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The use of a pro forma to improve quality in clerking vascular surgery patients

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Abstract

At our institution, a large tertiary referral centre for vascular surgery, patients are often admitted directly to the ward and clerked by foundation year one (FY1) doctors. We found that these clerkings frequently fell short of national record keeping standards, potentially leading to an increased risk for patients during their hospital stay. In addition, we found that junior doctors did not feel confident in clerking vascular surgery patients.

A literature review found that high quality clerkings were strongly linked to improved patient safety, and that the use of a pro forma was one method to improve compliance with documentation guidelines. We devised a clerking pro forma based on national guidelines and introduced it to the department.

We found that the use of a pro forma significantly improved documentation standards across a number of domains, including patient demographics, presenting complaint, and family and social histories ($p < 0.05$). Examinations were significantly more comprehensive, with cardiac and vascular examination as well as peripheral pulses documented ($p < 0.05$).

In conclusion, we found that using a pro forma helped to aid junior doctors in clerking new patients, and significantly improved the quality of their history and examinations. This leads to a potential positive impact on patient safety during their inpatient stay, and should be rolled out more widely across the hospital.

Problem

Our institution is a large tertiary referral centre, with a busy vascular surgery department run by ten consultants. Many patients are admitted through the emergency department, but patients are frequently admitted from clinic, transferred from other hospitals, or attend for elective procedures. In these circumstances the patients are clerked on the ward by FY1 doctors. These clerkings were noted to be inadequate, and often did not achieve the standards expected by senior doctors. Patient histories were often rushed and examinations were omitted. Problems were often encountered when patients were not ready for their procedures the following day, and they often required re-clerking at a later date due to lack of detail on their admission document. Venous thromboembolism (VTE) risk assessments were often not performed, and thus thromboprophylaxis was not prescribed; drug histories were often also incomplete, leading patients to be at increased risk during their admission.

Background

The admission clerking is one of the most important documents in the patient's record, and is frequently used as a reference point for the patient's history during their admission, particularly on attendance of the emergency medical team. The document is also often used by anaesthetists during their assessment of the patient.

It has been noted that vascular surgery patients often have a greater number of comorbidities and a more complex medical history than other surgical patients.[1] In addition, they often spend time in high dependency areas postoperatively. For this reason it is critical that the admission clerking is as precise and accurate as possible, in order for the patient to receive the most appropriate care during their stay in hospital. Notably, the admission clerking is also regularly used for reference when writing the patient's discharge summary. If the patient's diagnoses are correct on this document, it ensures correct coding and income for the hospital.

A number of studies have noted that the quality of admission notes are often poor due to lack of awareness of guidelines and standards.[2] In 2009, the Royal College of Physicians (RCP) published recommendations on standards expected from clinical clerkings of both medical and surgical patients.[3]

Baseline measurement

The paper records of 32 patients admitted to our ward that were clerked by FY1 doctors between 11/02/2015 and 30/04/2015 were collected and analysed using Microsoft Excel. Each clerking was marked against the domains laid out by the RCP. No identifiable patient information was used.

All FY1 doctors who had worked in vascular surgery between August 2014 and April 2015 (12 doctors) were asked to fill out a short survey about their experiences clerking vascular patients. A

link to an online survey was emailed to 12 FY1s, and nine responded (75% response rate).

We performed very poorly in documenting the patients' demographics, despite this being readily available on the patient's electronic health records (EHRs). The patients' presenting complaint and history of presenting complaint were absent in 19% of clerkings. Although past medical histories were well recorded, past surgical histories were absent in 45% of cases.

Drug histories were very poorly executed. Only 72% of patients had a drug history taken, 41% had the drug doses and frequency recorded, and only 75% of patients had their allergy status documented. These findings are extremely concerning and put patients at increased risk. Inadequate drug histories have been shown to have significant potential to cause patient harm.[4]

It has previously been shown that social histories are often neglected, despite the social history's impact on health delivery,[5] and this is true in our case. An accurate social history ensures prompt assessment and liaison with with health promotion services. Sixty percent of patients had a smoking and alcohol history recorded, and 53% had been asked who lived with them. Only 48% were asked about their previous level of independence and whether they had carers.

