

Analysis of 1263 deaths in four general practices

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SUMMARY

Background. The death of a patient is a significant event that occurs often enough in general practice for it to have the potential to tell us much about the care we provide. There are few large series in the literature and we still know little about the collaborative use of this outcome measure.

Aim. To determine the pattern of deaths and potentially preventable factors in our practices.

Method. We completed a standard data collection form after each death in four general practices over a 40-month period. The results were discussed at quarterly meetings.

Results. A total of 1263 deaths occurred among our registered patients during the period of the audit. Preventable factors contributing to deaths were considered to be attributable to: patients (40%): mainly cigarette smoking, poor compliance, and alcohol problems; general practice teams (5%): mainly delayed referral, diagnosis and treatment, and failure to prescribe aspirin to patients with vascular disease; hospitals (6%): mainly delayed diagnosis and perceived treatment problems; the environment (3%): mainly falls, principally resulting in fractured neck of femur.

Conclusion. A simple audit of deaths along the lines that we describe gives important information about the care provided by general practice teams and those in hospital practice. It has both educational value and is a source of ideas for service improvement and further study, particularly when carried out over several years.

Keywords: deaths; general practice; audit; prevention.

As an educational experience, a good system of medical audit is worth any number of postgraduate courses.

I R McWhinney¹

Introduction

A pioneer of medical audit in British general practice concluded, 'For the evaluation of medical care, measures of outcome are better than measures of process, but few practicable measures of outcome are available ... A retrospective search for avoidable factors in individual deaths is perhaps the most stringent form of self criticism available to any clinical team.'² Audits of death have produced some of the best known examples of audit in British medicine. The *Report on the confidential enquiry into maternal deaths*³ has led on to enquiries into perinatal and peri-operative deaths.⁴ All have produced important results, offering the prospect of better and safer medical care. Similar enquiries

can take place in general practice.^{2,5-7}

Audit should have a useful educational purpose for those who take part.^{1,8,9} Furthermore, when carried out over some time, we should be able to determine whether earlier lessons have been learnt and improvements in patient care have actually taken place. Groups of professional peers should have the advantage of mutual trust and confidentiality and an opportunity to work together long enough to produce extensive series of comparable results.

We started meeting as the St Helens Young Principals Group in 1988 and have met regularly since then. In 1991, five members from four practices in the St Helens area audited 319 deaths over a 12-month period.⁶ This experience led us to modify our data recording but to continue the audit, which we report.

Method

After a six-month pilot scheme and a one-year audit, the participants from four practices (comprising 14 doctors) agreed to record the same details on every patient registered with their practices who died in the 40 months from 1 December 1992 to 31 March 1996 (Table 1). Causes of deaths were obtained from the certifying doctor, or, if not known, from the Registrar's Office for the district.

Those deaths with preventable factors were identified by the participating doctors based on criteria of preventability agreed by the whole group. For example, we considered a death was caused by cigarette smoking if the cause of death was one known to be associated with smoking¹⁰ and the patient had been a smoker within the five years before death (or at any time in the case of deaths from malignant disease). Although all individual deaths were not scrutinized by others, those with factors considered preventable within primary or secondary care were discussed within the group, which meets regularly and discusses this project approximately quarterly. For the final year of the study, we reviewed all deaths under the age of 55 years in the whole group to determine whether we all agreed about the preventability of the death.

Results

Although practices varied in their registered list size from 2300 to 12800, they have similar occupational, social class composition, and age structure, and largely refer to the same hospitals. The mid-survey total patient population of the participating practices was 30790, and 1263 patients died in the study practices during the 40 months of the audit (12.3 per 1000 per annum). The age and sex distribution of the patients is shown in Table 2, and the place of death in Table 3.

Certified principal causes of death are shown in Table 4. In the 1260 patients over 15 years of age, 435 (34.5%) were known to be cigarette smokers in the five years before death, 678 (53.8%) were recorded as non-smokers in the five years before death, and there was no recorded information on the remaining 147 (11.7%).

A total of 372 patients (29%) had been diagnosed as being hypertensive at some stage in their lives, and 130 patients (10.3%) were diabetic at death. About 36% of patients had a history of vascular disease and, in this group, aspirin was prescribed or bought in 48% of the cases, contraindicated in 33%, and we had no information, or had failed to prescribe, in 19% of the

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Table 1. Information to be recorded on each person dying during the 40-month study period.

