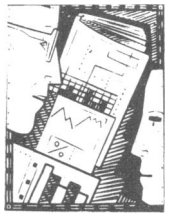

Although surveillance programmes may need to vary a little between districts to take account of local needs, there are several advantages in a core programme: the training of doctors and nurses could be standardised across the country, the surveillance of children who moved to another health district would not be affected, and primary health care teams who look after children from more than one health district would not have to vary their programme to suit the child's district of residence.

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Audit in Person

Occurrence screening as a method of audit

J Bennett, K Walshe

Brighton Health Authority has been actively pursuing a district wide quality assurance programme for almost five years since it first adopted a formal quality assurance strategy in 1985.[1,2] As part of that programme clinicians within the district, in cooperation with CASPE (Clinical Accountability, Service Planning and Evaluation) Research, have experimented with various approaches to medical audit. One of these techniques, developed in the United States and known as occurrence screening or screening criteria, has shown considerable promise and will form the basis of a hospital wide trial of medical audit at the district's main acute hospital.

Occurrence screening is based on two main principles: firstly, that it is far more practical to specify and describe what does not constitute good quality care than to specify what does; and, secondly, that focusing attention and resources on the investigation and analysis of instances of poor quality of care is an effective way to bring about improvement in overall standards of care. The specification and description of what does not constitute good quality care is set out in a set of screening criteria. The criteria are designed to highlight cases in which the patient experiences an adverse event or circumstance which, under optimal conditions, is not a natural consequence of his or her disease or treatment.[3] Such an event is sometimes termed an adverse patient occurrence.[4] Screening criteria may be generic or specific to particular specialities, conditions, or procedures. They are generally selected by the clinicians concerned with their use and may be based on clinical experience,

TABLE I—*MMA screening abstract**

Date variation identified		Element
	1	Admission for adverse results of outpatient management
	2	Readmission for complications or incomplete management on previous hospitalisation
	3	Operative consent: (a) Incomplete (d) Different surgeon (b) Missing (e) Not signed by patient (c) Different from procedure done (f) No consent note (g) Other
	4	Unplanned removal, injury, or repair of organ or structure during surgery, invasive procedure, or vaginal delivery
	5	Unplanned return to operating or delivery room on this admission
	6	Surgical and other invasive procedures not meeting criteria for necessity and appropriateness. (a) Pathology report or preoperative diagnosis mismatch (b) Non-diagnostic tissue (c) No tissue (d) Other
	7	Transfusion reactions, complications, and improper utilisation (a) Transfusion occasioned by atrogenic bleeding or anaemia (b) Transfusion not clinically indicated (c) Transfusion reaction
	8	Nosocomial (hospital acquired) infection
	9	Antibiotic/drug utilisation which is unjustified, excessive, results in patient injury, or varies from approved criteria (a) (b)
	10	Cardiac or respiratory arrest or low Apgar score
	11	Transfer from general care to special care unit (a) Complication (b) Utilisation problem
	12	Other patient complications
	13	Hospital-incurred patient incident: (a) Falls and accidents (d) Skin problems (b) IV problems (e) Equipment problems (c) Medication problems (f) Other
	14	Abnormal laboratory, radiographic, or other test results not accessed by physician
	15	Neurological deficit not present on admission
	16	Transfer to another acute care facility
	17	Death
	18	Subsequent visit to emergency room or outpatient department for complications or adverse results of this hospitalisation
	19	Utilisation management variations from criteria for (a) Length of stay (c) Other (b) Resource utilisation
	20	Medical record review—physician (a) (c) (b) (d)
	21	Medical record review—nursing (a) (c) (b) (d)
	22	Departmental or other problems
	23	Patient or family dissatisfaction
Comments:		

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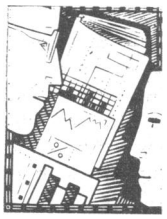
Br Med J 1990;**300**:1248-51



empirical evidence, or academic research into what constitutes an adverse patient occurrence.

