

A quality assurance initiative in day case surgery: general considerations

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With the increasing demand for audit in the day surgery setting, a quality assurance initiative was implemented in a busy British day surgery unit. This paper outlines how such a programme was designed and established. The indicators of quality in day surgery and the standards of practice used are discussed. The results of the data collected are discussed and the recommendations for improvement are outlined. Hopefully this paper will serve as a concrete and practical guide for the implementation of a quality assurance programme in other day surgery facilities.

Key words: Quality assurance audit, day surgery

Introduction

The scope of day surgery is expanding, not only in terms of the number of operations performed each year, but also in terms of the range of procedures undertaken on a day case basis. The foundation upon which day surgery is based is the concept of high quality care. It is unacceptable that a large number of patients can be treated efficiently, and cost-effectively, if the quality of that service does not match or surpass that of more formal inpatient care.

With the publication in the UK of the recent National Health Service (NHS) Management Executive Task Force Report¹ highlighting the proposed growth of day surgery to include 50% of all elective operations by the year 2000, the issue of quality assurance has now assumed relevance in the day surgery setting.

A quality assurance initiative was commenced at the Addenbrooke's Day Surgery Unit (DSU) in June 1993, with the aim of defining quality assurance indicators, setting the relevant standards, and refining the process of data collection and analysis to make such a programme practical in a busy day unit. The results of this initiative should therefore represent a 'snap-shot' of the functioning of a modern British day surgery facility, and may permit the description of a coherent, practical, and relevant quality assurance package which could be developed and continued over time.

Although much has been written about quality assessment and improvement, information on how this process is initiated and carried out, together with the more important issue of which parameters constitute a definition of quality, is scarce². Furthermore, in an increasingly cost conscious healthcare market, outcome studies, as they relate both to quality assurance and cost benefit analysis, will assume greater importance.

It is hoped that this and the following paper will help to redress this imbalance. The parameters required to define quality at the Addenbrooke's Day Surgery Unit will be listed, and the data collection and processing methods will be described in detail. The aim is to guide those unfamiliar with quality issues through the whole auditing process and enable them to initiate and maintain a similar system, based on the results from a modern day surgical facility in the UK. The results of this specific quality assurance initiative will be described and discussed, although the results and implications of quality assurance in day case anaesthesia are described elsewhere.

Quality assurance indicators: what constitutes 'quality'?

Audit and quality assurance programmes traditionally divide the focus of their attention between what Donabedian describes as structure, process and outcome³. Each area may confer specific potential benefits to both the day to day running of any day surgical facility, and to the maintenance of high standards of patient care. Clinical audit has tended to concentrate on the structure and process of care, but outcome measures have been ignored. However, outcome measures, while often the most difficult to define, are arguably the most crucial for the measurement of successful, high quality day surgery.

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Table 1. Quality assurance indicators

Process:
Numbers booked
Numbers done (both in DSU and elsewhere in the hospital)
Cancellations S/A/P/ including 'who by', reason, whether rebooked/inpatient/no treatment, and GP informed?
Cancelled sessions (whether 'on offer', whether taken up, reason for cancellation)
Where booked
When booked
Where screened
If screened
Non attenders
Waiting times, per speciality and per surgeon
Waiting lists, per speciality and per surgeon
Whether notes present
Whether x-rays present
Whether blood results needed/present
% Utilization of lists booked
% Utilization of lists done
Time lists start (reason for late starts)
Time lists finish (reason for late finishes)
Turnaround time
Duration of pre-op stay
Duration of operation, per surgeon, per operation
Duration of time in recovery
Duration of time in ward
Discharge information – if given, written or oral
Preoperative information – if given, written or oral, if followed

In the day surgical setting, with the exception of such indicators as unanticipated admission, which have been used to define good quality day surgical care for some time, and studies investigating the factors that predict adverse outcome⁴, other indicators of quality have been surprisingly few and have often been inappropriate for the purpose of assuring quality.

Tables 1, 2, and 3 present a list of quality assurance indicators which the authors have audited. Rather than strict adherence to the headings of structure, process, and outcome, the items listed in Tables 1–3 are grouped together under titles which indicate the area of day unit practice to which they relate. We believe that through a process largely of trial and error, and with the exception of data on costing and cost-benefit which we are still developing, we have defined the essential core of quality indicators in day surgery. Many are to be found in the Day Surgery Task Force Report¹ but the list is neither exhaustive nor complete. Even the development of quality indicators is an ongoing process, which will improve with time and experience, and should change to suit the particular needs of any individual day surgery facility.

Standards

Day surgery quality assurance, although rapidly expanding, is still a relatively new field. Thus not only are quality indicators not described but also, in many instances suitable standards are unknown. Where possible the standards adopted in this audit were based either

Table 2. Quality assurance indicators

Structure:
Equipment
Problems: not available, not working at all, faulty, poor quality, unfamiliarity
Safety
Compliance with regulations concerning:
Fire
Control of Substances Hazardous to Health (COSHH)
Surgery
Grade of surgeon
Presence of trainee
Type of operation
Complications
Nursing
Training
Grades
Number of nurses
Rotation through different work areas
Skills