Name
Age at death
Sex
Place of death
Certified cause of death
Daily smoking pattern
Weekly alcohol consumption
Whether diagnosed diabetic
Any history of vascular disease, and aspirin prophylaxis
Whether diagnosed hypertensive
Whether death might be considered to be avoidable, and if so, how

Table 2. Number of deaths by age and sex 1992–96.

	Age (years)			Total
	0–54	55–74	75 and above	
Male	66	285	273	624
Female	37	220	382	639
Total	103	505	655	1263

Table 3. Place of death.

Hospital (consultant care)	733	(58.0%)
Hospital (GP care)	25	(2.0%)
Hospice	11	(0.9%)
Home	283	(22.4%)
Residential home	174	(13.8%)
Other	37	(2.9%)
Unknown or uncertain	0	
Total	1263	

Table 4. Certified principal causes of death.

Cardiovascular	367	(29.1%)
Cerebrovascular	145	(11.5%)
Other vascular	41	(3.2%)
Respiratory	172	(13.6%)
Malignancy	351	(27.8%)
Others	187	(14.8%)

cases. Information on alcohol consumption is shown in Table 5.

Avoidable factors contributing to death are shown in Table 6. The one alteration to the classification in the 24 cases discussed in detail concerned a patient who presented with an advanced cerebral tumour 10 months after a normal computerized tomography brain scan.

Discussion

Although British general practitioners (GPs) usually record some information about deceased patients, this is mainly for administrative purposes.¹¹ However, it is possible to use the critical incident technique to audit deaths in practice,¹² and this can reveal a number of ways in which practice might be improved. A full discussion about each death would be time consuming, and we accepted individual judgment in the majority of cases, enhanced by peer group discussion when there was substantial doubt. Discussing the 24 deaths under 55 years of age only produced one alteration, suggesting that there was reasonable agreement between our assessments. We concluded that having common data collection forms and discussing cases frequently allowed us to maintain an adequate degree of uniformity once we had agreed

Table 5. Alcohol consumption recorded in notes in the five years before death (excluding children).

Below 14 (women) or 21 (men) units per week	892 (70.8%)
Above 14/21 units per week (but no record of alcohol problems)	124 (9.8%)
Clear record of alcohol problems	51 (4.0%)

Table 6. Avoidable factors contributing to patient's death.

Patient factors	
Cigarette smoking	393
Alcohol abuse	31
Self-neglect	25
Poor compliance	37
Suicide	10
All others	5 ^a
Total	501 (39.7%)
GP factors	
Delayed referral, diagnosis, treatment	25
Non-prescription of aspirin	22
Failure to check/control blood pressure	12
Poor diabetic control	1
Failure to challenge hospital drug treatment	1
Failure to treat osteoporosis	1
Side-effects from aspirin	3
Total	65 (5.1%)
Hospital factors^b	
Delayed diagnosis	38
Treatment delays or perceived errors	22
Pressure sores	3
Delayed tertiary referral/review	3
Inappropriate discharge to home	2
Hospital-acquired infection	3
Birth injury (1957)	1
Total	72 (5.7%)
Environmental factors	
Falls (mainly fractured neck of femur)	20
Transport accident	7
Industrial lung disease	7
Assault	4
Exposure to toxic chemicals	1
Epileptic living alone	1
Poor food hygiene	1
Total	41 (3.2%)

^aGross obesity (3), lifestyle, and hypochondriasis. ^bOnly including inpatient care in the minority of cases when there were clear records of such care available to us.

a system for allocating preventability based upon the literature and a pilot study.

Published audits of death can show how attitudes change, and predictions are often proved wrong later.¹³ Researching and discussing the deaths of patients often known and cared for by us can be uncomfortable, but also helped us to move forwards from vague guilt to clearer ideas about good care. Peer review is a method of changing physician behaviour that is being considered across Europe,¹⁴ and deaths are a suitable subject for such assessment.

