

# Career destinations in 1994 of United Kingdom medical graduates of 1983: results of a questionnaire survey

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**Cohort studies of doctors' career choices and career progression since the mid-1970s have shown important changes in the medical workforce, in specialist training, and in employment. Examples of these changes are the increasing proportion of women doctors and of doctors who wish to work part time, the emigration patterns of doctors, and the development of vocational training for general practice. Studies enable the effects of longer term changes to be assessed, and sometimes they inform current debate**

The number of entrants to medical school in the United Kingdom is fixed by quota. The number of junior medical posts and their geographical distribution are also tightly regulated. Control is aimed at avoiding either overproduction or inadequate supply of doctors. With a planned medical workforce it is important to know about the career intentions and destinations of medical graduates.<sup>1</sup> We report a follow up study of the qualifiers of 1983 from all medical schools in the United Kingdom. We record their employment 11 years after qualification, paying particular attention to doctors who were abroad, those who were in the United Kingdom but not in medicine, and those who were in the United Kingdom practising medicine outside the NHS.

## Methods

In 1983-4 lists from the General Medical Council were used to identify the cohort of doctors who had qualified in the United Kingdom in 1983.<sup>1</sup> Questionnaires were mailed to these doctors one, three, and 11 years after qualification. Structured questions covered career intentions, factors which influenced career choices, and posts held. Respondents were also invited to comment on any aspect of their career choice, training, and work experience.

Employment groups were defined to distinguish doctors who worked in the United Kingdom from those abroad, those working in the NHS from those in other medical employment in the United Kingdom, those working in medicine from those in other work, and those not in paid employment. For comparison we also analysed data from earlier cohorts, obtained in similar ways, to identify career destinations of the qualifiers of 1974 in 1987 and of the qualifiers of 1977 in 1986 (the latest years for which data were available).

Specialties were grouped for analysis into 14 main-streams, based on groupings defined in the Todd report.<sup>2</sup> These were general practice, hospital medicine (general medicine and the medical specialties), paediatrics, accident and emergency, surgery (general surgery and the surgical specialties), obstetrics and gynaecology, anaesthetics, radiology, clinical oncology, pathology, psychiatry, community health, public health medicine, and others. A complete list of specialties in each broad group may be obtained from TWL.

## Results

The original 1983 cohort comprised 3845 doctors. Ten had died by September 1994 and 16 refused to participate, giving an effective cohort of 3819 doctors (2363 (61.9%) men, 1456 (38.1%) women). Table 1 summarises the level of response and the recorded employment status of respondents in September 1994. The overall response rate was 71.1% (2716 doctors), or 72.8% when untraceable doctors were excluded. Consistent with our previous studies, proportionally fewer men than women replied (68.2% (n=1612) compared with 75.8% (n=1104);  $\chi^2=25.1$ ,  $P<0.001$ ). More of the respondents (2680/2716; 98.7%) than non-respondents and untraceable doctors (1019/1103; 92.4%) were on the medical register in 1994, including the overseas list, suggesting that our survey returns

**Table 1—Employment status in September 1994 of cohort of doctors qualifying in United Kingdom in 1983. Figures are numbers (percentages) of subjects**

