

# Travellers' diarrhoea and the effect of pre-travel health advice in general practice

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## SUMMARY

**Background.** Rates of travel-related diarrhoea vary from 8% to 50% depending on the country visited. Travellers' diarrhoea has social, health and economic costs. The impact of these may be reduced by relevant pre-travel advice. Little is known of the effect of pre-travel advice on the incidence of diarrhoea among travellers abroad.

**Aim.** To determine the 'true' attack rate of travellers' diarrhoea and to assess the effectiveness of pre-travel health advice in reducing the incidence of diarrhoea and the need for subsequent GP consultation.

**Method.** A retrospective study was carried out in a general practice in Stirling, Scotland, using a standardized, structured questionnaire to obtain demographic details and patients' home and foreign health experience in the previous 12 months. The questionnaire was administered to a 20% sample ( $n = 1771$ ) of practice patients aged 16 years or over, stratified by age and sex. Main outcome measures were reported diarrhoeal illness while abroad, its management and outcome, and a record of diarrhoea in the two weeks prior to responding to the questionnaire.

**Results.** The response rate was 97% ( $n = 1649$ ). Of those responding, 44% had travelled abroad in the past 12 months; 39% of travellers reported having diarrhoea while abroad, while 6% of the same group reported diarrhoea in the two weeks prior to being questioned; 9.7% of non-travellers reported diarrhoea in the two weeks prior to being questioned. Travellers were 6.5 times more likely to experience diarrhoea while abroad than when spending a comparable 2-week period at home. Travellers who had sought pre-travel advice were more likely to be travelling to a high-risk destination ( $P < 0.0001$ ) and were more likely to suffer diarrhoea while abroad ( $P < 0.05$ ); however, they were less likely to need medical help while abroad or on their return ( $P < 0.0001$ ). The results indicate a markedly higher attack rate of diarrhoea in patients travelling abroad than would be expected if they stayed at home.

**Conclusion.** Pre-travel advice does reduce the need for medical assistance while abroad; it also reduces GP workload in terms of post-travel health consultations with returning travellers.

## Introduction

THE prevalence of travel-acquired illness is likely to rise in proportion to the predicted increase in international travel, with estimates that the number of scheduled international passengers will have increased by 200 million (43%) over the decade

1990–2000.<sup>1</sup> An increase of 55% in the total number of air travellers world-wide occurred in the decade 1980–1990.<sup>2</sup> The number of British people travelling to tropical countries that are associated with a higher risk of illness<sup>3</sup> rose from 700 000 in 1975 to 1.6 million in 1986.<sup>4</sup> Existing data suggests that between 28% and 43% of the United Kingdom's population travel abroad in any one year.<sup>5,6</sup>

The amount of illness related to overseas travel has been difficult to establish. Cossar and colleagues,<sup>3</sup> in a cumulative 10-year study, describe an overall illness attack rate of 36% in British overseas travellers returning to Scottish airports. This survey relied on the return of a questionnaire, and the response rate averaged only 32%, suggesting some self-selection bias. The predominant destination reported was Europe, implying a lack of data on long-haul destinations such as Australasia, the United States, Africa and Asia. Other studies give broadly similar illness attack rates for British travellers, with McIntosh and colleagues<sup>7</sup> suggesting that the overall illness rate among 175 travellers aged over 65 years was 45%; McEwan and Jackson<sup>8</sup> quoted 41% of travellers succumbing to illness. Our previous published work<sup>6</sup> suggests an overall illness rate of 42% in all travellers attending a general practice who had travelled abroad in the previous 12 months. Travel-related diarrhoea is the predominant travel illness reported, with prevalence rates varying widely from 8% to 50% depending on the country visited.<sup>9,10</sup> Travellers' diarrhoea usually presents as a mild illness in which 23% of sufferers will have six or more bowel movements a day. It can, however, cause considerable morbidity (67% of sufferers have severe cramps, 50% have nausea, 15% have vomiting, and 20% have invasive mucosal disease with fever or bloody stools) and can be severe enough to blight a holiday or business trip.<sup>9</sup> Most of the published incidence rates base calculations on a 14-day holiday and most sufferers are at least 10 years old.

