

Improving the quality and speed of access to operation notes

ABSTRACT

Introduction: Operation notes are often poorly completed, potentially compromising patient care. This project was undertaken to improve the quantity, quality and clarity of information included in operation notes, and make them easier to locate within a set of patient notes.

Methods: Operation notes were audited against standards laid out in national guidelines. The time taken for staff to locate an operation note, and information within it, was then measured. The layout was re-designed, followed by a re-audit.

Results: The number of operation notes with all measured domains completed rose from 4% to 34% ($P < 0.001$). The mean time to locate the operation note fell from 30 to 4 seconds, and the mean time to locate all requested pieces of information within the operation note fell from 35 to 20 seconds.

Conclusions: The interventions have improved quality and speed of access of operation notes, but there is still room for improvement.

Method

The three aims were tackled separately, at a single large district general hospital. The Royal College of Surgeons of England's (2014) *Good Surgical Practice* clearly states 19 separate pieces of information which should be included in each operation note (Table 1), and this was used as an audit standard for information included in operation notes. An initial audit of the notes of 50 consecutive patients undergoing general surgical (upper gastrointestinal, colorectal, urology and breast) procedures from January–February 2016 was undertaken, measuring the compliance of each operation note against

The Royal College of Surgeons of England's (2014) *Good Surgical Practice* states: 'Surgeons must ensure that accurate, comprehensive, legible and contemporaneous records are maintained of all their interactions with patients'. One of the most important of these records is the operation note, which if completed correctly should provide an accurate record of events during the operation, and clear instructions for the wider surgical team to follow in the postoperative period.

Unfortunately, operation notes are often not completed to a satisfactory standard,

meaning that safe patient care can be jeopardized. Furthermore, operation notes can be difficult to locate among what is usually a thick stack of paper notes containing details of other aspects of the patient's hospital stay; this can mean at best that the health-care professional trying to find details of the operation or postoperative plan wastes time looking for it that could be better used performing clinical activities, and at worst means that precious time or crucial information is lost when responding to a postoperative emergency.

Previous studies at departmental, trust and regional levels (Singh et al, 2012; Whitehead-Clarke et al, 2015; Severn Audit and Research Collaborative in Orthopaedics and Blackburn, 2016; Parwaiz et al, 2017) have confirmed that the standard of operation notes is often poor, and varies markedly between areas. However, these studies have also shown that relatively minor changes can lead to dramatic improvements in practice.

The aims of this quality improvement project within the authors' hospital were threefold:

1. To improve the quantity and quality of information included in operation notes
2. To make the operation notes easier to locate within a set of patient notes
3. To make it easier to locate information within the operation note.

Table 1. Standards for operation notes as laid out in *Good Surgical Practice*

Date
Time
Elective or emergency procedure
Name of operating surgeon and assistant
Name of theatre anaesthetist
Operative procedure
Incision
Operative diagnosis
Operative findings
Problems or complications
Extra procedures performed, and reason why
Tissue removed, added or altered
Prosthesis used (including serial number)
Closure technique
Anticipated blood loss
Antibiotic prophylaxis
Deep vein thrombosis prophylaxis
Postoperative care instructions
Signature
<i>From Royal College of Surgeons of England (2014)</i>

