How information on different water quality measures can influence values

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Outline

- Six case studies of bathing water valuation
- Drawn from the Environmental Valuation Reference Inventory (EVRI)
  - www.evri.ca
  - Search term: ‘bathing water’
- Not a definitive assessment of the effects of water quality information on values
- Instead an illustration of how water quality information and other drivers can affect bathing water/beach values

Study 1: Machado & Mourato (1999)

- Health impacts and recreation benefits for 23 beaches on the Estoril Coast, Portugal

- Contingent valuation of three water pollution related health impacts:
  - Gastroenteritis, eye irritation, respiratory illness
  - Described in terms of symptoms, restriction on activities and duration
  - 401 Lisbon residents at 11 beaches

- WTP to avoid gastroenteritis
  - Mean: 7782 PTE (US$ 44.39)
  - Median: 2500 PTE (US$ 14.26)
  - Mean range of imprecision: 4284 PTE (US$ 24.44)

- Contingent ranking of 4 possible beach trips
  - Water quality (good, average, bad) and beach access charge
  - 195 beach users at 11 beaches

	Beach A	Beach B	Beach C	Beach D
Cost ($)	*300*	*1500*	*800*	*1500*
Water quality	*Bad: no blue flag*	*Good: Blue flag*	*Average: no blue flag*	*Average: no blue flag*
RANK				

- Mean WTP for water quality improvements
  - Bad-average: 1921 PTE (US$ 10.96)
  - Average-good: 1393 PTE (US$ 7.94)
  - Bad-good: 3313 PTE (US$ 18.90)

- CV results used to forecast WTP to avoid gastroenteritis in the CR sample
  - To disentangle health and recreation benefits
  - Adjusted to reflect risk

- Aggregate costs of water pollution relative to good, billion PTE (US$m):

	Health effect	Recreation effect	Total effect
Bad	1.3 – 1.9 (7.4 – 10.8)	8.9 (50.8)	10.2 – 10.8 (58.2 – 61.6)
Acceptable	-	1.8 (10.3)	1.8 (10.3)

Study 2: Hanley et al (2003)

- Combined travel cost and contingent market approach looking at visits at 7 Ayrshire beaches
  - On beach sample of 414 respondents
- On average beaches failed EU standard 62% of the time between 1989 and 2000
- Scenario was water quality improvement to meet EU standards
- Factors more likely to make people visit the beach:
  - Intention to swim following WQ improvement given they don't now
  - Perception of water quality: higher quality = more trips

- Estimated increase in visits from 3954 to 4006 per year
  - Additional 52 trips or 1.3% increase
  - Increase in per trip consumers' surplus of £0.48, or £5.81 per person per year

- Aggregate benefit of £1.25m/year

Study 3: Georgiou et al (1996)

- CV study at Lowestoft and Great Yarmouth
  - WTP to avoid loss of WQ at Lowestoft (currently passes)
  - WTP for gain in WQ at Great Yarmouth (currently fails)
- Mean WTP estimates

	Great Yarmouth - WTP for gain (95% CI)	Lowestoft - WTP to avoid loss (95% CI)
All sample	12.64 (9.00 - 16.28)	14.32 (11.18 - 17.45)
Holidaymakers	14.16 (9.66 - 18.65)	14.49 (9.20 - 19.77)
Day trippers	10.24 (2.01 - 8.46)	14.53 (9.55 - 19.51)
Local Residents	9.33 (-2.23 - 20.81)	13.50 (6.45 - 20.38)

- Selected influences on WTP, Great Yarmouth

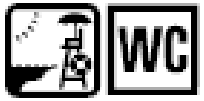
	All sample	Holiday-makers	Day trippers	Local residents
Unacceptability of all risks	+			
Family ever suffered from any illness from sea bathing	+			
Personally suffered from any illness from sea bathing				+
Been in water	-	-		
AIDS riskiness	-			
Aware of health risks of sea bathing		+		
Importance of beach passing standard		+		
Perceived water quality at beach		+		
Activity = swimming		-		
Number of visits in past year			+	
% enjoyment of day due to beach			-	
Has beach passed standard			-	
Powerful other Health Locus of Control			-	