Row No		Total	Men	Women
1	Total cohort:	3819 (100.0)	2363 (100.0)	1456 (100.0)
2	Untraceable	90 (2.4)	53 (2.2)	37 (2.5)
3	Non-respondents	1013 (26.5)	698 (29.5)	315 (21.6)
4	Respondents	2716 (71.1)	1612 (68.2)	1104 (75.8)
5	All respondents:	2716 (100.0)	1612 (100.0)	1104 (100.0)
6	Abroad	193 (7.1)	118 (7.3)	75 (6.8)
7	United Kingdom	2523 (92.9)	1494 (92.7)	1029 (93.2)
8	United Kingdom respondents:	2523 (100.0)	1494 (100.0)	1029 (100.0)
9	Non-medical	14 (0.6)	8 (0.5)	6 (0.6)
10	Not in paid employment	69 (2.7)	13 (0.9)	56 (5.4)
11	Occupation not given	31 (1.2)	17 (1.1)	14 (1.4)
12	Medical	2409 (95.5)	1456 (97.5)	953 (92.6)
13	United Kingdom medical:	2409 (100.0)	1456 (100.0)	953 (100.0)
14	NHS	2129 (88.4)	1248 (85.7)	881 (92.4)
15	Universities/research	169 (7.0)	132 (9.1)	37 (3.9)
16	Armed forces	48 (2.0)	42 (2.9)	6 (0.6)
17	Other public sector	11 (0.4)	5 (0.3)	6 (0.6)
18	Non-public sector	52 (2.2)	29 (2.0)	23 (2.4)
19	Abroad:	193 (100.0)	118 (100.0)	75 (100.0)
20	Non-medical	15 (7.8)	4 (3.4)	11 (14.7)
21	Medical	178 (92.2)	114 (96.6)	64 (85.3)

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alone underestimated the proportion of the cohort who had left medicine or gone abroad. Doctors who were abroad but working for the British armed forces in a medical capacity were regarded as working in medicine in the United Kingdom. When we included these, 92.9% of respondents (2523/2716) were in the United Kingdom and 7.1% (n=193) were abroad (table 1). Of the 2523 respondents in the United Kingdom, 2409 (95.5%) were working in medicine (table 1).

ESTIMATED NUMBERS OF DOCTORS NOT IN MEDICINE IN UNITED KINGDOM, 1994

We used the medical register, employment lists supplied by the Department of Health, and the medical directory to compile information about doctors whose employment status was unknown to us. From these data we estimated minimum, "best," and maximum percentages of doctors who were not in practice in the United Kingdom (appendix; table 2). Using data from respondents and adding those non-respondents who were unregistered or who were registered with an overseas address, we estimated that a minimum of 10.3% of men and 14.0% of women were not in medicine in the United Kingdom ( $\chi^2=12.8$ ;  $P<0.01$ ). More women than men among the respondents were not in paid employment (table 1), mostly for domestic reasons. Our best estimate was that 16.5% of all doctors (15.4% of men, 18.2% of women ( $\chi^2=4.9$ ;  $P=0.03$ )) were not practising in the United Kingdom.

The minimum and maximum estimates of 11.7% and 19.3% of doctors who were not practising in the United Kingdom were compared with estimates

**Table 2—Estimated percentages of doctors not in practice in United Kingdom among 1983 cohort of qualifiers in 1994, 1974 cohort of qualifiers in 1987, and 1977 cohort of qualifiers in 1986**

Cohort		Minimum estimate	"Best" estimate	Maximum estimate
1983	Men	10.3	15.4	18.5
	Women	14.0	18.2	20.5
	Total	11.7	16.5	19.3
1974	Men	14.8	21.9	24.7
	Women	18.3	26.2	28.7
	Total	15.7	23.1	25.8
1977	Men	11.2	20.1	22.1
	Women	18.8	25.9	27.1
	Total	13.7	22.0	23.8

**Table 3—Specialty breakdown in September 1994 of respondent doctors in United Kingdom and abroad, including all respondents from 1983 cohort of qualifiers who were in medical employment in September 1994**

Specialty group	United Kingdom				Abroad			
	Men		Women		Men		Women	
	No	%	No	%	No	%	No	%
General practice	670	46.0	509	53.4	27	23.7	31	48.4
Medicine	161	11.1	63	6.6	22	19.3	5	7.8
Paediatrics	35	2.4	33	3.5	6	5.3	2	3.1
Accident and emergency	13	0.9	9	0.9	1	0.9	0	0
Surgery	167	11.5	23	2.4	15	13.2	3	4.7
Obstetrics and gynaecology	33	2.3	19	2.0	2	1.8	5	7.8
Anaesthetics	109	7.5	57	6.0	7	6.1	3	4.7
Radiology	34	2.3	20	2.1	3	2.6	0	0
Clinical oncology	11	0.8	3	0.3	3	2.6	1	1.6
Pathology	78	5.4	39	4.1	3	2.6	2	3.1
Psychiatry	77	5.3	69	7.2	3	2.6	1	1.6
Community health	3	0.2	58	6.1	0	0	1	1.6
Public health medicine	27	1.9	27	2.8	2	1.8	1	1.6
Other/not stated	38	2.6	24	2.5	20	17.5	9	14.1
Total	1456	100.0	953	100.0	114	100.0	64	100.0