The care given to patients is objectively reviewed using: the screening criteria by specially trained screening staff, who are usually qualified nurses. When a case fits one or more of the screening criteria, the circumstances are carefully recorded, and the case is usually put forward for review by one of the clinician's peers. In some occurrence screening programmes the peer reviewer assesses the seriousness of the occurrence, considers what led to it, and makes a judgment about the standard of care that the patient received. If it merits it the particular case may be reviewed at an audit meeting, where trends in the number and type of cases, such as rates of wound infections, are also regularly examined. Occurrence screening provides a way of focusing on cases in which the standard of patient care may have been suboptimal and of systematically investigating and analysing the causes and contributory factors. The process of systematic investigation and analysis builds up a database of cases that can itself be analysed to identify trends or patterns or to compare clinical practice.

Occurrence screening is clearly well suited to multidisciplinary application—the criteria can relate to medical, nursing, paramedical, or non-clinical care—and appropriate review mechanisms for such criteria can be established. Indeed, because the technique can cover the whole of a patient's care it can reduce the duplication of effort inherent in a series of audit systems relating to individual professions and can identify concerns in quality assurance that cross professional boundaries and require joint professional action to resolve them. The ability of the technique to make use of simple generic criteria and more complex specialist criteria makes it highly flexible and adaptable to local circumstance.

TABLE II—*Data collection form**

Hospital case no _____ Consultant code _ *Inpatient/*day case

Date of admission _____ Date of discharge/Transfer/death _____ *Medical case/*surgical case

Diagnosis on admission

	Nurses Kardex	Medical notes
1 Readmission (clinical complications after previous admission (Y/N). If Y, dates of original admission/s)		
2 Consent for operation (Y/N)		
3 Unplanned return to theatre (Y/N)		
4 Patient transfused (Y/N) If Y, transfusion reaction (Y/N)		
5 Hospital acquired infection (Y/N) If Y, type of infection		
6 Cardiac or respiratory arrest (Y/N)		
7 Hospital incident: Please tick (a) Accident—include data and incident		
(b) Intravenous catheter problems		
(c) Skin problems—for example, bedsores/rashes		
(d) Equipment failure		
(e) Others—for example, electric shock from hospital premises or equipment		
8 Transfer to special care unit (Y/N) If Y, give dates		
9 Transfer to other hospital (Y/N) If Y, date of transfer and name of hospital		
10 Death (Y/N)		
11 *Patient or *Family dissatisfaction (Y/N)		
12 Resuscitation category noted (Y/N) If Y, category		
13 Discharge note	*Yes/*no *Yes/*no	Date _____ Date _____
14 Discharge summary Discharge summary: letter to doctor	*Yes/*no *Yes/*no	Date _____ Date _____
15 Property form signed for above admission	*Yes/*no	If no, previous admission *Yes/*no Date _____

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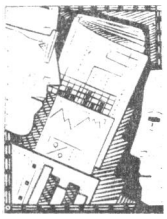
Development of the technique

Occurrence screening was developed in California in the mid-1970s as a byproduct of a study of the potential level of claims about medical negligence.[5] That study tried to assess whether it would be financially feasible to introduce a no fault compensation scheme for victims of medical accidents by screening the care give to 20 000 inpatients at participating hospitals for "potentially compensable events." To do this a set of generalised criteria were designed to pick out cases for subsequent review by a team of clinicians and lawyers. The findings were unsurprising: compensating every patient who experienced such an event would be vastly more expensive than the existing costs of legal services, out of court settlements, and court awards. The researchers found, however, that the methods they had developed for the study could form the basis of a systematic and workable quality assurance tool. Subsequently one of the research team refined and improved the system and marketed it as the Medical Management Analysis quality assurance and risk management system,[4] which is now used in over 200 hospitals in the United States.[4] Table I shows the set of 23 generic screening criteria recommended by Medical Management Analysis.