- Selected influences on WTP, Lowestoft

	All sample	Holiday makers	Day trippers	Local residents
Unacceptability of all risks	+			
Family ever suffered from any illness from sea bathing		+		
Been in water		+		-
Number of visits in past year			+	
% enjoyment of day due to beach				+

Study 4: Eftec (2002)

- Study to estimate benefits of revised Bathing Water Directive in England and Wales
- Choice experiment of 809 with choice sets considering the 'average' beach in Britain
  - i.e. not place specific
  - Five attributes: water quality, advisory note system, litter/dog mess, safety and amenities, additional water charges
- Two versions of the survey:
  - A: water quality described as the risk of suffering a stomach upset from bathing
  - B: water quality described as the number of days in the bathing season considered unsafe to swim due to elevated risk of suffering a stomach upset

B EXAMPLE CARD	Current Situation	Scenario A	Scenario B
Average water quality (chance of getting a stomach upset) 	7 in 100	1 in 100	1 in 100
Advisory notice system (advice against swimming on poor water quality days) 	None	None	In place
Litter / dog mess 	Some	None	None
Safety & Amenities (toilets, showers, safety equipment and amenities) 	Average	Average	Good
Additional water charges per year £	£0	£11	£25
I would prefer:	❑	✔	❑

- WTP estimates

	Household WTP/annum	England and Wales aggregate
A: 1% reduction in risk of stomach upset	£1.10	£26.4m £61m (2.3% risk reduction)
B: Reducing 'unsafe to swim' bathing by 1 day	£0.90	£21.6m
Advisory note system	£5.60 - £13.70	£134.4m
Avoid presence of litter/dog mess	£6.00 - £11.10	£144m
Improve amenities from 'average' to 'good'	£2.50 - £7.30	£60m

Study 5: Brouwer (2006)

- Two CV studies of 500 Dutch households eliciting WTP for a revised Bathing Water Directive
- December 2002 – off-season
- August 2003 – very hot summer with many bathing water sites (inland and coastal) closed due to low river levels, algal blooms and botulism
  - Severe impacts on biodiversity and industrial uses
  - Problems widely reported in media
- Opportunity to study stability of WTP over time and with different levels WQ information

- Mean WTP estimates (€/household/year)

	2002 survey (off-season)	2003 survey (summer)
Linear-logistic DC model	70.5 (55.0 – 86.0)	71.4 (53.0 – 89.8)
Turnbull DC model	32.5 (29.1 – 35.9)	30.4 (26.7 – 34.1)
Open ended WTP model	32.9 (28.8 – 37.0)	29.0 (24.8 – 33.3)

Study 6: Beharry-Borg & Scarpa (2010)

- Choice experiment looking at multiple beach recreation attributes for different user groups in Tobago

- Water quality presented as either an increased or decreased risk of an ear infection from swimming in polluted water

- Individual-specific WTP estimates (TT$) for snorkelers

	Class one (61%)	Class two (39%)
Up to 60 fishes	**35**	5
Up to 45 % coral cover	**50**	10
Vertical visibility of up to 10 m	**40**	10
MPA which allows fishing	**33**	7
MPA which prohibits fishing	**34**	10
Plastics of up to 5 pieces	15	**50**
Low chance of ear infection	**22**	**25**
Low level of development	15	**40**

Summary

- Values for health impacts often lower than for other water quality or beach attributes
- Evidence that information on water quality is more highly valued than potential health risk
- Experience of illness and water quality influences value
- Change in quality status may not greatly affect behaviour
  - People do a range of things on beach visits
- Beach users are heterogeneous
  - Different beach attributes are valued in different ways by different people
  - But WQ values may be similar
- Evidence that values may be stable over time and insensitive to extreme events

References

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