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# The e-CRABEL score: an updated method for auditing medical records

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## ABSTRACT

In 2001 the CRABEL score was devised in order to obtain a numerical score of the standard of medical note keeping. With the advent of electronic discharge letters, many components of the CRABEL score are now redundant as computers automatically include some documentation.

The CRABEL score was modified to form the e-CRABEL score. "Patient details on discharge letter" and "Admission and discharge dates on discharge letter" were replaced with "Summary of investigations on discharge letter" and "Documentation of VTE prophylaxis on the drug chart". The new e-CRABEL score has been used as a monthly audit tool in a busy surgical unit to monitor long-term standards of medical note keeping, with interventions of presenting in the departmental audit meeting, and giving a teaching session to a group of junior doctors at two points.

Following discussion with stakeholders: junior doctors, consultants, and the audit department; it was decided that the e-CRABEL tool was sufficiently compact to be completed on a monthly basis. Critique and interventions included using photographic examples, case note selection and clarification of the e-CRABEL criteria in a teaching session.

Tools used for audit need to be updated in order to accurately represent what they measure, hence the modification of the CRABEL score to make the new e-CRABEL score. Preliminary acquisition and presentation of data using the e-CRABEL score has shown promise in improving the quality of medical record keeping. The tool is sufficiently compact as to conduct on a monthly basis, maintaining standards to a high level and also provides data on VTE documentation.

## PROBLEM

With the advent of electronic discharge letters, many components of the CRABEL score for auditing medical records have been made redundant as computers automatically include some documentation.

Assessment of and prophylaxis against venous thromboembolism risk (VTE) is now meant to be undertaken at the time of admission of all medical and surgical patients. Despite this, it is still something that is occasionally not done for hours or days after a patient has arrived on a ward.

A sufficiently compact and modern tool is required in order to investigate standards of record keeping regularly over a long term period.

Three foundation doctors and a surgical consultant set out to use a compact tool to monitor the quality of medical records of surgical patients to give a numerical score, and improve this score over the course of the six months across all six surgical subspecialties at a busy surgical unit at Basildon and Thurrock University Hospital.

## BACKGROUND

Medical records serve a multitude of purposes in supporting patient care, from an aide memoir for clinicians, through being a communication avenue between professionals, up to providing a source of information for research, resource allocation, service planning and performance monitoring. It is thus vital that high standards of note-keeping are implemented and maintained by all clinical staff. It has been recognised that one of the most effective ways to sustain excellence in note-keeping is through regular audit and review of practice,<sup>1</sup> and an objective, reproducible assessment tool is of great benefit in this.

In the 14 years since the original CRABEL score (CRawford, BEresford, Lafferty)<sup>2</sup> was devised as a measure of quality of note-keeping, the landscape into which it was introduced has been radically altered by the advent of the electronic discharge summary.

Electronic discharge summaries are often felt to be superior to handwritten summaries in a number of ways, not least in their speed of transmission to a patient's General Practitioner (GP) on discharge from hospital. However, a study has previously noted that omissions and errors are relatively more common in electronic discharges,<sup>3</sup> and the original CRABEL score includes several aspects that are now automatically completed for the discharging doctor. By adjusting the



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domains of the CRABEL score, the authors hope to create a more representative scoring system that serves to drive improvement in standards.

Assessment of and prophylaxis against venous thromboembolism risk (VTE) is now meant to be undertaken at the time of admission of all medical and surgical patients.<sup>4</sup> Despite this, it is still something that is occasionally not done for hours or days after a patient has arrived on a ward. This has potentially life-threatening ramifications for affected patients, as well as medico-legal consequences for the team.

“Patient details on discharge letter” and “Admission and discharge dates on discharge letter” were removed from the original CRABEL score, as these are automatically completed on the electronic discharge letter. “Summary of investigations on discharge letter” and “Documentation of VTE prophylaxis on the drug chart” were added to the proforma in order to make the e-CRABEL score more up to date of modern requirements.

The e-CRABEL score was calculated using a proforma (fig 1) with points being deducted for omissions. Two random case notes would be assessed per firm each

month; with a score of maximum 50 points each to total a maximum score of 100.

During monthly audit a number of strategies were implemented to augment e-CRABEL scores.

### BASELINE MEASUREMENT

The original CRABEL score was modified to form the e-CRABEL score (Figure 1). “Patient details on discharge letter” and “Admission and discharge dates on discharge letter” were replaced with “Summary of investigations on discharge letter” and “Documentation of VTE prophylaxis on the drug chart”. The scoring tool is used to assess an entire patient record, comprising the initial clerking, subsequent entries, electronic discharge letter, and VTE on drug chart. The modification in criteria making the new e-CRABEL score resulted in differences of scores of up to 8% between the CRABEL score and e-CRABEL score. Furthermore the addition of VTE documentation assessment would provide information on whether this was completed.