Ascertaining the attack rates of illness in people travelling abroad is of limited value if the underlying prevalence of illness in a population is not known. Diarrhoea reported by travellers during a two-week period of residence abroad may merely reflect the level of diarrhoea that would normally be experienced at home in the population concerned. One recent study<sup>5</sup> has found no excess morbidity associated with travel abroad. However, the consensus in the literature suggests that there is an excess morbidity, particularly in diarrhoea, associated with foreign travel. The present study endeavours to confirm and quantify the 'true' attack rate of travellers' diarrhoea in a general practice population.

The discipline of travel medicine is now established, and with it the need for further examination of the value of pre-travel health advice. Porter<sup>11</sup> calls for the identification of the 'high-risk' traveller and states that the family doctor could be the principal source of advice for potential travellers. Cossar and colleagues<sup>3</sup> recommend targeted health education before travel, and suggest that this may reduce the incidence of diarrhoea in travellers. Little is known of the effect of pre-travel health advice on the incidence of illness experienced while travelling abroad, and the need for further research has been publicized.<sup>13</sup>

## Method

A total of 1771 people aged 15 years and over participated in this retrospective study, which represented a 20% quota sample,

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Submitted: 29 September 1995; accepted: 22 July 1996.

© British Journal of General Practice, 1997, 47, 71–75.

stratified by age and sex, of patients on the practice list of Viewfield Medical Centre, an NHS group practice situated in Stirling. All patients were eligible for inclusion who met age and sex criteria obtained from the practice age and sex register and who attended for any purpose in 1994, except those with a diagnosis of dementia, benign senile forgetfulness or mental disability. Age groups were stratified in deciles from 15 years of age upwards; patients over 75 years of age were entered as one group. For each specified age group, successive patients presenting for consultation were entered into the sample until the quota was met.

All were asked to complete a standardized, structured questionnaire comprising 14 questions, which recorded:

- Demographic details
- Whether they had travelled abroad in the preceding 12 months
- Their experience of travel-related diarrhoea (scored for severity on a three-point scale) and its management, both abroad and on return home
- Details of antidiarrhoeal medications used
- The origin and source of any pre-travel health advice, and
- Whether they had suffered diarrhoea at home in the two weeks prior to consultation and in the preceding 12 months, excluding time spent abroad.

Travellers' diarrhoea was defined with reference to three questions about diarrhoea: (a) relating to time when last abroad; (b) diarrhoea experienced over previous year; (c) diarrhoea experienced in previous two weeks before completion of questionnaire. Diarrhoea was defined as loose and frequent stools, interpreted by the subject as markedly different from normal bowel move-

ments. Severity of diarrhoea was defined as mild, moderate or severe according to the patient's own interpretation. This measure has been used in previous publications by the authors but has not been subject to formal means of validation.

In an attempt to establish the relative risks of destination with regard to incidence of illness, destinations were grouped into three broad categories as follows:

- Destination 1: Northern Europe, North America, and Australia
- Destination 2: the Mediterranean, mainland Europe, and the Mediterranean islands
- Destination 3: mainland Africa and Asia.

The justification for the groupings described is based on the findings of previous studies, which indicate that the risk to travellers of illness from gastrointestinal infection progressively increases from Destination 1 to Destination 3.<sup>3,14</sup> Data was analysed by means of chi-square tests using the SPSSX statistical package.

## Results

From a total of 1771 subjects invited to participate, a total of 1649 did so (response rate 97%). However, not all respondents completed all questions; the total number of replies for certain questions may therefore be slightly less than the study total.

### Travellers and non-travellers

As Table 1(a) illustrates, of 1649 respondents, 734 (44.5%) had travelled abroad in the previous 12 months, with no significant difference in the proportions of males and females. Non-trav-

**Table 1a.** Comparison between travellers and non-travellers in terms of sex, diarrhoea in past 12 months, and diarrhoea in past 2 weeks (excluding time spent abroad) (df=1).