Table 3. Quality assurance indicators

Outcome:
Staff satisfaction
Patient satisfaction including compliance with instructions
GP satisfaction
Specific postoperative audits
1. Pain audit
VAS pain scores pre-op, in recovery, in ward, at ½, 1½, 2 h post-op
Categorical scores for children
Combined with an audit of analgesia and local anaesthesia: pre-op, intra-op, in recovery, in ward, post-discharge analgesia
2. Postoperative nausea and vomiting (PONV) audit
VAS scores for PONV at same times as pain scores.
Again combined with audit of preoperative risk factors, anaesthetics used, antiemetic requirements
3. Desaturation
In recovery: <94% for >2 min, whether O ₂ given, air-way device
4. Bleeding
Presence of abnormal bleeding
Outcome needs
Outpatients, also physio and occupational therapy
General practitioners, health visitors and district nurses

on published research or experience gained in audits performed at Addenbrooke's DSU over the last 10 years. In some instances, it was apparent from the outset that standards of practice based on the available research fell far short of that which we were already able to achieve in our unit⁵. In such cases we reset the target for quality care, as it was not productive to work to standards which had already been surpassed. In no instances did we feel that standards set on the basis of published data were too high.

In all too many instances, however, standards for day surgery quality issues have never previously been set or

investigated. In these instances standards were set on a 'best-guess' basis by a committee with over 50 years' extensive day surgery experience. When standards were set in this manner, they were deliberately high, as is appropriate to a high quality service. Perhaps in the future many of these standards will have to be lowered, but only after careful consideration of our ultimate objective - high quality patient care. To some, such standards may seem impossibly and inappropriately high but no apologies are made for this. One could argue that standards should be unobtainably high to promote constant striving for improvement. We should aim for the highest quality care and must make certain that such standards are truly unobtainable before they are compromised.

Methods

Initially DSU staff satisfaction was assessed using an anonymous questionnaire, and a brief pilot audit of 100 consecutive patients was used to eliminate any problems with data collection and analysis. It was then decided to run the quality assurance initiative over the period of 1 month in the first instance, to include 80 clinical sessions and approximately 500 patients. Data on every patient passing through the DSU during this time was collected, and each patient was invited to complete a patient satisfaction questionnaire prior to discharge. At the end of the sample period, questionnaires were also sent to all the general practitioners whose patients use our day surgery facilities. After a period of data analysis and consultation, a series of general and specific recommendations on how to improve the quality of care offered by our unit was drawn up. These recommendations were ratified by the Addenbrooke's Day Surgery Users Committee, consisting of surgeons, anaesthetists, nurses and managers, and were subsequently sent to all DSU users. They were also informed that a subsequent quality assurance initiative would occur after an interval of 3 months, to assess what effect the changes had made on the level of quality and so 'close the audit loop'.

During the audit period, as part of the total quality assurance initiative, specific audits were also undertaken, including audits of perioperative, postoperative and postdischarge complications, e.g. postoperative pain, postoperative nausea and vomiting, postoperative bleeding and oxygen desaturation in the recovery area. These and the audit of anaesthesia-related outcome are described elsewhere. The use and wastage of propofol was also audited by recording, for each list, the amount of the drug actually administered to patients and the amount of the drug discarded at the end of each operating session.

The methods used to collect and process data evolved throughout the course of the audits presented as part of the whole quality assurance package. Figure 1 illustrates one of our original forms. Initially all data was collected 'long-hand' on forms written using a Macintosh computer. The burden of data collection fell on the nursing staff. Without their generous help and dedication such audits are doomed to failure associated with incomplete and inaccurate data. A senior nurse in each area of

their clinical practice (e.g. screening, preoperative preparation, theatre, recovery phase 1 and recovery phase 2) was designated the responsibility of ensuring that data in that patient area was correctly and accurately collected. We were then able to crosscheck the accuracy of our data with theatre logs and statistics which are routinely collected in our unit. Data entry was initially undertaken by hand into Filemaker Pro 2 software, however such methods of data entry were laborious and proved a source of error.

The general practitioner satisfaction audit was the first to utilize the Formic system of computer generated, laser printed data collection forms, optical mark reading and direct data base entry. This questionnaire, in Formic form, was sent to all 300 general practitioners who use the Addenbrooke's Day Surgery Unit and they were requested to return the completed forms within a period of 2 weeks using the hospital postal system. The Formic system was subsequently used exclusively for all data collection. An example of one of the Formic data collection forms is shown in Figure 2.

At the end of each working day forms for each patient were passed through an optical mark reader and loaded directly into our database. Data analysis was performed using D base 4 software. Once read, all forms were then returned to the patient notes to provide a written record of what had taken place.

Results

The first phase of our quality assurance initiative ran for a period of 1 month and this was equivalent to 80 clinical sessions. During this time 493 patients underwent day surgery in the Addenbrooke's Unit, 14% of these patients were aged <13 yr and 3% >65 yr. The unit performs day surgery in eight surgical specialities, including general surgery, paediatric surgery, ENT, plastics, maxillofacial, orthopaedics, urology and gynaecology. The percentage of the unit's workload provided by each surgical speciality is shown in Table 4, and the percentage of day cases performed by every hospital speciality in the DSU is shown in Table 5. These figures cover the period April 1992 to March 1993.

The results of the quality assurance initiative looking at some of the process measures involved in the working of the DSU are shown in Tables 6 and 7. The tables outline criteria, standards, and outcome measurements. The results specifically looking at outcome in terms of patient satisfaction are shown in Tables 8 and 9. The results with reference to outcome in terms of general practitioner satisfaction are shown in Table 10. The detailed results of the GP satisfaction audit are shown in Figure 3.