Baseline measurement was undertaken in April 2012 using the new e-CRABEL score and examined six

**Figure 1** e-CRABEL Proforma.

e-CRABEL Proforma	Case notes 1	Case notes 2
<b>Consultant</b>		
<b>Registrar</b>		
<b>Juniors</b>		
<b>Initial Clerking</b>	[10]	[10]
Patient Name	<input type="checkbox"/>	<input type="checkbox"/>
Hospital Number	<input type="checkbox"/>	<input type="checkbox"/>
Referral Source	<input type="checkbox"/>	<input type="checkbox"/>
Consultant	<input type="checkbox"/>	<input type="checkbox"/>
Date/Time	<input type="checkbox"/>	<input type="checkbox"/>
Diagnosis	<input type="checkbox"/>	<input type="checkbox"/>
Management Plan	<input type="checkbox"/>	<input type="checkbox"/>
Investigation Results	<input type="checkbox"/>	<input type="checkbox"/>
Clinician Signature	<input type="checkbox"/>	<input type="checkbox"/>
Clinician Name/Grade/Bleep	<input type="checkbox"/>	<input type="checkbox"/>
<b>VTE Prophylaxis</b>	[1]	[1]
VTE completed and signed in the drug chart	<input type="checkbox"/>	<input type="checkbox"/>
<b>Subsequent Entries</b>	[30]	[30]
Patient Name & Hospital Number	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Date and Time	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Heading	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Results	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Legibility	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Signature/Name/Grade/Bleep	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<b>Consent</b>	[5]	[5]
Patient Name	<input type="checkbox"/>	<input type="checkbox"/>
Hospital Number	<input type="checkbox"/>	<input type="checkbox"/>
Operation in Full	<input type="checkbox"/>	<input type="checkbox"/>
Risks/Complications	<input type="checkbox"/>	<input type="checkbox"/>
Signatures (Both)	<input type="checkbox"/>	<input type="checkbox"/>
<b>Electronic Discharge</b>	[4]	[4]
Final Diagnosis/Management	<input type="checkbox"/>	<input type="checkbox"/>
Investigations (Summarised)	<input type="checkbox"/>	<input type="checkbox"/>
Drug TTO's	<input type="checkbox"/>	<input type="checkbox"/>
Follow-up Arrangements	<input type="checkbox"/>	<input type="checkbox"/>
<b>Total Deductions</b>		
<b>Score /50</b>	[ ]/50=	[ ]/50=
<b>e-CRABEL Score</b>	[ ]/100	

randomly selected sets of notes from each surgical firm (total 24). 21% of the notes that were audited did not have VTE signed in the drug chart. Date and time omissions were present in 33%. Signature/printed name/grade/bleep were missing at least once in 75%. Headings were missing in 33%. Investigations were missing or not summarised in 42%. The average score across all firms was 84%.

## DESIGN

We recognised that in order for the e-CRABEL scores to improve, current results would have to be presented to the surgical departments, therefore the initial data of the e-CRABEL score was presented in the departmental Morbidity and Mortality meeting. Stakeholders present at this meeting included: junior doctors of all grades, consultants including the clinical lead, and the audit department leads.

The presentation of the baseline e-CRABEL measurements served to be the first intervention for improving standards of medical record keeping and subsequent measurements would be made using the same tool. The stakeholders agreed that the new e-CRABEL tool was sufficiently compact and informative to be a mandatory monthly audit assessment for each firm.

The firms were Vascular, Colorectal, Breast, and Urology. Junior doctors on respective firms audited two case notes per consultant totalling 12 sets of notes each month. Each pair of notes would be scored using the e-CRABEL score to give a total out of 100.

The authors set out to use a compact tool to monitor the quality of medical records of surgical patients to give a numerical score, and improve this score over the course of the six months across all six surgical subspecialties at a busy surgical unit at Basildon and Thurrock University Hospital.

## STRATEGY

### PDSA cycle 1:

Following a baseline average e-CRABEL score of 84% across firms (March), we aimed to improve e-CRABEL scores by raising awareness of the e-CRABEL score. This was done by presenting the baseline data in the departmental audit meeting to all doctors and encouraging thorough documentation practice. Following this, in the second month of audit (April), e-CRABEL scores were noticeably increased to an average of 89%. However, this time the stakeholders realised that the case notes section of the scoring system was favourable to case notes of patients with shorter admissions as they had fewer entries and therefore less scope for docking marks for mistakes. This was especially the case with case notes that had no operative records as there was no scope to lose marks in the consent form category. Further critique at month two was that the e-CRABEL score whilst being a numerical comparator, did not provide constructive critique for improvement.