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- Operative Note	
Click to add header	
Date & Time of Procedure <<	===
Operating Team <<	Performed By: Surgeon=== / Assistant=== / OTHER Supervision: SUPERVISED BY === / OTHER Anaesthetist: Anaesthetist=== Responsible Other: Responsible Consultant===
Diagnosis <<	Include Diagnosis / OTHER
Indication	Indication
Actual Procedure	Actual Procedure
Laterality <<	Right / Left / Bilateral / N/A
Diagram	
Type of Surgery <<	Elective / Emergency
Position <<	Position: Supine / Prone / Left Tilt / Right Tilt / Lithotomy / OTHER
Anaesthesia Type	Local Anaesthesia / General Anaesthesia / Spinal / Epidural / Block / Other
Antibiotic Prophylaxis <<	Yes / No
Sterile Preparation <<	Sterile Preparation: With alcohol / With chlorhexidine / With povidone iodine / With drapes to expose affected area / OTHER
Incision/Access	Incision
Findings	Findings
Operation Note	Operation Note
Closure	Closure
Tissue Removed? <<	None Histology: Histology=== Microbiology: Microbiology===
Prosthesis/Implants? <<	Yes / No / N/A
Confirmed Complications <<	No Complications Yes: Bleeding / Anaphylaxis / Death / Respiratory arrest / Allergic reaction / Cardiac arrest / Include Complication
DVT Prophylaxis <<	Early Mobilisation / Maintain Hydration / Other=== Mechanised Prophylaxis: TEDS / Foot Impulse Device / Other=== Chemical Prophylaxis: Dalteparin: Dose:===Units / OD / BD / Commencing:=== / Duration:===Days / Apixaban: Dose (mg):=== / Frequency:=== / Timing:=== / Duration:=== / Restart warfarin as per Trust protocol: Dalteparin cover until INR therapeutic
Post op Instructions	Instructions
Note Completed By <<	=== / Contact/Bleep No.===

Figure 1. Updated operation note, designed according to the Royal College of Surgeons of England (2014) standards, to be completed electronically.

17 of the set standards (details of ‘problems/ complications’ and ‘extra procedures performed’ were not included in the audit as it was deemed impossible to know whether

or not these had been excluded or simply had not happened).

The results of this were then shared at a departmental audit meeting and the operation

note was redesigned (*Figure 1*), with the aim of improving compliance with the Royal College of Surgeons of England standards. This involved removing redundant fields (which unnecessarily cluttered the printed operation note), auto-population of some fields (such as date, time, author), and the addition and expansion of others (such as antibiotic prophylaxis, blood loss and postoperative venous thromboembolism prophylaxis).

A re-audit of another 50 consecutive general surgical patients was undertaken in June 2017 following these changes, to determine whether the interventions had made a positive impact. Statistical analysis of any difference between the two cycles was undertaken, and a two-tailed Fisher’s exact test calculated using GraphPad QuickCalcs. A *P*-value of <0.05 was deemed to confer statistical significance.

The ease of locating an operation note within a set of patient notes was measured by the time taken for a health-care professional to find it. In November 2015 an initial group of 20 randomly selected clinical members of the surgical team (consultants, junior doctors, nurses, physiotherapists and health-care assistants) were each given the same five sets of patient notes picked randomly from a surgical ward, and asked to locate the operation note – with the time taken to do this recorded. They were also timed to locate five pieces of information within the operation note (date, operating surgeon, operative diagnosis, operative findings and postoperative instructions).

The results of this were then shared at a departmental audit meeting and the Trust’s ‘Safer Surgery’ meeting. The following interventions were introduced:

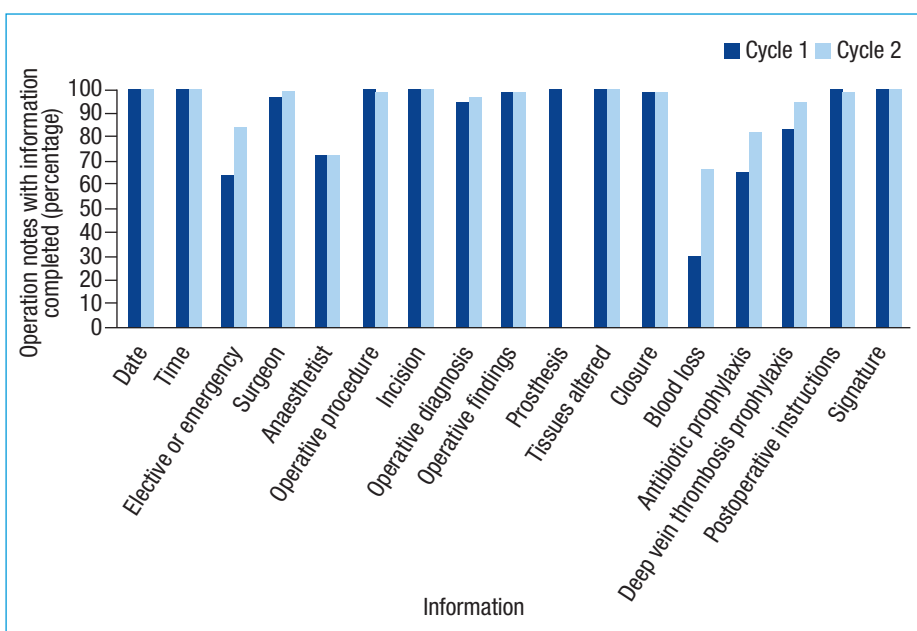
- All operation notes were printed on coloured paper (blue was chosen as this was thought to stand out, and was not in use for any other documents)
- Instructions were given to all theatre recovery and ward staff that the operation note was to be placed at the front of a patient’s set of notes
- The operation note was redesigned, as previously described.