Discussion

Data collection

In any quality assurance initiative in a busy clinical area such as day surgery, it is at the point of data collection

DSU OPERATIONAL AUDIT 1993

THEATRE LIST DETAILS

Date :

	AM		PM	
	Theatre A	Theatre B	Theatre A	Theatre B
Name of Consultant				
Number of Cases BOOKED				
Number of Cases PERFORMED				
Number of Cases CANCELLED P/A/S*				
Number of Patients NOT ATTENDING				
Pts ready 20 mins pre op (Y / N)				
Surgeon present 20 mins pre op (Y / N)				
Anaes present 20 mins pre op (Y / N)				
Grade of Anaes				
Grade of Surgeon				
Time of op session start				
Time of op session finish				
Time last G.A. started				
No. of medical students in theatre Junior staff				

* Specify Anaesthetist / patient / Surgeon

Figure 1. Form showing DSU theatre list details 1993.

where most problems arise. It therefore follows that if the data collection is poor then the audit results are rendered useless and will be open to sample bias⁶. Lillywhite has shown that data collection is often inaccurate and incomplete⁷. While we were able to maintain high standards for the completeness and accuracy of data recorded in our unit, this required considerable motivation and time. The data from both patient and general practitioner audits were less complete, and checking accuracy at source was impossible.

Form generation using computers is a simple task and reduces the problems of database design, however, the correct design of 'long-hand' forms to encourage accurate and complete data collection is a skilful procedure,

and the future will simply transfer these problems to hand-held computers or static screens. The difficulties of form design are, to some extent, insignificant in comparison with deciding what to collect and how to collect it. Furthermore, the audits described here encompass well over 100 000 discrete items of information and the size of the project constitutes considerable data entry and analysis problems.

Designing data collection forms in the Formic system was also fraught with problems, the most important of which was that it was all too easy to produce a form which was 'user-unfriendly'. The Formic system did speed up the process of data entry and analysis considerably, and will be utilized extensively in any further audits

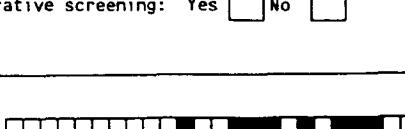
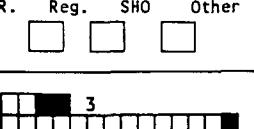
DAY SURGERY UNIT-			ADMISSIONS									
Q.1 Date:	Jan Apr Jul Oct	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Feb May Aug Nov	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Mar Jun Sep Dec	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Q.13 Induction Agent: Propofol Thio Etom Inhalation None	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				
Q.2 Hospital No:												
Q.3 Age:	<= 13 yrs <input type="checkbox"/>		>13-<65 yrs <input type="checkbox"/>		>=65 yrs <input type="checkbox"/>							
Q.4 Sex:	Male <input type="checkbox"/>	Female <input type="checkbox"/>										
Q.5 ASA:	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>								
Q.6 Consultant Surgeon:	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input type="checkbox"/>	10 <input type="checkbox"/>	1 <input type="checkbox"/>
Q.7 Grade of Surgeon Operating:	Consultant Senior Registrar Registrar SHO Other	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>										
Q.8 Operation Code:	0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/>	100 <input type="checkbox"/> 10 <input type="checkbox"/> 1 <input type="checkbox"/>										
Q.9 Duration (minutes)	0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/>	100 <input type="checkbox"/> 10 <input type="checkbox"/> 1 <input type="checkbox"/>										
Q.10 Grade of Anaesthetist	Consultant Sen Registrar Registrar SHO Other	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>										
Q.11 Type of anaesthetic:	LA <input type="checkbox"/> GA <input type="checkbox"/>								Surgeon <input type="checkbox"/> Anaes <input type="checkbox"/>			
Q.12 Pre-operative screening:	Yes <input type="checkbox"/> No <input type="checkbox"/>								Q.22 Grade Cons. <input type="checkbox"/> Sen R. <input type="checkbox"/> Reg. <input type="checkbox"/> SHO <input type="checkbox"/> Other <input type="checkbox"/>			
serial survey	 10076										Box page  3 1	

Figure 2. Formic data collection form.

Table 4. Workload of the Addenbrooke's Day Surgery Unit by surgical speciality 1993-4

<i>Surgical speciality</i>	<i>% DSU's total workload</i>
General surgery	12
Urology*	10
Orthopaedics	14
Plastic surgery	8
Maxillofacial	14
Gynaecology	34
ENT	8

*Includes paediatric surgery.

to 'close the loop'. The system is, of course, not without its problems, but at the present time what faults it does have are outweighed by its advantages in terms of rapid and accurate data entry and analysis.

The evolution of the data collection system using Formic was long but has enabled us to develop a system which is easy to use and covers all aspects of day surgery. Such a system may be outstripped in the future by hospital-based computerized data collection and accessing systems, but such systems often have inadequately developed day surgery software, despite the obvious need for accurate information concerning an area of clinical practice which will include so much elective surgery. The data collection system we now operate will at the very least prove useful in enabling us to modify the day surgery software of any hospital computer system which is acquired on our behalf, as we believe we have now defined and identified the key areas for audit.