Comparison with other audits of death in general practice

Tudor Hart audited 500 deaths of patients over 21 years of age in his single-handed practice in South Wales.² A comparison between his figures and ours is shown in Table 7. Any compari-

Table 7. Comparison of percentage of deaths with preventable factors in this (and in our earlier) study with those found by Tudor Hart in South Wales.²

Setting	South Wales	St Helens	This study
Duration	1964–85	1991–92	1992–96
Total deaths	500	319	1263
Proportion dying in hospital	37% ^a	59%	58%
Proportion dying at home/in residential care	59%	38%	36%
Death with avoidable factors attributable to:			
Patient	26%	35%	40%
General practitioner	9%	3%	5%
Hospital	2%	6%	6%
Environment	7%	2%	3%

^a'Institutions'.

son is difficult, because opinions vary regarding what is preventable, a problem expressed by Tudor Hart. For example, we were much readier than him to attribute deaths to cigarette smoking. Others have described such audits in Israel⁵ and Ireland.^{15,16} In Israel, only 10% of deaths were considered to be smoking related, but they only considered such a factor when the individual was aged less than 70 years and smoked more than 20 cigarettes a day. It is, therefore, necessary to consider definitions very carefully when making comparisons between series of deaths.

Comparison with our 1991–1992 study

Demography. The basic demographic data are similar to those produced by the Registrar General's office¹⁷ and other major studies of mortality in the United Kingdom (UK).⁴ Although all-cause mortality in the district is greater than for the UK as a whole,¹⁸ and specifically that for bronchial carcinoma and ischaemic heart disease, our figures lack accurate denominators, so it is difficult to compare them with the local or national picture. All-cause mortality did not change substantially between the two audit periods, nor would it be expected to do so. The value of this analysis is both educational and in providing a challenge to improving care. For instance, one practice used audit to help ensure that as many people died at home as they wished.¹⁹

Preventability. The contribution of individual decisions to subsequent death can be powerfully evident in the community. One young woman died of a progressive encephalitis that might have been prevented by a measles vaccination 20 years earlier. Some clear trends emerged about avoidable factors contributing to death. Cigarette smoking was by far the most important contributory factor. Our knowledge of lifestyle factors was substantially better than in our earlier study. Despite having clear rules for accounting blame to lifestyle factors, there are many degrees of such responsibility. It has also become clear how much benefit is conferred by the administration of aspirin to susceptible people.²⁰ We have become more self-critical about our prescription of aspirin compared with our first audit and considered that its non-prescription contributed to 1.7% of deaths in this study but 0.9% of deaths in the earlier report.⁶

Hospital care

In our earlier study, we discovered that it was almost impossible to assess the quality of care patients received while they were hospital in-patients, and we decided to cease trying to audit in-

patient care. Indeed, opinions of the contribution of secondary care to deaths were our own perceptions alone, as deficiencies are difficult to detect from hospital correspondence. It would be desirable to be able to discuss deaths with the responsible consultant and other staff, but distance and the numbers of people involved make this impracticable. The failure of a hospital to follow up a patient with intestinal polyps was an example of the importance of GPs monitoring and, if necessary, challenging consultants,^{2,21} a lesson we have learnt for ourselves.

Conversely, there remains a major difficulty in large studies of referral rates in identifying patients who need hospital care but who are not referred,²² a problem that a small-scale audit such as this might start to address. Nevertheless, the contribution of delay in diagnosis of cancer to subsequent mortality is difficult to determine. If the proposals for cancer services²³ are to make the greatest impact, there must be ways of identifying and correcting excessive delays in primary as well as secondary care. Perhaps the greater challenge lies in primary care, where individual patients are more likely to have minor symptoms.

Educational value

A principal value of this type of audit is in suggesting areas where improvements in practice are required or where further enquiries should be made.²⁴ Some of the procedural changes we needed to make were clarifying the handling of hospital letters and investigations to identify problems and action, checking that appropriate patients with a history of vascular disease are taking aspirin, and making a note of patients referred semiurgently to hospital.

Furthermore, it can have lessons that would not arise, or have their educational impact, without participation. The considerable impact on mortality of cigarette smoking and alcohol abuse are worthy of reiteration. Our figures taught us that about 10% of patients are diabetic at death, a figure much greater than we had realized but that may still be an underestimate of the true prevalence, which may approach 20% in elderly Caucasian patients.²⁵ Other GPs have been prepared to share data on registrations, workload, prevention, referrals, prescribing, and disease prevention, a project that relied heavily on confidentiality and comparability.²⁶ This present study considered very sensitive information, showing that doctors are prepared to record and discuss issues related to the deepest levels of professional competence and good practice within a group of GPs who know each other well and practise in the same area.

Although some delegation of routine recording tasks to practice staff is possible, most of the work was carried out by ourselves. On occasions, a great deal of effort was required to discover the cause of death of a patient who died away from our district. We estimate that the average death took 10–15 minutes to review and record: about four hours per GP per annum.