A second study was then carried out in June 2017 using another selection of 20 clinical team members with a further randomly selected five sets of patient notes picked from the same surgical ward as before. The same two tasks were again timed to determine whether the interventions had made a positive impact.

Table 2. Compliance with the Royal College of Surgeons of England’s standards on operation notes audited in cycles 1 and 2

Field	Cycle 1			Cycle 2			P value*
	Yes	No	%	Yes	No	%	
Date	50	0	100%	50	0	100%	1
Time	50	0	100%	50	0	100%	1
Elective or emergency procedure	32	18	64%	42	8	84%	0.039
Name of operating surgeon and assistant	48	2	96%	49	1	98%	1
Name of theatre anaesthetist	36	14	72%	36	14	72%	1
Operative procedure	50	0	100%	49	1	98%	1
Incision	39	0	100%	36	0	100%	1
Operative diagnosis	47	3	94%	48	2	96%	1
Operative findings	49	1	98%	49	1	98%	1
Tissue removed, added or altered	42	0	100%	50	0	100%	1
Prosthesis used (including serial number)	1	0	100%	0	0	N/A	N/A
Closure technique	49	1	98%	49	1	98%	1
Anticipated blood loss	15	35	30%	33	17	66%	<0.001
Antibiotic prophylaxis	28	15	65%	38	9	81%	0.102
Deep vein thrombosis prophylaxis	37	8	82%	46	3	94%	0.110
Postoperative care instructions	50	0	100%	49	1	98%	1
Signature	50	0	100%	50	0	100%	1
Notes with all standards completed	2	48	4%	17	33	34%	<0.001

*Two-tailed Fisher’s exact test



Results

The initial audit of information recorded on operation notes revealed reasonable compliance with the majority of the Royal College of Surgeons of England standards, although there was room for improvement in several areas, in particular ‘elective or emergency procedure’ (64%), ‘anticipated blood loss’ (30%) and ‘antibiotic prophylaxis’ (65%) (Table 2).

Following the redesign of the operation note the re-audit showed that there had been an improvement in six of the 17 domains (Table 2, Figure 2). Of these, ‘elective or emergency procedure’ and ‘anticipated blood loss’ documentation were both statistically significant ($P=0.04$ and $P<0.01$ respectively). The number of operation notes with all 17 domains completed rose from 4% to 34% ($P<0.001$).

The initial timing study showed a mean time of 30seconds to locate the operation

Figure 2. Compliance with the Royal College of Surgeons of England (2014) standards on operation notes audited in cycles 1 and 2.

KEY POINTS

- Operation notes are often poorly completed, which can compromise patient care.
- The Royal College of Surgeons of England has produced clear guidelines stating what information should be included in an operation note.
- Operation notes are often difficult to find by clinicians among a larger set of inpatient hospital notes.
- Simple, low-cost interventions can dramatically improve the quality and ease of access of operation notes.