reached by similar methods for the two earlier cohorts (table 2). For the 1974 cohort in 1987 (2350 doctors; 1807 respondents) estimates of the minimum and maximum proportions of doctors who were no longer in medicine in the United Kingdom were 15.7% and 25.8%. For the 1977 cohort in 1986 (3136 doctors; 2495 respondents) the estimates were 13.7% and 23.8%.

SPECIALTIES AND GRADES OF DOCTORS IN UNITED KINGDOM, 1994

Table 3 gives a breakdown of respondents known to be in medical employment by location (United Kingdom or abroad), specialty group, and sex. Of the 2409 respondents known to be in medical employment in the United Kingdom, 1179 (48.9%) were in general practice. A higher proportion of women than men entered general practice, and both at home and abroad proportionally fewer women than men were in surgical and medical specialties. After general practice the most common career destinations for men were the surgical specialties, medical specialties, anaesthetics, pathology, and psychiatry. After general practice the most common career destinations for women were psychiatry, the medical specialties, community health, and anaesthetics. Almost all the doctors in community health were women.

There were 874 doctors (576 men, 298 women) with substantive contracts with the NHS in the hospital specialties. A total of 213 men (37.0%) and 86 women (28.9%) had reached consultant grade (with the exclusion of locum appointments) by year 11 (men v women:  $\chi^2=5.32$ ;  $P=0.02$ ). For specialties in which there were at least 15 consultants the figures for men and women reaching consultant status were as follows: 39 of 93 (42%) and 12 of 50 (24%) in the medical specialties; 13 of 26 (50%) and four of 24 (17%) in paediatrics; 21 of 143 (15%) and none of 21 in the surgical specialties; 45 of 105 (43%) and 17 of 53 (32%) in anaesthetics; 20 of 32 (63%) and 15 of 20 (75%) in radiology; 29 of 60 (48%) and 15 of 36 (42%) in pathology; 33 of 67 (49%) and 22 of 61 (36%) in psychiatry. Differences between men and women were significant for paediatrics and the medical specialties only ( $\chi^2$  test:  $P=0.04$  and  $P=0.05$ ); women, however, generally took longer than men to reach consultant level.

Of the 2129 respondents in the NHS, 430 (20.2%) worked part time in 1994 (2.6% of men, 45.2% of women). A total of 49.7% of women in general practice (249/501) and 33.9% of women in hospital practice (101/298) worked part time.

DOCTORS ABROAD

The distribution of specialties of doctors abroad was broadly comparable to that of doctors in the United Kingdom, except that fewer of the doctors abroad were in general practice (33% compared with 49% of doctors in Britain). Few doctors abroad worked in anaesthetics, radiology, and pathology. Australia and New Zealand were the most popular destinations of doctors working abroad (65/178; 37%). The United States and Canada were next (37; 21%), followed by Africa (18; 10%) and continental Europe (16; 9%). Thirty eight (58%) of the 65 doctors who went to Australia and New Zealand were in general practice as compared with only five (14%) of the 37 doctors in the United States and Canada.