Apart from easy and accurate data collection, it was considered imperative that whatever system was developed should impose no extra workload on the nursing and medical staff. Initially this was impossible but as the acceptability and accuracy of the system improved it was then possible to dispense with our more traditional and more labour intensive methods of audit and data collection, thus reducing staff workload. Report generation and analysis were also uncomplicated and inaccuracy in data entry was reduced. The ability to provide rapid feedback to nursing staff greatly increased the enthusiasm and accuracy of data collection. Indeed audit with accurate results is a powerful educational tool.

The initial pilot study and the staff satisfaction audit proved useful in focusing attention on various aspects of the process of day surgery in our unit which may otherwise have been overlooked. The pilot study proved useful in helping, in addition, to eliminate the collection of data for which we would subsequently have no use.

Waiting time

Increasing the percentage of elective surgery undertaken on a day basis may have beneficial effects on waiting lists and the average time patients have to wait for surgery^{8,9}. In our own hospital the expansion of the DSU and the associated increase in the number of patients treated, initially saw a dramatic fall in both the number of

patients waiting for elective surgery and the average duration they waited. The effect of a recent spate of government reports^{1,5,8,9}, however, has seen increasing numbers of patients booked for day surgery. It is now apparent that waiting lists for day surgery are increasing as the demand exceeds the capacity of the existing day surgery facilities. Waiting time also seems to have the 'knock-on' effect of affecting the number of patients not attending on the day of surgery. It is interesting to note that 45.4% of patients who waited more than 6 months for their surgery, failed to attend on the day. Also of note is that 23.5% of the patients waiting for more than 1 yr were paediatric patients. This is probably a reflection on the number of paediatric surgeons available, rather than the day surgery facilities per se.

Duration of surgery

The percentage of operations lasting longer than 1 h (1.9%), was nearly double the target we set of 1%. Meridy 1982 has shown that the duration of surgery cannot be related to the incidence of adverse outcome following day surgery. Only one of the nine patients whose surgery lasted longer than 1 h was admitted, and this was because of pain due to the unanticipated extent of the surgery rather than the effect of prolonged anaesthesia. Only one patient in this group was associated with any complication, and in fact the surgical complication (the failure of an orthopaedic drill) precipitated the excessive duration of surgery rather than vice versa.

Number of patients cancelled on the day of surgery

The 2.5% of patients cancelled on the day of surgery far exceeded the target we had set of 1%. These cancellations were made in equal proportions by surgeon and anaesthetist. While we accept that there will inevitably be those patients who develop colds on the day of surgery, or who no longer require surgery, this cancellation rate must represent either poor preoperative screening or deviation from the operational policy for patient selection. This had led us to increase the amount of data collected for each patient cancelled on the day of surgery, in order to differentiate the causative factors. It has also led us to implement an education policy for all users of our day surgical facilities.

Patients not attending on the day of surgery (DNA)

The 4.4% of patients who did not attend on the day of surgery exceeded the target we had set. The relationship between the DNA rate and the waiting time has already been alluded to. Patients booked for surgery at our unit come from a number of referring peripheral hospitals. We were interested to see whether the place of booking made any difference to the DNA rate, as patients booked at Addenbrooke's itself are required to visit the unit and complete a preoperative screening questionnaire, whereas those patients booked at peripheral hospitals are simply given a date on which to attend the DSU for the

Table 5. Percentage of day cases performed in the DSU for each speciality 1993-4

Speciality	No. of day cases performed in DSU	No. of day cases performed at other sites	Total no. of day cases performed	% of total day cases performed in DSU
General surgery	192	255	447	43
Urology	435	41	476	91
ENT	455	151	606	75
Maxillofacial	677	4	681	99
Plastics	192	379	571	33
Orthopaedics	619	36	655	95
Obs & Gynaecology	1754	47	1801	97
Ophthalmology	0	340	340	0
Neurosurgery	0	44	44	0
Neurology	0	16	16	0
Gen medicine	0	23	23	0
Nephrology	0	14	14	0
Cardiology	0	18	18	0
Rehabilitation	0	218	218	0
Rheumatology	0	34	34	0
Thorac medicine	0	34	34	0
Paed general	0	111	111	0
Paed oncology	0	190	190	0
Haematology	0	660	660	0
Clin oncology	0	1287	1287	0
Total without endoscopy	4326	3902	8228	53
Endoscopy	0	1819	1819	0
Total	4326	5721	10 047	43

Table 6. Audit of process in day surgery – timings and cancellations

Criteria	Standard set	Outcome
Number of cases cancelled should be small	Less than 1% of cases booked should be cancelled	2.5% of booked cases were cancelled
Number of patients not attending should be small	Less than 1% of cases booked should not attend	4.4% of booked did not attend
Patients should be ready to be seen before the lists start	95% of patients should be ready to be seen 20 min before the lists start	97.5% of patients were ready to be seen 20 min before the lists started
Surgeons should not be late	95% of surgeons should be present in the DSU 20 min before list start time	61.2% of surgeons were present 20 min before list start time
Anaesthetists should not be late	95% of anaesthetists should be present in the DSU 20 min before list start time	87.5% of anaesthetists were present 20 min before list start time
Senior anaesthetists should work in the DSU	90% should be consultants or senior registrars	83% were consultants or senior registrars
Senior surgeons should work in the DSU	90% should be consultants or senior registrars	91% were consultants or senior registrars
Lists should start on time	95% should start within 5 min of official start time	59% started at least 5 min after the official start time
Lists should finish on time	95% should finish within 5 min of the official finish time	59% finished at least 5 min after the official finish time
The start of GA should not be near to the official finish time of the list	100% of GAs should be started more than (or equal to) 15 min before the official finish time of the list	42.5% of GAs were started less than 15 min before the official finish time of the list
Numbers of junior staff being taught in theatre should be small	100% of lists should not have more than one junior member of staff in theatre	100% of lists had not more than one member of junior staff in theatre
Numbers of medical students being taught in theatre should be small	100% of lists should not have more than one medical student in theatre	6.3% of lists had more than one medical student in theatre