The use of occurrence screening systems as an important part of hospital quality assurance programmes, usually in tandem with rather than instead of other quality assurance techniques,[6,7] is now widespread in the United States. Occurrence screening is recommended by the American College of Surgeons and the American Society of Anesthesiology.[3] It is mandatory in all Department of Defence hospitals, and since July 1986 all professional review organisations have been using occurrence screening for reviewing records.[4] The suite of hospital wide clinical indicators recently developed by the Joint Commission for the Accreditation of Healthcare Organisations[8,9] is based on the topics highlighted as being significant in occurrence screening systems.[10]

Validity and reliability

Relatively few studies of the reliability and validity of occurrence screening as a measure of quality of care have been published. In 1986 a study of 426 patients with myocardial infarctions found a screening criteria measure both valid and reliable.[11] Yet in 1987 a study of 752 patients with a wide variety of diagnoses suggested that an occurrence screening had poor interobserver reliability.[12] More recently, an investigation of judgments concerning adverse events occurring during stay in hospital, which used multiple reviews of the records of 360 patients, found that such a review process can produce judgments which are both valid and reliable.[13,14] There are many anecdotal accounts of the value and effectiveness of occurrence screening, but it is clear that its validity and reliability as a measure of the quality of care are far from proved.[15]



Occurrence screening in the United Kingdom

British hospitals have few existing locally managed mechanisms for routinely detecting, investigating, and analysing adverse patient occurrences. Those mechanisms that do exist, such as accident reports, records of errors in medication, patient complaints, mortality and morbidity meetings, postmortem examinations, and so on, are rarely applied universally and often rely on the "self reporting" of adverse patient occurrences by those directly concerned with patient care. They usually exist in isolation and rarely form part of a coordinated quality assurance programme.

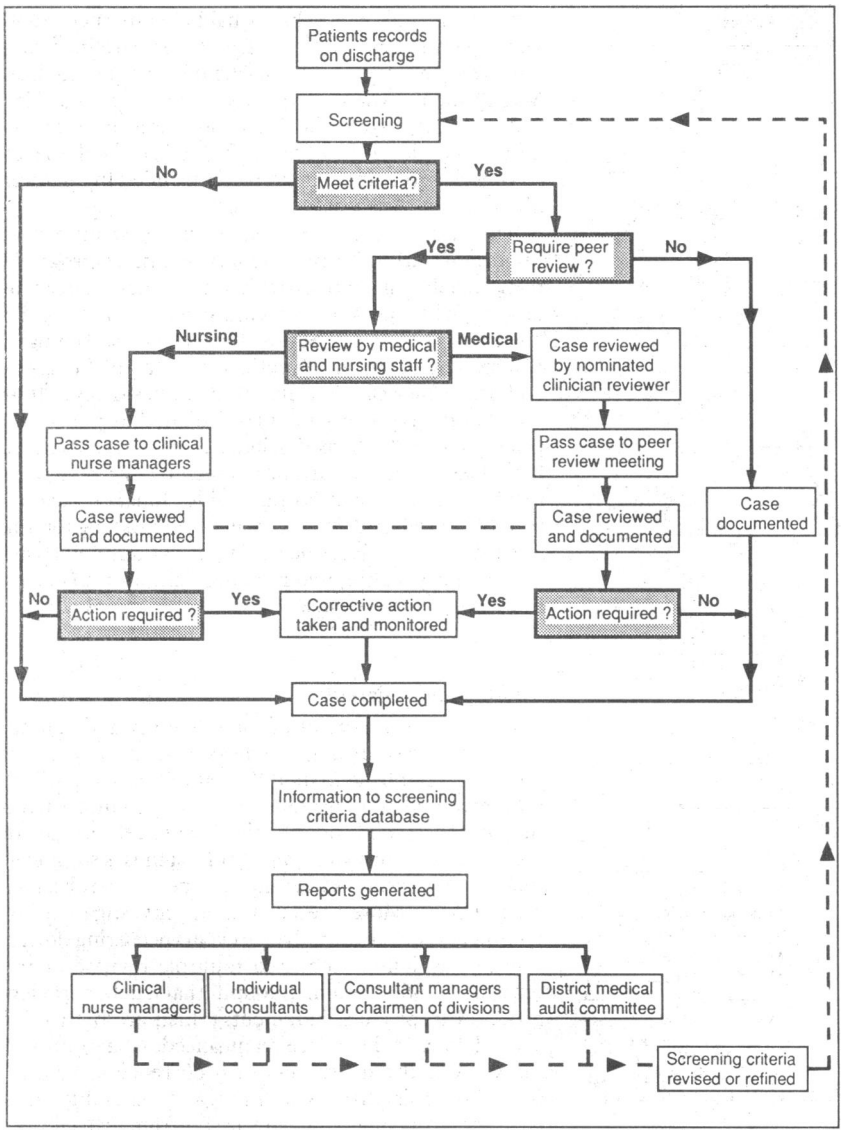
Pilot studies using occurrence screening techniques have been carried out at hospitals in Bath health authority (N Dixon, personal communication) and Brighton health authority.[16] Both studies have concentrated on identifying the applicability and practicability of the approach in the British setting. The Bath project is in progress, and major trials in the acute setting are now being planned at the Royal Sussex County Hospital in Brighton and in the acute unit of Bromley health authority.[17]