### PDSA cycle 2:

An idea to remedy the critique from PDSA cycle 1 was to include examples where marks were docked by taking an anonymised photograph of the deficiency and including this in the presentation of data. For instance, if there was a case entry that had no bleep next to the signature this entry would be photographed, anonymised, and included in the next audit presentation. Additionally, junior doctors on each surgical firm selected two sets of notes randomly from patients who had acute admissions with operations. The reason for this case note selection was in order to avoid case notes with shorter admission times or lack of operative records that may give an artificially more favourable score. e-CRABEL scores over the subsequent three months (May, June, July) remained static at 88-89%. This was felt that a combination of case note selection and seeing concrete examples cancelled out to give a stable score. Advice given at this stage by stakeholders was to give a teaching session on the e-CRABEL score and optimum medical documentation - which coincided with the changeover of junior doctors in August.

### PDSA cycle 3:

Between July and August a teaching session was given to the new group of junior doctors in order to inform them of the monthly audit, and having a Q&A session. Each aspect of the e-CRABEL score was explained in detail:

#### Initial Clerking

Regardless of whether it is entered into a proforma, or entered in free text, the initial clerking should include: the patient's name, hospital number, their referral source, and the admitting consultant. This record should be dated and timed, along with a provisional diagnosis, appropriate management plan, and all available investigation results. The admitting clinician should sign the record, legibly print their name, designation, and provide a contact number/bleep.

#### VTE Prophylaxis

One point is allocated for completion of VTE documentation on the drug chart. Specifically, the risk assessment on admission as well as the prescription should be complete in order to receive the point.

#### Subsequent Entries

This section allows for a maximum of five points to be lost in each domain. Each entry subsequent to the patient's initial clerking proforma must: have the patient's name and hospital number at the top of the page, be headed with the decision-making clinician's name, and the date and time at which the entry is being made. Any relevant results that have become available since the last entry should be clearly included. The whole entry should be legible in its entirety, and should be signed by the recording clinician, as well as their

name being legibly printed, their grade stated, and their contact or bleep number provided.

### Consent

The patient's name and hospital number, a full description of the procedure to be performed, along with the potential risks or complications, and the signatures of both the consenting clinician and patient must be charted and included in the operative section of the main case note binder.

### Electronic Discharge

In addition to the pre-filled patient metrics, the electronic discharge should contain at least: a final diagnosis or management plan, a concise summary of the most relevant investigations performed whilst an inpatient, a fully completed record of medications administered on discharge, and a complete summary of follow-up arrangements for the patient.

### Selection of case notes

Two sets of notes were randomly selected from acute admission patients who had operations, giving each consultant's team a score out of 100.

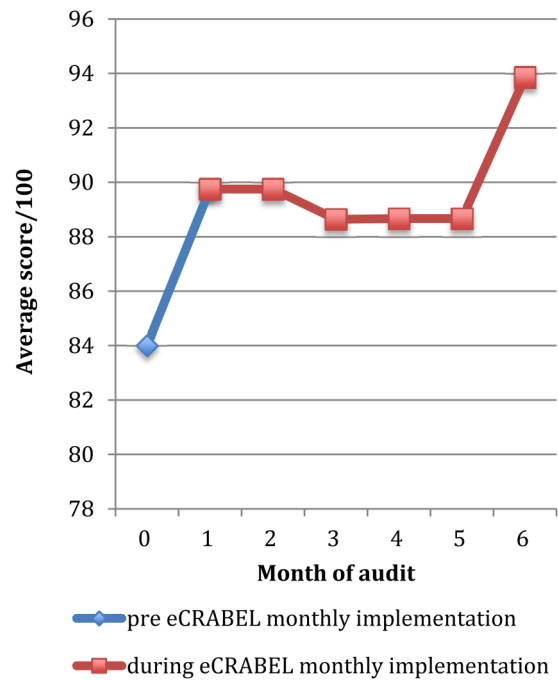
This teaching session was received extremely well and questions seeking clarification of the tool itself were answered and discussed in depth. This included revising case note selection, how to use the scoring tool, and tips on writing electronic discharge letters including ensuring a summary of investigations is included rather than copying all investigations into a discharge letter. Following this the average e-CRABEL score across firms improved to 94%.

