Number (percentage) of maternity units with general practitioner and midwife input to patient care in maternity units classified by type of input and by type of unit (not all units answered all questions)

	General practitioner unit			Consultant unit	p Value	χ^2 (degrees of freedom)
	Isolated	Alongside	Integrated			
			Indirect general practitioner and midwifery input			
Maternity liaison committee:						
Midwife and general practitioner input	27 (68)	20 (80)	86 (82)	14 (100)	NS	
General practitioner input; midwife none	13 (32)	5 (20)	19 (18)			
Audit*:						
Midwife and general practitioner input	17 (48)	4 (23)	9 (11)	3 (10)	<0·001	41 (6)
Midwife input; no general practitioner input	18 (50)	9 (50)	28 (35)	18 (62)		
No midwife or general practitioner input	1 (2)	5 (27)	43 (54)	8 (27)		
Perinatal mortality meetings†:						
Midwife and general practitioner input	18 (53)	15 (60)	47 (39)	9 (20)	<0·01	13·6 (3)
Midwife input; no general practitioner input	16 (47)	10 (40)	73 (61)	35 (80)		
Booking policy‡:						
Midwife and general practitioner input	20 (38)	12 (52)	32 (32)		<0·01	13·7 (4)
General practitioner input; no midwife input	17 (32)	7 (30)	17 (17)			
No general practitioner or midwife input	16 (30)	4 (17)	52 (51)			
Approval of general practitioner obstetricians‡:						
Midwife and general practitioner input	4 (8)	2 (6)	8 (7)		<0·001	39·4 (4)
General practitioner input; no midwife input	28 (58)	12 (35)	15 (14)			
No general practitioner or midwife input	16 (33)	10 (29)	88 (80)			
			Direct midwifery input			
Midwives can suture perineums:						
Yes	36 (55)	26 (90)	128 (96)	44 (90)	<0·001	56·1 (3)
No	29 (45)	3 (10)	6 (4)	5 (10)		
Midwives can read cardiotocographs:						
Yes	29 (45)	25 (89)	128 (96)	44 (90)	<0·001	81·3 (3)
No	35 (55)	3 (11)	5 (4)	5 (10)		
Not known	1	1	1			
Midwives can discharge patients:						
Yes	36 (56)	20 (77)	97 (73)	37 (76)	NS	
No	28 (44)	6 (23)	35 (26)	12 (24)		
Not known	1	3	2			
Unit recognised for training student midwives:						
Yes	10 (16)	21 (72)	114 (85)	35 (73)	<0·001	92 (3)
No	53 (84)	8 (28)	20 (15)	13 (27)		
Not known	2			1		

*Eight hospitals where there was general practitioner input but no midwife input were excluded from the analysis.
†No hospitals had general practitioner without midwife input as well; three hospitals that had no general practitioner or midwife input were excluded from the analysis.
‡No hospitals had midwife input without general practitioner input.

more often provided a domino service than other general practitioner units and performed more domino deliveries. Community midwives may be satisfying a demand for personal care where general practitioners do not provide intrapartum care and no alternative to specialist care exists.

In Britain midwives have maintained their position as the primary profession caring for women in labour by being willing to work with consultants. However, they contribute little to policy making, audit, and perinatal meetings of specialist units, suggesting that they have lost some independence. This idea is supported by the closure of independent schools of midwifery. Midwives may become obstetric nurses in all but name and may find it difficult to maintain their own discipline.

1 Robinson S. Providing maternity care in the community. *Midwife, Health Visitor and Community Nurse* 1988;**21**(8):274-9.
2 Campbell R, MacFarlane A. *Where to be born? The debate and the evidence.* Oxford: National Perinatal Epidemiology Unit, 1987.
3 Coupland VA, Green JM, Kitzinger JV, Richards MPM. Obstetricians in the labour ward: implications of medical staffing structures. *BMJ* 1987;**295**: 1077-9.
4 Smith LFP, Jewell D. The contribution of general practitioners to hospital intrapartum care in the maternity units of England and Wales in 1988. *BMJ* 1990;**302**:13-6.