	Travellers n (%)	Non-travellers n (%)	Total	c <sup>2</sup>	P
Sex					
Male	316 (43.1)	402 (43.9)	718 (43.5)	0.13	ns
Female	418 (56.9)	513 (56.1)	931 (56.5)		
Total	734	915	1649		
Diarrhoea in past 12 months (excluding hols)					
Yes	157 (21.4)	242 (26.5)	399 (24.2)	5.7	<0.01
No	576 (78.6)	672 (73.5)	1248 (75.8)		
Total	733	914	1647		
Diarrhoea in past 2 weeks (excluding hols)					
Yes	44 (6.0)	89 (9.7)	133 (8.1)	7.6	<0.005
No	689 (94.0)	825 (90.3)	1514 (91.9)		
Total	733	914	1647		

**Table 1b.** Comparison between travellers and non-travellers in terms of age profile.

Age profile	Travellers n (%)	Non-travellers n (%)	Total	c <sup>2</sup>	P
15-24	137 (18.3)	176 (19.2)	313 (19.0)	0.07	ns
25-34	172 (23.5)	197 (21.5)	369 (22.4)	0.91	ns
35-44	104 (14.2)	141 (15.4)	245 (14.9)	0.46	ns
45-54	150 (20.5)	124 (13.5)	274 (16.6)	14.12	<0.001
55-64	113 (15.4)	123 (13.4)	236 (14.3)	1.32	ns
65-74	49 (6.7)	103 (11.2)	152 (9.2)	10.11	<0.01
75+	7 (1.0)	51 (5.6)	58 (3.5)	24.52	<0.001
Total	732	915	1647		

ellers had significantly higher rates of diarrhoea than travellers, both in the past 12 months as a whole (26.5% versus 21.4% respectively;  $\chi^2 = 5.7$ ,  $df = 1$ ,  $P < 0.01$ ) and in the two weeks before completion of the questionnaire (9.7% versus 6.0% respectively;  $\chi^2 = 7.6$ ,  $df = 1$ ,  $P < 0.005$ ); time spent abroad was excluded in both cases. Table 1(b) illustrates the age distribution of travellers and non-travellers, indicating a significantly greater proportion of travellers than non-travellers in the 45–54 age group only ( $P < 0.001$ ) and a greater proportion of non-travellers than travellers in the 65–74 age group ( $P < 0.01$ ) and the over-75 ( $P < 0.001$ ) age group.

It therefore appears that when both groups are normally resident in the United Kingdom, non-travellers are more vulnerable than travellers to episodes of diarrhoea. Thus, any increased rates of diarrhoea among travellers while abroad cannot be explained by supposing that they have a higher susceptibility to such problems than non-travellers.

### Travellers

In order to provide some indication of the level of increased susceptibility to diarrhoea while abroad, Table 2 shows the percentage of travellers who experienced diarrhoea (a) in the past 12 months, excluding time spent abroad (21.4%), (b) in the two weeks prior to completing the questionnaire, excluding time spent abroad (6.0%), and (c) while abroad (39.2%). Travellers were 6.5 times more likely to experience diarrhoea while abroad

**Table 2.** Rates of diarrhoea in travellers while abroad, compared with past two weeks at home (x6.5) and past 12 months at home (x1.8).

	While abroad	Diarrhoea in travellers	
		Past 2 weeks (excluding hols)	Past 12 months (excluding hols)
Diarrhoea	n (%)	n (%)	n (%)
Yes	287 (39.2)	44 (6.0)	157 (21.4)
No	446 (50.8)	689 (94.0)	576 (78.6)
Total	733	733	733

than when spending a comparable two-week period at home. Furthermore, travellers were 1.8 times more likely to experience diarrhoea while abroad than in a whole 12 months in the United Kingdom.

Of 728 respondents who travelled abroad, 100 (13.7%) received pre-travel health advice regarding management of travellers' diarrhoea. In 20 cases this advice was from a travel agent, and in 76 cases from a GP or nurse; the remaining 13 respondents received advice from other sources. Thus, some respondents received advice from more than one source. For one case, the source of medical advice was not recorded.