PILOT STUDY

In 1988 a pilot study of 250 patients' medical records was carried out at Hove General Hospital.[16] The intention was to establish whether an occurrence screening measure could be adapted for use in a British acute hospital, to ascertain the feasibility of using patients' medical records as the information source for screening, and to identify any unforeseen difficulties with the method. A set of 11 generic criteria were selected for use in the pilot study, and their definitions were translated into English (rather than American) terminology. Four additional criteria were developed locally. Table II shows the criteria used. The screening of patient records against these criteria was carried out by an experienced medical administrator without medical or nursing training. A sample of her screening was then checked by a doctor, who found no errors in her work and judged that in those instances in which she had been unsure a qualified nurse would have been able to be more certain. The screener's time was used most efficiently by screening notes soon after discharge. This made the notes easier to locate and simplified the task of identifying what information in the notes related to the most recent admission. Under these circumstances over 90% of cases took less than 10 minutes each to screen.

The results of screening in the pilot study indicate the rates of adverse patient occurrences that might be encountered in a larger trial. It was found that 22% of patients had at least one adverse patient occurrence during their stay (studies in the United States suggest that around 18-20% of patients have an adverse patient occurrence while in hospital[18]). The commonest occurrence (experienced by a tenth of all patients in the study) was a hospital acquired infection. Four per cent of patients, however, had incomplete operation consent forms, 2% had a cardiac or respiratory arrest, 3% had problems related to intravenous cannulas or catheters, and 1% had a slip or fall during their stay.[14]

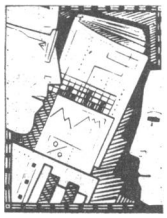
It proved difficult to apply some of the criteria, such as those relating to evidence of patient or family dissatisfaction and to the standard of discharge documentation, solely on the basis of the information in the patient's medical records. The results of the pilot study were, however, largely encouraging and confirmed that the method could be applied practically in a British hospital.



OCCURRENCE SCREENING PROJECT

In mid-1989 Brighton health authority and CASPE Research were awarded finance from the Department of Health's central fund for medical audit to test whether occurrence screening could form the basis of a hospital wide approach to medical audit at the district's main acute services site, the Royal Sussex County Hospital, which has over 22 000 discharges and deaths per year. With the participation of consultant medical staff and joint medical and managerial leadership, a three year project plan was designed. The project has four main aims. Firstly, to investigate the reliability and validity of occurrence screening as a measure of quality of hospital care. Secondly, to foster the development of peer review mechanisms among medical and nursing staff so that the information gathered by screening can be appropriately analysed and investigated; in the process it is planned to develop accurate, timely, and comprehensible formats for reporting screening information to clinicians. Thirdly, to establish whether a combination of peer review mechanisms and meaningful reports facilitate changes in clinical practice if these prove to be necessary. Finally, to establish benchmarks for the costs associated with the use of occurrence screening so that its cost effectiveness can be clearly identified. Because of the differences in organisational structure and professional practice in hospitals in the United States and Britain the American model for peer review is not wholly suited to a British setting, and we plan to use a revised model (figure).

In parallel with the Brighton project, a cooperative commercial development of an occurrence screening system is in progress in the acute unit of Bromley health authority, sponsored by South East Thames



Regional Health Authority. The two project teams intend to meet regularly and pool experience and skill.

Conclusions

Experience in the United States and initial research in Britain suggest that occurrence screening systems may provide a highly effective approach to audit that can accommodate the requirements of a wide variety of medical specialties. Though such systems are clearly limited in their remit and take little account of important issues such as the appropriateness of care or its opportunity costs, it is evident that they can make a major contribution to maintenance and improvement of overall standards of care for hospital patients. In the light of the white paper *Working for Patients*[19] and the statement in its associated working paper that all doctors (not just all consultants) should be involved in medical audit by April 1991, occurrence screening may prove highly relevant to the fast changing needs of the NHS.