GA, General anaesthesia.

surgery itself. Place of booking made very little difference; a finding which rather surprised us as we had anticipated that the visit to the unit before the day of

surgery would reinforce the need to attend and result in a lower DNA rate. It is possible that the larger number of patients booked centrally were waiting longer than their

Table 7. Audit of process in day surgery – propofol wastage and discharge criteria

<i>Criteria</i>	<i>Standard set</i>	<i>Outcome</i>
Propofol wastage should be minimal	Less than 10% of the propofol drawn up should be wasted	12.9% of the propofol drawn up was wasted
DSU patients should be accompanied home	100% of DSU patients should be accompanied home	1.9% of DSU patients were NOT accompanied home
DSU patients should be fit for discharge when discharged	100% of patients should have stable vital signs on discharge	100% of patients did have stable vital signs when discharged
DSU patients should be fit for discharge when discharged	100% of patients should be alert and orientated when discharged	100% of patients were alert and orientated when discharged
DSU patients should be fit for discharge when discharged	95% of patients should be tolerating oral fluids when discharged	99.7% of patients were tolerating oral fluids when discharged
DSU patients should be fit for discharge when discharged	100% of patients should be able to sit unaided when discharged	100% of patients were able to sit unaided when discharged
DSU patients should be fit for discharge when discharged	100% of patients should be steady on their feet when discharged	99.7% of patients were steady on their feet when discharged
DSU patients should be fit for discharge when discharged	90% of patients should be able to void urine when discharged	44.9% of patients were able to void urine when discharged
DSU patients should be fit for discharge when discharged	100% of patients should be given written instructions when discharged	95.7% of patients were given written instructions when discharged
Patients thought to require admission after day surgery should be seen by a doctor	100% of patients thought to require admission after day surgery should be seen by a doctor	100% of patients thought to require admission after day surgery were seen by a doctor

Table 8. Patient satisfaction audit

<i>Question</i>	<i>Standard set</i>	<i>Outcome</i>
Did you receive enough information about the DSU before you arrived?	95% should respond YES	95% responded YES @1
Do you think the DSU was easy to find?	95% should respond YES	97% responded YES @0
Were you greeted on arrival at the DSU?	100% should respond YES	95% responded YES @0.5
Did you find the pre-op nursing assessment useful	85% should respond YES	95% responded YES @1.5
On the day of your op was everything adequately explained to you?	100% should respond YES	98.5% responded YES @0.5
Did you see the surgeon pre-op?	100% should respond YES	94% responded YES @0.5
Was this useful?	90% should respond YES	91% responded YES @0.5
Did you see the anaesthetist pre-op?	100% should respond YES	94% responded YES @2.5
Was this useful?	90% should respond YES	96% responded YES @2.5
Did you feel that you had enough privacy when changing?	95% should respond YES	96.5% responded YES @2
Was there too much waiting around?	90% should respond NO	69% responded NO @1.5
Was your pain treated to your satisfaction?	100% should respond YES	71% responded YES @26
Did you experience more pain than you expected?	75% should respond NO	75.5% responded NO @8.5
Did you feel sick after your operation?	95% should respond NO	83% responded NO @4
Were you sick after your operation?	99% should respond NO	95.5% responded NO @1.5

@ = % of non-respondents or N/A.

peripherally booked counterparts, and that this concealed the higher DNA rate of peripherally booked, and so unscreened (until the day of surgery) patients. Our data, however, did not confirm this theory.

The grade of medical staff working in the day surgery unit

We believe that quality day surgical care should be provided by senior anaesthetic and surgical personnel. We appreciate that this raises issues with regard to the training of junior staff but feel that while such training is extremely important, unsupervised juniors should not be working in the day surgical environment, and that training lists, with a suitably reduced workload to take into

account the slower patient turnover rate, should be considered. Inappropriate techniques practised in the day unit will have an adverse effect on both morbidity and admission rate. However, all too often, service commitments force training requirements to take second priority. As education is so important for the continued provision of quality day surgical care, we urge that this trend is resisted.

Late starting and finishing of lists

The percentage of lists starting and finishing on time fell far short of our target of 95% within 5 min of the official start/finish time. All start/finish times are clearly set out in the unit's operational policy and are sent to all day

Table 9. Patient satisfaction audit

<i>Question</i>	<i>Standard set</i>	<i>Outcome</i>
Were you given enough information prior to discharge?	100% should respond YES	88% responded YES @11.5
Would you recommend the DSU to a friend having an operation?	95% should respond YES	97% responded YES @1.5
Knowing what you now know, would you still have had your op as a day case?	95% should respond YES	97% responded YES @2.5
Would you have preferred to have been kept in hospital overnight post-op?	95% should respond NO	96% responded NO @1.5
Did you think the DSU was efficiently run?	95% should respond YES	98.5% responded YES @1
Did you find the environment cheerful and friendly?	95% should respond YES	99% responded YES @0
Was the DSU a comfortable temperature?	75% should respond that temp was 'just right'	86.5% responded that temp was 'just right' @1.5
What was your overall impression of the DSU?	90% should respond 'good/excellent'	87.5% responded 'good/excellent' @12.5
What was your overall impression of the surgeon?	90% should respond 'good/excellent'	97% responded 'good/excellent' @3
What was your overall impression of the anaesthetist?	90% should respond 'good/excellent'	86.7% responded 'good/excellent' @13.3
What was your overall impression of the nurses?	90% should respond 'good/excellent'	98% responded 'good/excellent' @2
What was your overall impression of the reception staff?	90% should respond 'good/excellent'	97% responded 'good/excellent' @2

@ = % of non-respondents or N/A.