As Table 3 illustrates, those who received pre-travel health advice regarding travellers' diarrhoea were more likely to be worried about contaminated water while abroad than those who did not seek such advice (40% versus 27.2% respectively;  $\chi^2 = 6.2$ ,  $df = 1$ ,  $P < 0.05$ ). These two groups did not differ with regard to worry about infected food while abroad. Respondents who sought pre-travel health advice were more likely to get diarrhoea while abroad than those who did not have such advice (49% versus 37.9% respectively;  $\chi^2 = 4.5$ ,  $df = 1$ ,  $P < 0.05$ ). This may be because those seeking advice were visiting destinations where the risk of diarrhoea is greater.

Table 4 indicates that the proportion of travellers seeking medical advice increases for higher-risk destinations, rising from 4.6% for Destination 1 to 10.3% for Destination 2 to 56.8% for Destination 3 ( $\chi^2 = 28.4$ ,  $df = 2$ ,  $P < 0.0001$ ). However, despite medical advice, the proportion of travellers experiencing diarrhoea also increases by destination, from 26.7% for Destination 1 to 41.8% of Destination 2 to 59.3% for Destination 3 ( $\chi^2 = 146.2$ ,  $df = 2$ ,  $P < 0.0001$ ).

Although pre-travel medical advice does not appear to be associated with a reduction in the likelihood of experiencing diarrhoea while abroad, such advice may be of more importance in determining how the illness is managed by the traveller.

### Travellers with diarrhoea

For the sample of 287 travellers who experienced diarrhoea while abroad, a comparison was made between those who had and those who had not received pre-travel medical advice, in terms of the manner in which the diarrhoea was managed or

**Table 3.** Comparison between travellers who did and did not have pre-travel medical advice in relation to worry about infected water, worry about infected food, medication carried, and diarrhoea while abroad ( $df = 1$ ).

	Pre-travel Yes	Medical advice No	Total	$\chi^2$	P
Worried about infected water	n (%)	n (%)			
Yes	40 (40.0)	171 (27.2)	211 (29.0)	6.2	<0.02
No	60 (60.0)	457 (72.8)	517 (71.0)		
Total	100	628	728		
Worried about infected food					
Yes	35 (35.0)	176 (28.0)	211 (29.0)	2.0	ns
No	65 (65.0)	452 (72.0)	517 (71.0)		
Total	100	628	728		
Carried medication					
Yes	73 (73.0)	240 (38.2)	313 (43.0)	42.6	<0.001
No	27 (27.0)	388 (61.8)	415 (57.0)		
Total	100	628	728		
Diarrhoea while abroad					
Yes	49 (49.0)	238 (37.9)	287 (39.4)	4.5	<0.05
No	51 (51.0)	390 (62.1)	441 (60.6)		
Total	100	628	728		

**Table 4.** Pre-travel medical advice and diarrhoea while abroad by destination (df = 2).

	Destination 1 n (%)	Destination 2 n (%)	Destination 3 n (%)	c <sup>2</sup>	P
Pre-travel medical advice					
Yes	10 (4.6)	44 (10.3)	46 (56.8)	28.4	<0.0001
No	207 (95.4)	385 (89.7)	35 (43.2)		
Total	217	429	81		
Diarrhoea while abroad					
Yes	58 (26.7)	181 (41.8)	48 (59.3)	146.2	<0.0001
No	159 (73.3)	252 (58.2)	33 (40.7)		
Total	217	433	81		

**Table 5.** For travellers who experienced diarrhoea while abroad (n = 287), comparison between those who did or did not receive pre-travel health advice in relation to treatments for diarrhoea.

	Yes n (%)	No n (%)	Pre-travel medical advice c <sup>2</sup>	P
No treatment	14 (28.0)	96 (38.1)	16.8	0.0001
Self-treatment	29 (58.0)	73 (28.4)		
Doctor abroad / GP at home	7 (14.0)	79 (31.3)		
Hospitalized	0	4 (1.6)		
Total	50	252		

treated. Table 5 lists the various treatment options used: no treatment, self-treatment, consultation with a doctor while abroad or with their GP on return home, or hospital admission. For the 287 subjects, the total number of responses was 302 (some travellers adopted more than one method of diarrhoea management).