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Health risks associated with bathing in sea water

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The risk to health of bathing in sea water contaminated with sewage has attracted public concern in Britain.[1] European standards for bacteriological quality of bathing water are less rigorous than those in the United States and Canada; hence there is increasing pressure on the European Commission to revise its bathing water directive.[2] The difficulty is in establishing rational mandatory standards based on scientific criteria.[3] We report a study commissioned by the Department of the Environment to test procedures for determining the health risks of bathing in contaminated sea water.

Subjects, methods, and results

We conducted the study at the main beach in Ramsgate, Kent, during three weeks in August 1990, when 2010 subjects aged 5-64 years were interviewed. Quota sampling based on age, sex, and whether the subjects were bathers or non-bathers was used in selecting respondents. We obtained information on whether they were day trippers, visitors, or residents and whether non-bathers, waders, swimmers, surfers, or divers. Of those interviewed, 1883 (94%) were contacted by telephone for information on the following symptoms arising in the week after leaving the resort: sore or red eyes, ear infection, runny nose, sore throat, respiratory symptoms (wheezing, cough), and gastrointestinal symptoms (nausea, vomiting, stomach cramps, and diarrhoea as defined by three loose stools or more in 24 hours). The sea water was monitored daily at prespecified sites and times for various indicators including counts of coliforms, thermotolerant coliforms, and faecal streptococci.

In all, 455 of 1883 subjects (24·2%) reported the

occurrence of at least one symptom, the relative risk of symptoms adjusted for age and sex being significantly increased in bathers (1·31; 95% confidence interval 1·04 to 1·64). Risk increased with degree of exposure, rising from 1·25 (0·96 to 1·62) in waders to 1·31 (0·98 to 1·75) in swimmers to 1·81 (1·09 to 2·99) in surfers or divers, indicating a dose-response relation (table).

Bathers experienced significantly more gastrointestinal illness than non-bathers (relative risk 1·47, 95% confidence interval 1·06 to 2·04); in particular, the risk of diarrhoea was almost doubled (relative risk 1·88, 1·18 to 2·99). Relative risks were raised also for eye; ear, nose, and throat; and respiratory symptoms, although they did not reach significance. Surfers or divers had a significantly increased risk of eye (relative risk 2·65, 1·22 to 5·75) and respiratory (relative risk 2·85, 1·38 to 5·87) symptoms. Risks were highest among 15-24 year olds. No significant differences were apparent between residents and visitors. The detailed findings are reported elsewhere.[4]

Relative risk of reported symptoms adjusted for age and sex according to bathing in sea water, Ramsgate, August 1990

	No (%) reporting symptoms	Relative risk (95% confidence interval)
At least one reported symptom		
Non-bathers (n=839)	180 (21·5)	1·00
Bathers (n=1044)	275 (26·3)	1·31 (1·04 to 1·64)
Waders (n=561)	142 (25·3)	1·25 (0·96 to 1·62)
Swimmers (n=399)	105 (26·3)	1·31 (0·98 to 1·75)
Surfers or divers (n=84)	28 (33·3)	1·81 (1·09 to 2·99)
Gastrointestinal symptoms (including diarrhoea)		
Non-bathers (n=839)	68 (8·1)	1·00
Bathers (n=1044)	116 (11·1)	1·47 (1·06 to 2·04)
Diarrhoea		
Non-bathers (n=839)	30 (3·6)	1·00
Bathers (n=1044)	61 (5·8)	1·88 (1·18 to 2·99)
Eye symptoms		
Non-bathers (n=839)	41 (4·9)	1·00
Bathers (n=1044)	62 (5·9)	1·24 (0·81 to 1·90)
Ear, nose, and throat symptoms		
Non-bathers (n=839)	110 (13·1)	1·00
Bathers (n=1044)	148 (14·2)	1·08 (0·82 to 1·43)
Respiratory symptoms		
Non-bathers (n=839)	47 (5·6)	1·00
Bathers (n=1044)	77 (7·4)	1·40 (0·94 to 2·07)

Water quality varied appreciably day by day, and the beach failed the European Commission's mandatory standard for thermotolerant coliforms on 12% of sampling occasions. The association between the microbiological quality of the water daily and reported symptoms is best investigated in day trippers, but their numbers were insufficient for analysis.