DOCTORS IN UNITED KINGDOM NOT WORKING IN MEDICINE

Sixty nine respondent doctors in the United Kingdom (56 women, 13 men) were not in paid employment (table 1). Among the women, three were seeking full time work in medicine, 10 were seeking part time work

**Table 4—Factors influencing career choice “a great deal” as specified in 1994 by 1983 cohort who said they were “definitely” or “probably” in their final choice of career**

Factor	United Kingdom public sector medical		Abroad medical		United Kingdom non-public sector medical	
	No	%	No	%	No	%
Domestic circumstances	816	39	42	29	10	26
Hours and working conditions	1005	47	62	42	26	67
Current financial circumstances	264	12	16	11	8	21
Future financial prospects	295	14	21	14	14	36
Promotion and career prospects	569	27	41	28	20	51
Self appraisal of own skills and aptitudes	1416	67	112	76	28	72
Advice from others	301	14	10	7	5	13
Student experience of chosen subject	437	21	31	21	0	0
A particular teacher or department	378	18	30	20	2	5
Inclinations before medical school	302	14	28	19	5	13
Experience of previous career choice	289	14	21	14	14	36
Experience of present career choice	1173	55	88	60	25	64
Inability to secure qualifications for previous choice	30	1	1	1	3	8
All	2118	100	147	100	39	100

**Table 5—Intention to practise in United Kingdom as reported by doctors in 1984, 1986, and 1994. Data refer to doctors in United Kingdom and abroad in 1994 who in 1984, 1986, and 1994 replied to, “Apart from temporary visits abroad, do you intend to practise in the United Kingdom for the foreseeable future?”**

Intend to practise in United Kingdom?	Doctors in United Kingdom in 1994						Doctors abroad in 1994					
	Response in 1984		Response in 1986		Response in 1994		Response in 1984		Response in 1986		Response in 1994	
	No	%	No	%	No	%	No	%	No	%	No	%
Yes, definitely	976	50	1136	59	1318	68	37	27	35	25	16	12
Yes, probably	815	42	644	33	453	23	63	45	56	40	16	12
Undecided	71	4	90	5	98	5	7	5	16	12	18	13
No, probably not	62	3	49	23	44	2	23	17	18	13	35	25
No, definitely not	15	1	20	1	25	1	9	6	14	10	54	39
Total	1939	100	1939	100	1939	100	139	100	139	100	139	100

Base used for totals is all doctors in 1983 cohort who replied to question in all three years.

in medicine, 35 were not seeking work, and eight did not say whether they were seeking work. Of the 43 women who did not specify that they were seeking work, 11 gave their current circumstances as “planned career break,” nine as “maternity,” four as “housewife,” and three as “illness”; 16 gave no further details. Among the men, six were seeking full time work in medicine, one was seeking part time work in medicine, three were not seeking work, and three did not say whether they were seeking work. Of the six men who did not specify that they were seeking work, two gave illness as the reason, one gave planned career break, and three gave no further details. A further 14 doctors were in non-medical occupations such as business and law.

#### FACTORS CITED AS INFLUENCING CAREER CHOICE

Each doctor was asked, “Do you regard your current specialty/type of employment as your final choice of career?” Possible responses were “definitely,” “probably,” and “not really.” Each was then asked “How much have the following factors influenced your career choice?” and presented with a list of 13 factors. Possible responses for each factor were “not at all,” “a little,” and “a great deal.”

For those who regarded their current employment as definitely or probably their final choice of career we examined the responses for each factor (table 4). We were interested to know which factors had most influence on doctors’ choice of careers and to see whether there were differences between doctors who

were working in the United Kingdom (within and outside the public sector) and those abroad. Doctors outside the public sector included 22 in the pharmaceutical industry, 11 in private clinical practice, six in industrial medicine, and four in medical journalism. Table 4 shows the proportion in each group who answered “a great deal” for each factor. Factors specified as having the greatest influence were self appraisal of skills and aptitudes, experience of chosen career, hours and working conditions, and domestic circumstances. Experience as students and the influence of a particular teacher or department were rated as important by only a minority of doctors. Inability to secure qualifications for a previous choice of medical career was a negligible influence.

Doctors abroad showed a similar pattern of responses to those of doctors in the United Kingdom public sector on almost all factors, with no significant differences between them. Only 39 doctors worked in medicine outside the public sector in the United Kingdom; these doctors were more likely than others to ascribe importance to hours and working conditions (26 doctors) and financial prospects (14 doctors).