Family histories were only documented in 19% of cases, and 12% of patients had a systems enquiry.

Examinations are a fundamental part of the clerking, and although respiratory, cardiac, and abdominal exams were usually performed (77%, 69%, and 72% respectively), vascular examination and examination of pulses were often forgotten (59% and 46%). This is particularly poor considering the specialty within which the doctors were working. Only 31% of patients had a set of observations recorded in the clerking.

Only 73% of patients had a VTE assessment performed on admission, and of the eight patients that did not, two of these were completed within 48 hours.

A plan was clearly written in 97% of clerkings, and the entry was usually validated with a name, grade, time, and contact number (97%, 97%, 88%, and 78% respectively).

Seventy five percent of FY1s approached (nine FY1 doctors) completed our online survey. Six reported that they typically spent 15 to 30 minutes clerking a patient, and one spent 30 to 45 minutes on the task. When asked if they knew what was expected of their clerkings, four reported that they were "partially aware," and two reported that they were "not aware." Only 22% of those surveyed felt confident in outlining preoperative plans for patients, and none were aware of the perioperative anticoagulation guidelines. Of those who responded, 89% were supportive of the use of a pro forma, as they felt it would provide structure and act as a memory prompt.

See supplementary file: ds7007.pdf - “Baseline measurements (figures 1 to 17)”

Design

It became clear from our survey that the cause of the problem was lack of education for FY1s about what was expected from their clerkings.

A literature search was performed, which found a total of nine previously published papers that evaluated the effect of pro formas on surgical admission clerking quality. These studies represented a total of 624 clerkings performed using traditional free text notation, and 682 clerkings performed using a pro forma. All of these papers except one found that the use of a pro forma was associated with an improvement in the overall quality of clerking for surgical patients. This review showed that the use of a pro forma improves the quality of clerking documentation in elective surgical patients, and that standardisation of the medical record improved the quality of patient care.[6-15]

Evidence is presented across the audits that the use of a pro forma leads to significantly improved documentation for surgical patients, in areas such as previous medical history and medication history.[7,12,13,15] It has also been shown to significantly improve the completion of VTE assessment.[11] The evidence also supports the argument that the use of a pro forma specifically improves documentation of items considered important by the Royal Colleges that are often missed during clerking documentation.[9]

A pro forma document was designed to cover all of the criteria suggested by the RCP. Junior doctors were educated about the pro forma, and advised to use it when clerking new patients. The ward clerk was also informed, and agreed to ensure that the documents remained well stocked.

Strategy

We initially discussed the issues and findings of our baseline measurements with both the juniors and seniors in the vascular surgery team, in order to highlight the severity of the issue.

In PDSA cycle 1, the pro forma was drafted based on the RCP guidelines and shown to consultant surgeons. It was edited to include a section for an abbreviated mental test score (AMTS) and VTE assessment, in order to ensure compliance with trust policy. We trialed the pro forma on the ward and predicted that it would improve record keeping. We analysed the clerking documents of 30 patients that had been admitted to the ward after introduction of the pro forma. In order to eliminate selection bias, clerkings that had not been recorded on the pro forma were included in our measurements.

In PDSA cycle 2 the results from the second measurement were presented in the department's audit meeting, and received positive feedback from the consultants. They felt that a box for ankle brachial pressure index (ABPI) should be added, as delays in recording this had repeatedly led to delays in patient investigation

and treatment. We asked the nursing staff to record their observations on the pro forma after they had recorded them, but there was some resistance to this, as they felt it was an unnecessary task if they were already recording them on the patient's chart. Alternatively, we asked FY1s to either perform the observations themselves at the time of clerking, or wait until they had already been done. In addition, an area for recording the results of preoperative investigations was added, as these were still frequently omitted, and we publicised which investigations were needed and where the results could be found. We noted that "nil by mouth" status was not being documented in all cases, and made the tick box more conspicuous.