Table 10. General practitioner satisfaction audit

<i>Criteria</i>	<i>Standard set</i>	<i>Outcome</i>
GPs should be aware of the existence of the DSU	More than 75% of GPs should know the DSU exists	90.8% of GPs know of the existence of the DSU
GPs should know day surgery is cheaper than inpatient treatment	More than 95% of GPs should know day surgery is cheaper than inpatient treatment	82.2% of GPs knew day surgery offers a cheaper service than inpatient treatment @0.5
GPs should be satisfied with the service the DSU provides	More than 75% should be satisfied with the service the DSU provides	68.1% of GPs were satisfied with the service the DSU provides @25.4
Patients discharged from the DSU should not increase the workload of GPs	Less than 20% of GPs should feel their workload is increased by patients discharged from DSU	49.7% of GPs felt their workload was increased by patients discharged from DSU @28.2
GPs should receive discharge summaries quickly	100% of GPs should receive discharge summaries within 1 week	27.6% of GPs receive discharge summaries within 1 week @55.7
GPs should find DSU discharge summaries useful	75% of GPs should find DSU discharge summaries useful	72% of GPs find DSU discharge summaries useful @24.9
GPs should be aware what types of operation can be performed in the DSU	75% of GPs should be aware what types of operation can be performed in the DSU	61.6% of GPs were aware what types of operation can be performed in the DSU @2.7
GPs should be aware what patient selection criteria are used in the DSU	75% of GPs should feel they know DSU patient selection criteria	31.9% of GPs feel they know DSU patient selection criteria @2.2
GPs should be able to undertake preliminary DSU patient screening	50% of GPs should feel able to undertake preliminary DSU patient screening	51.4% of GPs felt able to undertake preliminary DSU patient screening @25.9

@ = % who replied 'don't know' or who did not answer.

surgery users. Some will argue that a 5 min 'period of grace' is very optimistic but we felt that as the overrunning of operating lists was the most commonly cited cause of discontent amongst the day surgery staff, and the late opening and thus staffing of the unit has significant cost implications, this point was one on which there was little margin for laxity. Further analysis of the database revealed that, not surprisingly, 65.9% of lists which started late, also finished late. The argument sometimes

put forward as an excuse for late arrival in the day surgery unit, that the list could still be finished on time, appears erroneous. The patient satisfaction audit revealed that 29.5% of patients felt that there was too much waiting around before surgery, and the late arrival of medical staff to start operating lists is thus even more inexcusable.

A recommendation regarding the cancellation of patients on the end of lists likely to overrun was made. In

185 out of 300 questionnaires returned. Response Rate = **61.7%**

1. Have you heard of the Day Surgery Unit at Addenbrooke's NHS Trust?
yes (168) **90.8%** no (16) **8.7%** no reply (1) **0.5%**
2. Are you aware that for any operation that can be performed on a day case basis in the Day Surgery Unit, the cost of that operation is between 40% and 60% cheaper than performing the same procedure in the hospitals' main theatre?
yes (152) **82.2%** no (32) **17.3%** no reply (1) **0.5%**
3. Are you happy with the service your patients receive from this unit?
yes (126) **68.1%** no (2) **1%** don't know (47) **25.4%** no reply (10) **5.4%**
4. Do patients discharged following a day case operation increase your workload in terms of surgery consultations or home visits?
yes (92) **49.7%** no (41) **22.2%** don't know (48) **26%** no reply (4) **2.2%**
5. Of the (92) **49.7%** who replied Yes, patients were seen because of:

PAIN	yes (80) 87%	no (12) 13%
NAUSEA/VOMITING	yes (35) 38%	no (56) 61%
BLEEDING	yes (45) 49%	no (47) 51%
OTHER	yes (66) 71%	no (27) 29%
6. Do you receive day-patient discharge summaries within one week of the patient's operation?
yes (51) **27.6%** no (31) **16.8%** don't know (90) **53%** no reply (5) **2.7%**
7. Do you find such summaries useful?
yes (134) **72%** no (5) **2.7%** don't know (35) **19%** no reply (11) **5.9%**
8. Does your surgery have a Fax machine?
yes (147) **79.5%** no (37) **20%** no reply (1) **0.5%**
9. Do you think we could improve the service that we provide if we were to fax discharge summaries to you?
yes (137) **74%** no (22) **11.9%** not applicable (23) **12.4%** no reply (3) **1.6%**
10. Do you feel you know what kind of operations can be performed as a day case?
yes (114) **61.6%** no (66) **35.7%** no reply (5) **2.7%**
11. Are you aware of the criteria used to select patients suitable for day surgery?
yes (59) **31.9%** no (122) **66%** no reply (4) **2.2%**
12. Do you consider you could effectively screen patients for day surgery at their initial consultation with you?
yes (95) **51.4%** no (42) **22.7%** don't know (46) **24.9%** no reply (2) **1%**
13. Would you be interested in coming to an open day/evening at the Day Surgery Unit?
yes (128) **69.2%** no (54) **29.2%** no reply (1) **0.5%**

Figure 3. GP satisfaction audit.

the short term it is the patients who suffer from such stringent measures, however in the longer term, we considered that this would bring about the desired change. We also believe that it is important to demonstrate to DSU staff that essential action will be taken on the results of the quality assurance data collected by their colleagues.