General practitioners can identify factors that might have contributed to the death of individual patients. Such factors occur sufficiently commonly for comparisons to be made with secondary care and with factors originating in the patient or the environment. However, the imposition of such a task upon GPs is likely to destroy the trust upon which its success depends.

The future

Ideas about what constitutes 'preventability' change, and an audit of deaths must consider this. A continuing audit can address such issues as they arise, as we have done for aspirin prophylaxis. In short, we agree that 'a retrospective search for avoidable factors in individual deaths is perhaps the most stringent form of self-criticism available to any clinical team'² and are continuing to record and discuss deaths in our practices.

References

1. McWhinney IR. Medical audit in North America. *BMJ* 1972; **1**: 277-279.
2. Tudor Hart J, Humphreys C. Be your own coroner: an audit of 500 consecutive deaths in general practice. *BMJ* 1987; **294**: 871-874.
3. UK Departments of Health. *Report on confidential enquiries into maternal deaths 1988-1990*. London: HMSO, 1994.
4. Campling EA, Devlin HB, Hoile RW, Lunn JN. *Report of the national confidential enquiry into perioperative deaths 1990*. London: National Confidential Enquiry into Perioperative Deaths, 1992.
5. Hermoni D, Nijim Y, Spenser T. Preventable deaths: 16 year study of consecutive deaths in a village in Israel. *Br J Gen Pract* 1992; **42**: 521-523.
6. Holden JD, Brindley J, O'Donnell S, Miles L. An audit of 319 deaths across four general practices. *Br J Clin Pract* 1996; **50(2)**: 79-84.
7. Khunti L. A method of creating a death register for general practice. *BMJ* 1996; **312**: 952.
8. Marinker M. *Medical audit and general practice*. London: BMJ Publications, 1990.
9. Irvine D, Irvine S. *Making sense of audit*. Oxford: Radcliffe Medical Press, 1991.
10. Doll R, Peto R, Wheatley K, et al. Mortality in relation to smoking: 40 years' observation on male British doctors. *BMJ* 1994; **309**: 901-911.
11. Wagstaff R, Berlin A, Stacy R, et al. Information about patients' deaths: general practitioners' current practice and views on receiving a death register. *Br J Gen Pract* 1994; **44**: 315-316.
12. Berlin A, Spencer JA, Bhopal RS, van Zwanenberg TD. Audit of deaths in general practice: pilot study of the critical incident technique. *Quality Health Care* 1992; **1**: 231-235.
13. Caldwell JR. One hundred deaths in practice. *J R Coll Gen Pract* 1971; **21**: 460-468.
14. Hartmann P, Bott U, Gruber M, et al. Effect of peer-review groups on physicians' practice. *Eur J Gen Pract* 1995; **1**: 107-112.
15. O'Meara B. Analysis of 178 deaths in a rural practice. *Ir Med J* 1985; **78**: 19-21.
16. O'Meara B. Death in a country practice. *Ir Med J* 1990; **83**: 31.
17. Office of Population Censuses and Surveys. *Mortality statistics: cause 1991*. London: HMSO, 1993.
18. St Helens and Knowsley Health Authority. *Brighter horizons: annual report 1992-93*. St Helens: St Helens Health Authority, 1993.
19. Holden JD. Auditing palliative care in one general practice over eight years. *Scand J Prim Health Care* 1996; **14**: 136-141.
20. Antiplatelet Trialists Collaboration. Collaborative overview of randomised trials of antiplatelet treatment. I. Prevention of death, myocardial infarction, and stroke by prolonged antiplatelet therapy in various categories of patients. *BMJ* 1994; **308**: 81-106.
21. Gray DJP. Role of the general practitioner in the early detection of malignant disease. *Trans Hunterian Soc* 1966; **25**: 121-175.
22. Morrell DC. Role of research in development of organization and structure of general practice. *BMJ* 1991; **302**: 1313-1316.
23. Chief Medical Officers' Expert Committee on Cancers. *A policy framework for commissioning cancer services*. London: Department of Health and Welsh Office, 1995.
24. Holden JD. Educational value of a short audit of deaths in general practice. *Educ Gen Pract* 1996; **7**: 48-53.
25. Meneilly GS, Tessier D. Diabetes in the elderly. *Diabetic Med* 1995; **12**: 949-960.
26. Pringle M. Newark Information Sharing Project: lessons for medical audit advisory groups. *Health Trends* 1991; **23**: 15-18.

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