#### DECISION TO LEAVE UNITED KINGDOM

In 1984, 1986, and 1994 doctors in the cohort were asked whether they intended to work in the United Kingdom “for the foreseeable future.” Table 5 gives their responses stratified by whether they were in the United Kingdom or abroad in 1994. Even in 1984 those who would be working abroad in 1994 were significantly less definite in their intention to stay in the United Kingdom (Mann-Whitney U test,  $P < 0.001$ ). Those in the United Kingdom in 1994 were progressively more definite in their intention to stay in the United Kingdom in 1986 and 1994 than they were in 1984 (Wilcoxon test for 1986 v 1984 and 1994 v 1984,  $P < 0.001$  and  $P < 0.001$ ). By 1994 only 3% of doctors in the United Kingdom did not intend to stay; 22% of those abroad stated that they definitely or probably intended to return.

One hundred and sixteen (60%) of the 193 doctors known to be abroad completed a comment form. Of the 97 who commented specifically on reasons for working abroad, 44 gave reasons which we scored as positive (for example, to widen their experience) and 23 gave reasons which we scored as negative (for example, lack of training opportunities in the United Kingdom). The remainder gave reasons which we scored as professionally neutral (for example, accompanying a spouse). Of those in the United Kingdom public sector who were considering moving abroad and who commented, almost equal numbers of positive and negative reasons were cited (88 and 84 doctors respectively).

#### Discussion

Eleven years after qualification most respondents were practising medicine in the United Kingdom. Of those who were not, most were abroad and most of them were in medical practice. Though more women than men were not in medical practice, differences were small and most women were working in medicine. Medical unemployment was very low among respondents, most doctors who were not in paid work having domestic reasons for not seeking work at the time of the survey.

Because of non-response from some doctors it was difficult to establish the exact proportion of a particular cohort who were not practising medicine in the United Kingdom. We assembled available information from various sources on non-respondents and others whose career destinations were unknown. Taking account of this, we know that between 11.7% and 19.3% of the

1983 cohort were not practising medicine in the United Kingdom in September 1994. Our best estimate is about 16%. We undertook similar calculations on historical data on the career destinations of the qualifiers of 1974 and 1977. Follow up data from these two cohorts were not entirely comparable to those of 1983. The information available related to their careers in 1987 and 1986 (13 and nine years after qualification, respectively) rather than after 11 years. There was also less precise historical information about the non-respondents. However, on the available evidence it seems likely that the proportion of doctors from the 1983 cohort working in medicine in the United Kingdom was a little higher than that of doctors from the 1970s cohorts.

The Todd report gave a target figure of 3850 medical graduates in Great Britain for 1983.<sup>2</sup> Subtracting the 171 graduates from Queen's University of Belfast from the 3845 graduates in the United Kingdom shows that the 1983 cohort for Great Britain actually numbered 3674. The "loss" of 16% from the base of 3845 means that the 1983 cohort provided about 3230 doctors in medicine in the United Kingdom. The second report of the Medical Workforce Standing Advisory Committee estimated that up to 20% of any given cohort of doctors may not be working in the NHS or University sector five years after qualification.<sup>3</sup>

#### RELEVANCE OF PART TIME WORK

The loss of 16% of doctors from medicine in the United Kingdom plus the fact that about 5% of doctors in the United Kingdom are outside the NHS and University sector (table 1, rows 16-18) means that the 1983 cohort was close to the figure of 20% 11 years after qualification. Those concerned with planning the medical workforce also need to take account of patterns of part time work. We have shown that at this stage in this cohort's career substantial numbers of women were working part time. Our data also confirm that women take longer than men to reach consultant status,<sup>4,6</sup> at least in some specialties. We plan to compare career progression for men and women in the 1974, 1977, and 1983 cohorts to determine the extent to which time spent not working or in part time work accounts for the differences.