Propofol wastage

The percentage of propofol drawn up and wasted in our unit amounted to 12.9%. This exceeded the target we had set of 10%. Whilst we appreciated from the start that there will inevitably be some drug wastage, this percentage waste amounts to over £3000 sterling per annum. Hospital pharmacy budgets all over the UK are often overspent and propofol is high on the list of drugs on which most money is spent. The audit of such wastage is

the beginning of a detailed cost benefit analysis of anaesthetic and surgical techniques we hope to complete.

Total intravenous anaesthesia, using propofol and alfentanil, is widely used by the authors in their day surgery practice. We utilize this technique of anaesthesia because we believe that it has many advantages which are particularly required in the day surgery setting. The cost of this technique is often cited as an argument for the use of more traditional methods of anaesthesia, although more recently it has become appreciated that the acquisition cost of the drug represents but a small proportion of the total cost of day case anaesthesia, which in turn represents approx. 6–10% of the total cost of a day surgery procedure¹⁰. Wetchler has rightly urged those who wish to argue from the point of view of cost to consider all costs, and not just the acquisition cost of the drug or volatile agent¹¹. If we are therefore to produce a realistic cost benefit analysis of various anaesthetic tech-

niques, we should take into account not only the amount of propofol that the patient actually receives as part of their anaesthetic, but also the amount that, by necessity, will be wasted. An awareness of the amount of this drug wasted, principally as a result of opening the larger containers of propofol near the end of lists, has in itself been sufficient to reduce the amount wasted substantially.

In future we intend to incorporate into our data collection system the facility to cost all day case procedures. At present we have to be content with simply monitoring the cost of the surgical items and anaesthetic agents we utilize. Information on the cost-benefit ratio of day surgery anaesthesia is scarce, but will become of fundamental importance in the very near future.

Discharge criteria

In our practice senior nursing staff take the responsibility of discharging patients from the unit. This is done on the basis that each patient has met certain criteria which we have found indicate suitability for discharge. The quality assurance initiative indicated to us that the criteria we have adopted required review. The ability to void urine should not be a prerequisite for discharge fitness in the majority of patients. It would be illogical to keep all patients who have undergone short operations for lengthy periods in phase 2 recovery just so that their ability to void urine is demonstrated. It is accepted, however, that in certain surgical procedures, e.g. circumcision, or in situations where caudal anaesthesia has been used, the ability to void urine prior to discharge should be retained as a necessary criterion for that patient's discharge. The concept of operation and anaesthetic-specific discharge criteria may well be more appropriate.

We were concerned to find that not all patients were given written instructions prior to discharge. We believe that due to the effects of even very brief general anaesthesia on memory for new information this is an extremely important indicator of quality day care¹², and one which we will be interested in carefully reauditing. The importance of providing written patient information is reinforced by the fact that we also failed to meet the target that all our patients should perceive that they had been given enough information prior to discharge.

Patient satisfaction

The design of questionnaires in order to gauge patient satisfaction with day surgery services is a difficult task^{13,14}. In view, however, of the increased consumerism which is becoming more evident in healthcare, we felt that some measure of patient satisfaction should be incorporated into any quality assurance initiative. The questionnaire that we devised asked for both global and specific measures of satisfaction, and also invited comments on those aspects of patient service that we ourselves had omitted to enquire about. Overall, we recorded that most of our patients were satisfied with the service they had received, but that is not to say that there were no areas for improvement. The accurate interpre-

tation of this section of our quality assurance initiative was devalued however by the lack of complete data that is to be expected in such an undertaking⁶.

The subject of patient information has already been discussed. Although the questionnaire revealed that our targeted percentage of patients felt that they did receive sufficient information before arrival in the day unit, we failed to meet the requisite standard with respect to the percentage of patients who felt that, on the day of their operation, everything had been adequately explained to them. This, and the provision of pre-discharge information are two areas where the need for urgent improvement has been highlighted.

At Cambridge, the majority of patient assessments are performed by the nursing staff. These assessments are usually performed prior to the day of surgery in order to facilitate the correction of any patient problems, and minimize the cancellation of patients on the day scheduled for their operation. We were interested to ascertain whether both surgeon and anaesthetist meeting each patient, served any useful purpose on the day of surgery itself, a process which has the potential to cause considerable delay in busy operating sessions. It was useful to find that patients valued such preoperative meetings and therefore their contribution to patient satisfaction, and patient safety, justifies the continuation of this practice.

Only 86.7% of patients rated their anaesthetist as 'good/excellent' which fell short of our target response of 90%. However, 13.3% of patients failed to respond to this question and 21% of patients underwent surgery with local or regional anaesthesia. Patients' assessment of surgeons, however, was 'good/excellent' in 97% of responses.