We thank Professor M D Warren, Mrs R Walczak, Mr B H Lang, and Mr J Coles for commenting on the manuscript, and Mr N Chaplin, editor of *Health Services Management*, for his permission to reproduce the material in tables I and II.

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News and Information

Despite 30 years' experience opinions still differ about the best way of treating hyperthyroidism with radioiodine. Evaluation of different treatment regimens was attempted by comparing a cohort of patients in Sheffield, randomised to receive low, medium, and high doses of radioiodine, with patients from five Scottish centres who were given doses according to the size of their thyroids (*Journal of the Royal College of Physicians* 1990;**24**:36-42). Annual costs per 100 referrals were over £45 000 for the low dose regimen and over £38 000 for the high dose treatment; costs for Scottish patients fell between the two, and in these patients attendance was lowest. As no treatment had a clear advantage it was suggested that choice should be based on long term quality of life and medical workload, as well as cost, rather than on strictly clinical criteria.

Conflicting views exist on the desirability of routine admission and psychiatric consultation for all patients who attempt suicide. After a training session in psychiatric assessment junior doctors were allowed to select patients who had deliberately taken overdoses (parasuicides) but who had no immediate medical or psychiatric problem and to allocate them randomly to hospital admission or discharge home (*British Journal of Psychiatry* 1990;**156**:236-42). No differences were found between the two groups at one week and three months for outcome measures including psychiatric state and social functioning assessed by validated questionnaires, detailed information from general practitioners, subsequent psychiatric referral, and further suicide attempts. Of 511 patients seen over 16 months, 160 were excluded for various reasons and 274 because of a need for medical or psychiatric treatment, leaving only 77 deemed suitable for inclusion. Nevertheless, reduction in use of beds and better education of junior staff may be considered potential benefits arising from the findings.

Closure of hospital beds may at least provide an opportunity to ascertain what is happening to provision of services. A quarter of the 120 acute medical beds at Northwick Park Hospital was closed in October 1987; the next year a further 51 beds disappeared in neighbouring Brent and Barnet. Average daily medical admissions rose from 7·2 in 1986 to 9·1 in 1988 at Northwick Park; requests for admissions climbed steadily, especially from self referred patients, the accident and emergency department, and the emergency bed service (*Journal of the Royal College of Physicians* 1990;**24**:32-5), resulting in an increasing proportion of requests from local general practitioners being refused. The hospital coped by closing the medical wards to admissions on no fewer than 20 out of 31 nights in the 1988 survey; by dispersing medical patients to any ward with vacant beds (almost destroying the former specialist teams); by refusing more requests for admission; and, presumably, by shortening hospital stay.

The dramatic decline in the number of stapedectomies—from around 100 per year in the 1970s to eight per year in 1986-8—means that senior registrars in Birmingham are operating on at most one patient a year compared with an average of seven a year previously (*Journal of Laryngology and Otology* 1990;**104**:203-5). A good result as judged by audiograms was found in 88% of 129 patients operated on by consultants compared with 65% of 70 patients operated on by senior registrars. These results almost certainly reflect what is going on elsewhere; as 100 operations represent the peak of the learning curve it is likely that stapedectomies will have to be restricted to a few teaching centres with adequate temporal bone laboratories and specialist surgeons.

Roughly a quarter of people in Britain have serum cholesterol concentrations above 6·5 mmol/l. Specialist lipid clinics are available not only for managing more severely affected people but also for screening and promoting awareness among doctors and the public. Analysis of 185 patients attending such a clinic in a district general hospital over the past eight years (*Quarterly Journal of Medicine* 1990;**74**:239-45) showed that 42% and 46% had achieved target reductions in serum concentrations of cholesterol and triglycerides respectively. The average fall in serum cholesterol concentration of 1·5 mmol represented an 18% reduction in risk of ischaemic heart disease. The annual cost of treating each patient was estimated at £500—10 times that of patients attending hypertension and diabetic clinics—largely due to the cost of drugs. More effort should be directed