Another measurement of 20 sets of notes was undertaken after six weeks, in order to assess whether there had been attrition in the use of the pro forma over time, as had been suggested by a previous publication.[14]

After seeing the improvement that the introduction of the pro forma had on documentation for patients admitted directly to the ward, we wanted to look more widely at all vascular surgery patients admitted to the hospital. Those that are admitted via A&E are typically clerked either on the computerised records system or using history sheets. They are clerked by the on call surgical team, composed of a senior house officer (SHO) and registrar (SpR). We wanted to see whether these clerkings were better than the ones performed by FY1s, and whether the introduction of the pro forma more widely in the hospital would be beneficial. Twenty three sets of patient notes were reviewed during this measurement.

See supplementary file: ds7074.pdf - “Clerking pro forma (figure 18)”

Results

PDSA cycle 1 was performed after six weeks, and we analysed our findings against the baseline measurement using chi-square testing. Significance was set at $p < 0.05$. It should be noted that one clerking was performed by a doctor at SHO level, but was still included in the results. Twenty eight out of 30 clerkings were recorded on the pro forma.

Details of the patients' admissions showed significant improvement: the named consultant, admission method, and presenting complaint were all documented more often.

The medical history also showed improvement. History of presenting complaint was documented in 100% of the sample that used the pro forma. Although the change in drug history recording was not significant, the dosing and frequency of medications, as well as documentation of allergies, showed significant improvement.

We highlighted family histories and review of systems as being particularly poorly documented in admission clerkings during our baseline measurement. We can see that the introduction of a pro forma significantly improves documentation standards across both domains. All domains of the social history that we looked at showed significant improvement.

Cardiac, respiratory, and abdominal exams were performed significantly more frequently. Vascular examination and examination of pulses showed vast improvement. Recording of the patients' observations showed marginal improvement, but this was not significant. Still only 42% of patients had a set of observations recorded on the clerking, likely because the nursing staff had not yet recorded them, and the medical staff were unwilling to do this themselves.

Unfortunately the patients' prior investigations were still recorded very poorly. This may have been due to the fact that doctors were unsure which investigations should be recorded, or where to find them. In addition, documentation of the patients' nil by mouth status showed a significant deterioration between the two measurements. We felt this may have been because the area of the pro forma that mentioned nil by mouth status was in the middle of a sentence, and therefore easy to overlook.

Documentation of the doctor's name and signature, as well as their grade, were documented on fewer of our sample clerkings. One possible explanation for this is the use of an unfamiliar document. Where clinicians were used to signing continuation sheets in the bottom right hand corner, the pro forma presented a new style of record paper that may take some time to become accustomed to.

In PDSA cycle 2, 20 sets of patient records were reviewed after two months, which showed a sustained improvement in the quality of record keeping. Sixty two percent of patients now had a set of observations recorded, which was a significant increase. There was an improvement in the number of patients with nil by mouth status documented, but this was not significant. In addition, the number of patients who had results of their prior investigations recorded increased, but not to a significant level. We informally asked the FY1s why this was, and they said they had forgotten.

Our third measurement was performed after another three months, and looked at the notes for all patients admitted to the ward, regardless of whether they were admitted by the FY1s on the ward or via the surgical acute take. All the clerkings reviewed were recorded using traditional (freehand) documentation, and not the pro forma. Only 1 of the 23 records were of a patient admitted directly to the ward. This showed equally poor results to our first audit cycle.

No patients had their local hospital or postcode documented. Only 8.7% of patients had a family history or systems enquiry recorded.

Social histories again performed very poorly: less than 50% had any form of social history recorded. Examinations were also very poor: cardiac, respiratory, and abdominal examinations were recorded in 13%, 22%, and 26% of records respectively. Vascular examination and assessment of peripheral pulses were performed in 65% and 69% of cases.

One hundred percent of records had a date and time recorded, but only 52% had the grade of the doctor, and 4.3% had a contact number.