## RESULTS

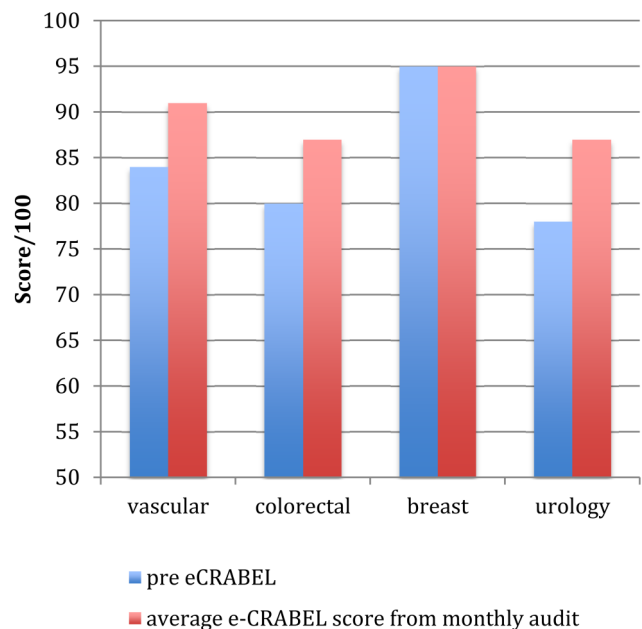
Over the course of the PDSA cycles, the average score across all firms increased to 89-94%, where the implementation of monthly e-CRABEL resulted in consistently improved scores pre e-CRABEL implementation (figure 2).

Between month two and five there was no change in scores despite using photographs showing areas where points were deducted. The authors postulated that whilst this adds interesting detail, subcategory scores were actually providing the same information and further teaching on this would provide the real clarification that was required. Alternatively, the selection of longer case notes may have caused a negative effect on scores which had actually improved as a result of the photographic intervention.

There was a sharp increase in average between month five and six after the teaching session given to the new cohort of juniors doctors at their hospital induction regarding the components of the e-CRABEL score and its use during monthly audit. This was attributed to the clarification of the tool as well as advice on discharge letter documentation.



**Figure 2** Average score during monthly implementation of e-CRABEL.



**Figure 3** Breakdown by firm pre and post monthly eCRABEL implementation.

Overall three out of four firms showed clear improvement in e-CRABEL scores over the six month period (figure 3). The e-CRABEL score is still being used as a mandatory monthly assessment of standards of medical record keeping.

## LESSONS AND LIMITATIONS

The question of inter-auditor subjectivity in scoring certain record elements has come up before in the

literature,<sup>7</sup> and when initial audit results were collated, the auditors discovered that there had been confusion in what constituted an error or omission in various areas due to broad criteria. There was some concern that excluding patients who did not have operations would bias towards worse scores as these patients would be more likely to have longer admissions and therefore more scope for errors.

However, selection of case notes that have consent forms for operation and by this token also longer admissions, still resulted in higher e-CRABEL scores. This was further augmented by use of the teaching session for new junior doctors, as teaching on the criteria produced not only a more homogenous result across auditors but served to teach how to document correctly in the first place.

A recurrent critique of the compactness of the tool is that the sample sizes are too small. Whilst the sample sizes are small, it is not clear whether this is a detriment to learning and improvement. This could be investigated further by auditing larger case notes to see if that in itself will cause an improvement in record keeping - or be more representative of record keeping as a whole.

In terms of generalisation, the e-CRABLE score can be well replicated in surgical units with paper notes and electronic discharge summaries. Modification will need to be made for other medical specialties where consent or operation notes are not routinely part of a patient record. This may also be a critique of surgical case notes for which no operation was done.

In terms of sustainability, the e-CRABEL score is still being used as a monthly audit tool. The presentations are kept by the audit department, so there is good scope to continue analysis of the results. Whilst education of the tool is implicit by means of doctors handover, it would be ideal to formalise this as a regular part of junior doctor induction.

It is likely that with the advent of electronic inpatient notes, that the e-CRABEL tool will need to be developed further as mandatory entries such as signature and grade will be autocompleted by using logins.

## CONCLUSION

In conclusion, the e-CRABEL is an easy to use, updated, objective tool for auditing medical record keeping. Monthly use of this tool is capable of ensuring high standards of record keeping are maintained and also provides additional information regarding VTE prophylaxis documentation. e-CRABEL scores can be augmented by using real case note examples when presenting scores and by providing a detailed teaching session for junior doctors on medical documentation and the e-CRABEL score.

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**Declaration of interests** There are no competing interests.

**Ethical approval** Ethical approval was not required for this quality improvement project.

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