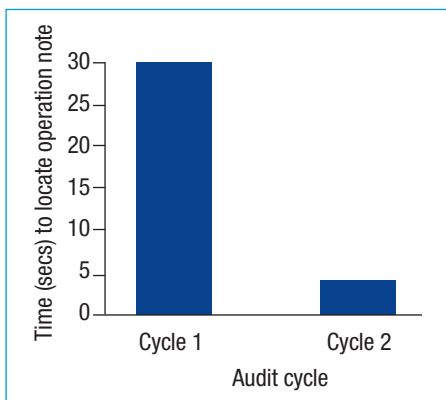


Figure 3. Improvement in time taken to locate operation note following study interventions.

note within a set of patient notes, and 35 seconds to locate the five pieces of information within the operation note. Following the interventions of printing on coloured paper and instructions to place the operation note at the front of the notes, the mean time to locate the operation note fell to 4 seconds (*Figure 3*), and redesign of the operation note led to the five pieces of information being found in a mean time of 20 seconds.

Discussion

The results of this study clearly demonstrate that simple interventions can drastically improve both the quality of and speed of access to operation notes. A marked and statistically significant increase in a number of individual domains, and in the total number of operation notes with all items completed has been shown. The ability to complete operation notes electronically helps with compliance (because of the ability to create specific fields for each of the Royal College of Surgeons of England domains,

with some of these able to auto-populate), and removes any previous problems of illegibility of hand-written notes.

However, there is room for further improvement – despite a significant increase, only 34% of operation notes had all domains completed. Possible means of further improving compliance would be to introduce a ‘pop-up’ alert before signing off the note if there were fields still not filled in, or indeed to go a step further and make the completion of each field on the electronic form compulsory, with the operation note not able to be signed off until all fields were completed.

There is also scope for improved integration with other documentation in theatres, allowing various pieces of information to already be present on the operation note when the surgeon comes to fill it in – this could include names of operating surgeons and anaesthetist, procedure performed, and details of implants used (all this information is already documented electronically on theatre databases interoperatively by theatre staff), and antibiotic administration and blood loss (usually documented by the anaesthetic team). Further discussion with theatre staff and the hospital IT team would be beneficial to assess the feasibility of this.

Before redesigning the operation note input was obtained from many members of the multidisciplinary team. The section on postoperative venous thromboembolism prophylaxis was thought to be particularly deficient. Many operation notes would not include any mention of venous thromboembolism prophylaxis, with others having very rudimentary instructions. The new operation note had input from the venous thromboembolism nurses and surgical lead for venous thromboembolism prophylaxis, and allowed detailed recording of instructions for postoperative venous thromboembolism prophylaxis. It allowed selection of ‘no prophylaxis’, ‘mechanical’ or ‘chemical prophylaxis’, and specific doses, times and durations could be selected.

Furthermore, the section on antibiotic prophylaxis allowed the operation note’s author to select the identity and dose of the antibiotics, and blood loss could be more easily quantified as it was split in to separate categories (0–500 ml, 500–1000 ml, 1000–2000 ml, >2000 ml). This was thought to be quite important as it allowed nurses and junior doctors looking after the patient

postoperatively to judge the need for early blood tests and transfusions.

The very basic change of coloured paper and location of the operation note at the front of the patient’s set of notes markedly decreased the time taken to locate it, which can have big time-saving implications both on clinicians’ day-to-day practice, and in emergencies. The redesign of the operation notes also helped to make it easier to locate information within the operation note. This was the result of the removal of fields which added little value to the reader (thereby decluttering the printed operation note), a more logical re-ordering of fields, and inclusion of more information within certain sections – particularly the postoperative instructions.

These changes have now been implemented on a trust-wide level across all surgical specialties. The interventions involved, and means of measuring changes in practice following them, were simple, low cost and easily reproducible. A further re-audit in 6 months’ time would be helpful to assess continued compliance with the changes introduced.

Conclusions

Simple interventions can lead to marked advances in the quality and speed of access of operation notes, but there is still room for further improvement. **BJHM**

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