#### GENERAL PRACTICE

It is difficult to know whether any one year of medical graduates is typical of its generation. A higher proportion of the 1983 cohort than of the 1974, 1977, or 1980 cohorts expressed a career preference for general practice at the end of the preregistration year.<sup>1</sup> Of all respondents from the 1983 cohort working in the NHS, 53.9% were general practitioners in 1994. Department of Health figures for 1993 show that in England and Wales there were 28 481 hospital doctors at registrar, senior registrar, and consultant levels plus 30 310 general practitioners.<sup>5</sup> This means that 51.6% of doctors in these categories were in general practice. The comparable proportion for our 1983 respondents, calculated by excluding hospital doctors of grades other than registrar, senior registrar, and consultant, was 59.5%. It is not necessary for the qualifiers of any one year to seek careers in proportion to the general national requirements as long as entry to different careers evens out over a number of years.

#### WORKING ABROAD

Most doctors who leave the United Kingdom do so to practise abroad and most seem to have positive rather than negative reasons for going. Our evidence indicates that it was common for doctors who emigrated to have expressed an interest in doing so from early in their careers. Apart from this, however, we found that doctors going abroad did not differ much from those

who stayed in their comments about the NHS or in the factors which influenced their career choices (table 4). A comparatively large number of those abroad in this cohort were in general practice in Australia or New Zealand. Doctors who currently work abroad are not necessarily "lost" to the NHS. Our detailed data on patterns of emigration and return indicate that a substantial proportion of doctors abroad do not stay abroad permanently.

#### UNEMPLOYMENT

Doctors not in paid employment were predominantly women. This does not equate with permanent loss from the profession. Particularly in the early years after qualifying, just as there are doctors who go abroad for a time and return there are doctors who leave work for domestic reasons with every intention of resuming. Among the 1983 respondents there were 13 women not in paid employment in 1994 who had been working in the NHS in 1993, but there were 24 women working in the NHS in 1994 who had not been in paid employment in 1993. Some women wished to return to work part time after having children but had failed to find a suitable post or training opportunity. A study of vocationally trained general practitioners also found this.<sup>7</sup> In our study only nine of the 2716 respondents were seeking full time employment in medicine without success, confirming that in the United Kingdom medical unemployment of full time doctors is rare.

#### LOSSES FROM UNITED KINGDOM MEDICINE

There is debate about possible recent losses of doctors from medicine in the United Kingdom. We conclude that, though doctors commonly commented about dissatisfaction with work circumstances, there was no evidence of recent large scale loss of doctors from the NHS in this cohort. However, the qualifiers of 1983 were well established in their careers and our findings cannot necessarily be extrapolated to more recently qualified doctors.

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Conflict of interest: None.

#### Appendix

There were 1013 non-respondents, 90 untraceable doctors, and 31 respondents who gave incomplete data (table 1)—that is, 1134 doctors whose employment status in September 1994 was unknown. Of these doctors, 85 were not on the medical register in September 1994 and 86 were listed with an overseas address (table 6). If we assume that these 171 doctors were not practising medicine in the United Kingdom, adding them to the 276 known not to be in practice (table 1, rows 6, 9, and 10) gives a minimum estimate of 447 doctors (11.7% of the cohort) who were not in medicine in the United Kingdom.

A total of 963 doctors remained (table 6, rows 3-5) registered with addresses in the United Kingdom whose occupation was unknown to us. We matched these doctors' General Medical Council registration numbers against lists of employment data in September 1993 (the latest available) supplied by the Department of Health. This showed that 674 were in NHS practice in the United Kingdom (table 6, row 3). This left 289 doctors (table 6, rows 4 and 5) who were registered but of unknown recent employment status. If we assume that none of these 289 doctors were practising medicine in the United Kingdom and we add them to the minimum estimate of 447 the maximum estimate is 736 doctors (19.3% of the cohort) who had been "lost" from medicine. From the 1994 medical directory we inferred that 107 of the 289 doctors were probably working in medicine in the United Kingdom. It seems reasonable to give a "best

**Table 6—Facts known about non-respondents, untraceable doctors, and respondents with occupation not given. Results expressed as proportions of total cohorts**

