 'boil water' notices due to a natural disaster versus a human error incident

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The Incidents

Mythe

- Gloucestershire
- July – August 2007
- 340,000 residents affected
- Large-scale floods cause complete loss of water
- Residents first issued with a ‘do not drink’ notice, and 7 days later with a ‘boil water’ notice
- ‘Boil water’ notice in place for 4 days

Pitsford

- Northamptonshire
- June - July 2008
- 258,000 residents affected
- Rabbit in the treatment works causes cryptosporidium contamination
- Residents issued with ‘boil water notice’
- ‘Boil water’ notice in place for 10 days

Previous Studies

		Human Error			Natural Disaster
		O'Donnell et al. (2000)	Willocks et al. (2000)	Karagiannis et al. (2009)	Ram et al. (2007)
Unboiled tap water	Drinking	20%	9%	18%	-
	Preparing food	17%	20%	-	-
	Brushing teeth	54%	57%	-	-
Boiled tap water	Drinking	-	-	-	39%
	Preparing food	-	-	36%-48%	46%
	Brushing teeth	-	-	28%	23%

- During Hurricane Rita, only 31% knew of the 'boil water' notice. Word of mouth was used more than media channels.
- Information source use has been found to have no effect on compliance rates (O'Donnell et al., 2000; Karagiannis et al., 2009).
- Reasons for non-compliance include forgetting (Willocks et al., 2000), not being worried and the inconvenience (Karagiannis et al., 2009).

Aims

- To compare across the two incidents:
 - Use of and preference for different information sources
 - Water behaviour and level of compliance
 - Satisfaction with advice/notices and information sources
- To investigate factors that may have influenced differences in behaviour.

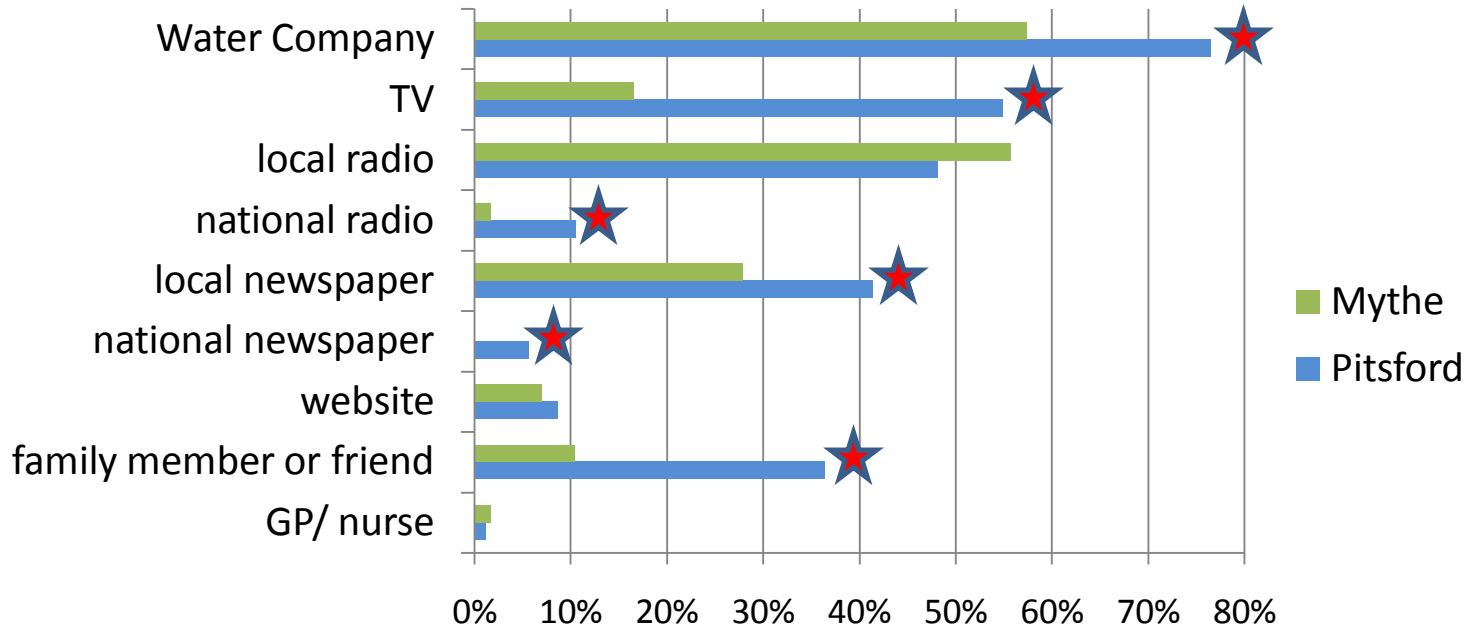
Methods

- January-February 2009
 - Mythe: 18 months after the incident
 - Pitsford: 8 months after the incident
- Postal questionnaires to 1,000 households per incident
- Primarily yes/no and closed questions
 - Demographics
 - Advice recollection
 - Information sources
 - Water behaviours and compliance
- Response Rates
 - Mythe: 195 replies, 159 included in analysis
 - Pitsford: 173 replies, 162 included in analysis
- Analysis performed with SPSS

Participant Demographics

- No significant differences between the two samples.
- Samples closely resemble Census 2001 data.
- As normal:
 - Slight under-representation of younger males (Murray & Graham, 1995)
 - Slight under-representation of lower socio-economic tiers (Sheikh & Mattingly, 1981)
- No significant over-representation of female consumers.
 - Mythe: 60.0% female; Pitsford: 63.8% female

Use of information sources for both 'boil water' notices



- Mythe: Water company (54.7%), local radio (55.7%), local newspapers (27.8%).
- Pitsford: Water company (76.5%), television (54.9%), local radio (48.1%).