Individuals who experienced diarrhoea but had pre-travel medical advice were much more likely to treat themselves (58%) than those who did not receive pre-travel medical advice (28.4%). Furthermore, those diarrhoea sufferers who did not have pre-travel medical advice were more likely to attend a doctor abroad or their GP on return home (31.3%) than those who had medical advice before travel (14.0%). These two groups also differed in that those who had pre-travel advice were less likely to leave their diarrhoea untreated (28.0%) than those who had no such advice (38.1%). For individuals who reported diarrhoea while abroad, the absence or presence of pre-travel medical advice was found to significantly influence the manner in which their episode of illness was managed ( $\chi^2 = 16.8$ , df = 3,  $P < 0.0001$ ).

## Discussion

The results of this study lead us to conclude that travellers who seek pre-travel advice are more likely to be travelling to a high-risk destination and more likely to suffer diarrhoea while abroad, but less likely to need medical help while abroad or on return. As a retrospective study, this investigation suffers from the usual problems associated with delayed information recall. However, health disturbances during holidays often have a major effect on the quality and enjoyment of the vacation, and are likely to be clearly remembered. As questions were usually related to a two- or three-week time interval, it was felt that the responses were probably accurate.

The practice population is known to be representative of the general population except for a slight preponderance in Social Class 5. The sampling procedure assessed all practice patients attending for consultation for general medical services of any nature, the quotas being determined by age. With regard to recall

of episodes of diarrhoea while not abroad, it is unlikely that memory impairment would significantly influence recall of such illness in the two-week period before receipt of the questionnaire. However, failure to recall such illness may affect the accuracy of the number of episodes of diarrhoea recorded over the previous 12 months while not abroad, and therefore these figures should be treated with caution.

The present study shows that an increased rate of diarrhoea among travellers while abroad cannot be explained by this group having an higher innate susceptibility to such problems as they are less likely than non-travellers to experience diarrhoea over a 12-month period while at home. Furthermore, this paper indicates that the 'true' attack rate of diarrhoea in patients travelling abroad is not the same as would be expected if they remained in the United Kingdom. Rather, travel abroad prompts a genuine and marked increase of 6.5 times in the attack rate of diarrhoea.

Previous studies have indicated a considerable burden of post-travel health consultations with about one in five travellers attending their GP on return for a variety of travel-related illnesses.<sup>6,15</sup> It has been suggested that this figure might be reduced if travellers received pre-travel health advice.<sup>16</sup> The present paper has illustrated that those who receive pre-travel advice are more likely to experience diarrhoea while abroad. However, travellers with diarrhoea who had pre-travel advice were more likely to self-medicate appropriately and less likely to be a burden on health care professionals, either abroad or on their return home, than travellers with diarrhoea who had no such advice.

Travellers' diarrhoea has social, health and economic costs. The impact on all of these may be reduced by relevant pre-travel advice. The main source of standardized pre-travel advice in this study came from practice doctors and nurses and was presented in a verbal and written form with specific instructions on precautions to be taken to avoid diarrhoea. Standardized health advice referred to oral advice on personal hygiene and avoidance of possibly contaminated food and water; it was based on a protocol to ensure a common response by all health professionals involved. Health advice provided by the travel agent has been shown to be rarely provided, often irrelevant, and sometimes inappropriate



and misleading.<sup>13</sup> Uptake of health advice would be improved if similar advice on oral hygiene while abroad and on avoidance of contaminated food and water were to be given by all travel health professionals and clinics and by travel agents, preferably by oral instruction reinforced by written information.

From these results it appears that the provision of standardized pre-travel health advice did not decrease morbidity from travellers' diarrhoea. However, they lend support to the view that this form of advice, when given by nurse or GP at a travel health clinic, does beneficially influence the management and outcome of travellers' diarrhoea. Those contracting the illness are less likely to seek GP consultation on returning home, with a resultant decrease in GP workload. The additional input required by a GP or nurse in providing this advice is likely to be more than balanced by savings in consultation time and in the cost of prescriptions and investigations.

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## Acknowledgements

Our thanks are due to the partners and practice nurses of Viewfield Medical Centre, Stirling, and to the staff of the Department of Psychology, University of Stirling. The research was funded from the Chief Scientist Office, Scottish Office Home and Health Department.

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