General practitioner satisfaction

The purpose of this project was to ascertain the level of awareness amongst local general practitioners of the existence of the DSU and the services provided. An attempt was also made to discover if day surgery increased the GP's workload, if GPs were satisfied with the service they received, and how GPs regarded the 'fast-tracking' day case patients. The interpretation of results was hampered by incomplete response.

Jackson et al.¹⁵ have highlighted the concern amongst GPs that increased day surgery will confer an additional workload on general practitioners. Our results tend to confirm this; while nearly a third of GPs replied 'don't know' or failed to answer this question, nearly half felt their workload was increased by patients discharged from our unit. Inadequate analgesia post-discharge was the main reason (87%) for this increased workload burden, although nausea and vomiting (38%) and bleeding (49%) both attracted high positive responses. We were unable to confirm whether or not post-discharge infection caused a significant problem, as we had only asked for responses to the category 'other', but 71% of GPs answered that they saw patients for such reasons.

The general practitioners audited seemed to feel that

we could improve the level of communication between the DSU and the community by more rapid delivery of discharge data to the GP. Seventy-four per cent indicated that faxed discharge summaries would improve the service, and this is an issue we intend to explore, within the limits of confidentiality.

While the majority of GPs were unaware of the criteria used to select patients for day surgery, 61.6% felt that they knew what types of operation were suitable to be performed on a day case basis, and 51.4% felt that they could effectively screen patients for day surgery. Of great interest to us was the fact that 69.2% of GPs were interested in attending the DSU for the purpose of education in such matters as patient selection and developments in the types of surgery to be performed on a day case basis in the future. The implementation of measures for a series of such meetings is planned.

Conclusions

In this quality assurance initiative we have demonstrated that it is possible to collect the vast majority of data needed to maintain a high standard of day surgical practice in a busy day unit. The introduction of such a data collection system has resulted in less, rather than more work for the nursing staff, on whom the burden will inevitably fall, and has highlighted a number of areas where our expectations have exceeded the level of quality we have been able to provide. In some instances this heightened awareness has in itself brought about change, whereas in others we intend to implement specific measures to improve the quality of care provided.

The indicators of quality, and the standards utilized in this initiative are dynamic and will continue to evolve as day surgical practice expands. It will be appreciated that while the perception of quality will differ, not only between countries and units, but also between provider and consumer¹⁶, it is of paramount importance that programmes for quality assurance are commenced in day surgical facilities so that a core of quality indicators and standards of practice may be devised. The expansion of day surgery is driven by many factors, not least of all economic considerations. Quality assurance initiatives will provide, not only an assessment of the quality of care now being provided, but also the means by which quality

can be maintained in the future, in the face of increased demands for greater throughput of cases of enhanced complexity. Finally, if professionals in DSUs are ignorant about their present performance, how may improvements for the future will be planned?

References

- 1 NHS Management Executive. Value for Money Unit. Report of the Day Surgery Task Force. London: HMSO, 1993
- 2 Twersky RS. How to assess quality in ambulatory surgery. *J Clin Anaesth* 1992; **4**: 25–32s
- 3 Donabedian A. *Explorations in quality assessment and monitoring* Vols 1–3. Ann Arbor, MI: Health and Administration Press, 1985
- 4 Patel RI, Hannallah RS. Anesthetic complications following pediatric ambulatory surgery: a 3-year study. *Anesthesiol* 1988; **69**: 1009–12
- 5 Guidelines for Day Case Surgery. Commission on the provision of Surgical Services, Royal College of Surgeons of England. London: HMSO, 1985
- 6 Duncan PG, Cohen MM, Tweed WA, Biehl D, Pope WDB, Merchant RN, DeBoer D. The Canadian four-centre study of anaesthetic outcomes: III. Are anaesthetic complications predictable in day surgical practice? *Can J Anaesth* 1992; **39**: 440–8
- 7 Lillywhite N, Ward P. Accuracy of a computer based anaesthetic audit system. *Anaesthesia* 1993; **48**: 885–6
- 8 Audit Commission. A short cut to better services. Day Surgery in England and Wales. London: HMSO, 1990
- 9 NHS Management Executive. Value for Money Unit. Day Surgery: Making it Happen. London: HMSO, 1991
- 10 Lethbridge JR, Walker JS. Cost of anaesthetic drugs and clinical budgeting. *Br Med J* 1986; **293**: 1587–8
- 11 Wetchler BV. Economic impact of anesthetic decision making: they pay the money, we make the choice. *J Clin Anaesth* 1992; **4**: 20–4s
- 12 Ogg TW, Fischer HBJ, Bethune DW, Collis JM. Day case anaesthesia and memory. *Anaesthesia* 1979; **34**: 784–9
- 13 Fitzpatrick R. Surveys of patient satisfaction. I. Important general considerations. *Br Med J* 1991; **302**: 887–9
- 14 Fitzpatrick R. Surveys of patient satisfaction. II. Designing a questionnaire and conducting a survey. *Br Med J* 1991; **302**: 1129–32
- 15 Jackson IJB, Blackburn A, Tams J, Thirlway M. Expansion of day surgery; a survey of general practitioners views. *J One Day Surg* 1993; Spring: 4–7
- 16 Orkin F. What do patients really want? Preferences for immediate postoperative recovery. *Anesth Analg* 1992; **74**: S225