Use of Information Sources

- Higher average number of information sources used for Pitsford (Pitsford (M=2.833); Mythe (M=2.019)).
- Mythe consumers ranked the local radio as the most useful source (53.4%).
- Pitsford consumers ranked the water company as the most useful source (41.2%).

Advice Recollection

- Mythe consumers were less likely to have received the ‘boil water’ notice.
- Pitsford consumers were more likely to recall the notice as ‘boil water’.

	Mythe (N=107)		Pitsford (N=157)	
	n	%	n	percent
there was one advice: do not use	1	0.9%	9	5.7%
there was one advice: do not drink	9	8.4%	6	3.8%
there was one advice: boil	31	29.0%	74	47.1%
there was one advice: safe	58	54.2%	3	1.9%
there was more than one type of advice	8	7.5%	65	41.4%

- TV users for both incidents were less likely to recall the notice as ‘boil water’.
- For Pitsford, demographics had no effect. For Mythe, more females than males recalled correctly. Males were more likely to think the advice was ‘water safe’.

Consumer Satisfaction

	'very unclear' or 'unclear'	'very uninformed' or 'uninformed'
Mythe	12.8%	16.2%
Pitsford	8.1%	9.9%

- Pitsford consumers were more likely than Mythe consumers to think the advice was 'very clear' or 'clear' and were more likely to feel 'very informed' or 'informed'.
- For Pitsford but not for Mythe, consumers who did not use the water company were more likely to feel 'uninformed' and less likely to think the advice was 'clear' or 'very clear'.
- For Mythe but not for Pitsford, consumers who used more information sources felt the advice was clearer.

Water Behaviours: Boiled water

Pitsford consumers used boiled tap water to a greater extent, particularly for ingestion purposes, such as drinking, preparing food and brushing teeth.

Use of boiled tap water	Mythe (N=116)		Pitsford (N=161)	
	n	percent	n	percent
flush toilet	5	4.3%	2	1.2%
shower/bathe	5	4.3%	5	3.1%
wash hands	6	5.2%	24	14.9%
prepare/cook food with	41	35.3%	100	62.1%
brush teeth	29	25.0%	90	55.9%
drink hot	45	38.8%	107	66.5%
drink cold	23	19.8%	81	50.3%
prepare babies' bottles	4	3.4%	6	3.7%

Water Behaviours: Unboiled water

Mythe consumers were more likely than Pitsford consumers to use unboiled tap water for ingestion purposes.

Use of unboiled tap water	Mythe (N=116)		Pitsford (N=161)	
	n	percent	n	percent
flush toilet	105	90.5%	144	89.4%
shower/bathe	97	83.6%	142	88.2%
wash hands	81	69.8%	117	72.7%
prepare/cook food with	49	42.2%	40	24.8%
brush teeth	44	37.8%	34	21.1%
drink	34	29.3%	8	5.0%
prepare babies' bottles	4	3.4%	2	1.2%

Behaviour Predictors

Demographics

- No demographic factors predicted adult ingestion for either incident.
- For Mythe, demographic factors predicted behaviour.
- For Pitsford, demographic factors rarely predicted behaviour.

Information Sources

- For Mythe, information source use did not predict water behaviour.
- For Pitsford, water company and local radio use predicted unboiled tap water for adult ingestion.
- For Pitsford, family/friends use predicted personal hygiene with unboiled water.

Summary of Results

- **Use of information sources and recall**
 - High use of the water company for Pitsford.
 - High use of local radio for Mythe.
 - More information sources used on average for Pitsford.
 - More accurate recall of the ‘boil water’ notice for Pitsford.
 - More likely to feel ‘very informed’ and that the advice was ‘very clear’ for Pitsford.
- **Water behaviours**
 - For Mythe, higher use of unboiled water for ingestion purposes.
 - For Pitsford, higher use of boiled water for ingestion and washing hands.
- **Water behaviour predictors**
 - More water behaviours predicted by demographic factors for Mythe than Pitsford.
 - More water behaviours predicted by use of information sources for Pitsford than Mythe.

Conclusions

- During natural disasters, people may be more likely to search for information from local sources rather than relying on the water company leaflets.
- The chaos of natural disasters and/or the combination of two different water notices may lead to:
 - Confusion over what advice has actually been given
 - Consumers feeling less informed
 - Risky behaviour caused by a lack of comprehension of the advice
 - Risky behaviour caused by the added strain of complying during a high-stress situation.
- During natural disasters more so than routine problems, behaviours may be predicted by demographic factors.