Comment

We showed an increased and dose related risk of self reported illness from bathing in sea water, findings consistent with those of the first phase study at Langland Bay.[5] These studies confirm that the study design used by the United States Environmental Protection Agency, endorsed by the World Health Organisation and the United Nations environment programme, and developed further by us is suitable for application in the United Kingdom. The noteworthy difference between our findings for Ramsgate and those for Langland Bay is the significant association between bathing and gastrointestinal symptoms observed at Ramsgate, where the sea water contains higher levels of faecal pollution.

The increased risk associated with sea bathing needs careful verification in terms of bacterial indicators of water quality, by examining the relation between these indicators and illness daily. We have performed a larger study this summer, encompassing several beaches of varying quality, to determine more precisely the incidence of illness against bacterial indicators of quality of sea water.

1 Eykin SJ. Health hazards from British beaches? *BMJ* 1988;**296**:1484.
2 Commission of the European Communities. Council directive of 8 December 1975 concerning the quality of bathing water (76/160/EEC). *Official Journal of the European Communities* 5 Feb 1976. (L31/1.)
3 House of Commons Environment Committee. *Pollution of beaches. Fourth report.* London: HMSO, 1990.
4 Epidemiology and Public Health Research Unit. *Health risks associated with bathing in the sea: results of a study in Ramsgate.* Guildford: University of Surrey, 1990.
5 Epidemiology and Public Health Research Unit. *Health risks associated with bathing in the sea: results of a pilot study in Langland Bay.* Guildford: University of Surrey, 1990.

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Effect of high dose steroid bolus on occlusion of ocular central artery: angiographic study

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Occlusion of the ocular central artery generally leads to permanent blindness after 105 minutes.[1] It may be caused by endothelial oedema,[2] so quick recanalisation may be possible with steroid treatment. We report four cases of acute occlusion of the ocular central artery in which a bolus of high dose steroid was injected intravenously and its effect on the retina examined by fluorescein angiography.[3]

Patients, methods, and results

The four patients studied were the only ones to have been admitted to our hospital in the past 15 years in the early stages of ocular central artery occlusion. All were women (ages 42, 48, 51, and 69) and all reported a sudden, one sided blindness during the 1½ to 2 hours before admission. The only ophthalmopathological sign was an amaurotic fixed pupil. After fluorescein angiography had shown occlusion of the ocular central artery in all four cases (figure, c and d) intraocular pressure was reduced by giving acetazolamide 500 mg intravenously and performing anterior chamber puncture. (Lower intraocular pressure facilitates the inflow of blood into the eye[4] and either retinal circulation is reinstated and the patient regains vision or the patient remains blind.) Thirty minutes later none of our patients had regained retinal circulation or subjective visual improvement.

We then administered 1000 mg undiluted prednisolone intravenously as a bolus. Ten to 15 minutes after the injection all the patients recognised contours and described their visual field as a "cracked mirror." In a second angiogram (60 minutes after steroid injection), three patients had a functioning retinal circulation with nearly normal circulation times (figure, e and f). In the eldest patient circulation was reduced and circulation times prolonged fivefold. To protect the recanalised ocular vascular system 250 ml plasma expander was infused on the second, fourth, and sixth day after treatment. Thereafter all patients but the eldest patient started taking heparin followed by nicoumalone, and their final visual acuity during five years of follow up was between 0·05 and 0·15. Perimetry showed a persistent central scotoma of about 5° in the three younger patients, which suggests permanent macular