Row No		Total (No in cohort=3819)		Men (total cohort=2363)		Women (total cohort=1456)	
		No	%	No	%	No	%
1	Not registered (September 1994)	85	2.2	45	1.9	40	2.7
2	Registered abroad (September 1994)	86	2.3	59	2.5	27	1.9
3	Registered, practising in United Kingdom	674	17.6	470	19.9	204	14.0
4	Registered, likely to be practising	107	2.8	73	3.1	34	2.3
5	Registered, occupation unknown	182	4.8	121	5.1	61	4.2
6	Total non-respondents	1134	29.7	768	32.5	366	25.1

Row 3 is based on Department of Health data for September 1993.  
Row 4 is inferred from entries in 1994 medical directory.

guess" estimate of doctors lost from medicine in the United Kingdom in 1994 of about 629 (736 minus 107), or 16% of the cohort.

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## Lesson of the Week

### Something in the air: survival after dramatic, unsuspected case of accidental carbon monoxide poisoning

Richard Pullinger

**Doctors should not assume hypoxic death in cases of overwhelming poisoning with natural gas**

In cases of intentional carbon monoxide poisoning the diagnosis is usually straightforward and is suggested by the circumstances in which the patient is found. In contrast, accidental carbon monoxide poisoning remains underdiagnosed because the source of carbon monoxide is often not obvious and may be remote and because the symptoms of poisoning—headache, lethargy, nausea, and vomiting—are non-specific.

In the United States a review of death certificates over 10 years identified 56 133 deaths in which carbon monoxide poisoning was implicated.<sup>1</sup> Of these, 46% were suicide, 28% were associated with burns, and 21% were unintentional for other reasons. Fifty seven per cent of these last unintentional deaths were related to exhaust fumes from a motor vehicle, which in most cases was stationary. A three year study of carbon monoxide poisoning in France identified 735 cases, of which 196 had domestic causes.<sup>2</sup> The domestic sources of carbon monoxide were water heaters (57%), boilers (21%), coal stoves (9%), braziers (4%), cookers (2%), and heating devices (1.5%). In addition, reports of carbon monoxide poisoning due to poorly maintained or poorly ventilated domestic appliances have come from Switzerland,<sup>3</sup> Denmark,<sup>4,5</sup> and Belgium.<sup>6</sup> In one report of domestic carbon monoxide poisoning from the United States patients were poisoned far from the source of the gas: carbon monoxide had been drawn into a motel's air conditioning system from the heating vents of a nearby swimming pool.<sup>7</sup>

The indoor use of cooking devices designed for outdoor use is also an important cause of carbon monoxide poisoning. Foutch and Henrichs reported the death due to carbon monoxide poisoning of two mountaineers at 4300 m while they were cooking inside

their tent.<sup>8</sup> Several reports detail carbon monoxide intoxication resulting from the indoor use of charcoal barbecues for cooking<sup>9-11</sup> and for heating.<sup>12,13</sup>

Carbon monoxide poisoning is well recognised in deep sea divers and is caused by faulty air compressors or contamination of air with fumes from nearby combustion engines or burners.<sup>14</sup> The symptoms of such poisoning are non-specific, sometimes mimicking decompression sickness, but, fortunately, hyperbaric oxygen is effective treatment for both conditions. In less specialist surroundings Heckerling found that seven out of 37 patients presenting to an accident and emergency department with headache had carboxyhaemoglobin concentrations greater than 10%.<sup>15</sup> Subsequent investigation by the gas company found that six of the seven patients had been exposed to toxic concentrations of carbon monoxide at home, but in none of them had carbon monoxide poisoning been suspected by the admitting doctor. Dolan found that of a sample of patients presenting to an accident and emergency department with flu-like symptoms, 23.6% had carboxyhaemoglobin concentrations of 10% or more.<sup>16</sup> In none of them was carbon monoxide poisoning diagnosed.

I report a case showing the importance of considering carbon monoxide poisoning even when there is no direct evidence of gas combustion.

#### Case report

An unconscious woman in her 70s was brought by ambulance to an accident and emergency department. Her neighbour had contacted police when she noticed that post had not been collected from the front

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