See supplementary file: ds7006.pdf - “Pre- and post-implementation results (figures 19-24)”

Lessons and limitations

We learnt a number of lessons during this project. First, we found that despite a huge amount of medical training and knowledge, doctors admit they forget important parts of clerking when tired or under pressure. In order to eliminate this issue, we designed our pro forma to prompt them about each domain. If a box on the pro forma has not been filled out, the clinician has actively chosen to omit it.

Although some doctors were initially resistant to changing their practice and using the pro forma, after showing them our initial results it was made clear how important the use of the document was.

We were limited by the small sample size, as patients were not admitted to the ward frequently. It took approximately two to three months in order to obtain 30 sets of patient notes.

There were three domains that repeatedly underperformed in each measurement: the recording of previous investigations, recording of nil by mouth status, and documentation of the patient's observations. We tried to address these with each cycle, and they showed an upward trend, however the results were unacceptably low. We must try to ascertain exactly what it is that led these results to be so poor, and institute a culture change within the department.

Our results were collected over an 11 month period, with four different cohorts of FY1s rotating through the firm during this time. Therefore, it is possible that the perceived improvements in documentation could represent an improvement in clerking skills over time, rather than improvements attributable exclusively to the use of the new pro forma. Measurements were taken at different times during the rotations, and therefore may not be directly comparable. It is important to note, however, that the baseline measurement was taken during the fourth month in one rotation, and PDSA 1 was conducted during the second month of the next rotation. If we were to conduct the project again, we would ensure that measurements were taken at the same time point during each rotation, in order to provide a truly comparable snapshot of clerkings.

The frequent turnover of junior staff may potentially lead to loss of enthusiasm for the pro forma, and thus limit its use. We have tried to overcome this by assigning a project lead in each cohort who will take control of ensuring the document is still used. Due to the strong level of senior support for the project, the juniors remain encouraged to use it.

Our results from measurement three may not necessarily be comparable to the other results we collected for two reasons. Firstly, they were typically conducted by doctors at SHO and SpR level, who may have up to nine years additional surgical training to the FY1 cohort. Secondly, the patient population is different; the patients we looked at initially were those admitted to the ward, who were typically well and presenting for elective surgery. The notes reviewed in measurement three were primarily of acutely unwell patients, admitted via A&E on a busy surgical take. Differences in the time available to clerk, and the environment in which the clerking took place, will undoubtedly have had an impact on their quality.

One of the primary limitations in rolling out the pro forma more widely is the lack of continuity within the hospital regarding paper or computerised notes. Some departments, such as A&E, function on an entirely paper free basis, whereas others, such as the vascular surgery ward, predominantly use paper documentation. This leads to difficulty in disseminating the pro forma, and we are in discussion with the IT department to create a computerised version.

Conclusion

Instituting our intervention led to a positive impact on the clerkings of vascular surgery patients.

Introduction of a pro forma helped to alleviate concerns and gaps in knowledge of junior doctors within the department. The pro forma improved the quality of patient clerkings across a number of domains laid out by the RCP, including admission details; surgical, social, and family histories; as well as the physical examination. Importantly, drug histories were also more comprehensive. This has a potentially significant impact on patient safety during their inpatient stay.

The project highlights the need for departments to provide education for the junior doctors rotating into them. Our project helped to provide some guidance for doctors on what was expected from them, and will hopefully be instituted more widely within the trust.

The project showed a sustained improvement in the quality of clerkings once junior doctors were made aware of the introduction of the document. After highlighting how poor the documentation performed by the acute take was, in comparison to those admitted and clerked by FY1s, the project has the potential to roll out more widely.

As there was strong consultant support for the project, they will continue to assign one FY1 per cohort as the project lead in order to sustain the project. This designated person will remain in communication with the original project team to ensure that any questions are answered, and that the quality of documentation can continue to improve, by working together to highlight outstanding deficiencies and instituting ongoing PDSA cycles.

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Declaration of interests

None declared

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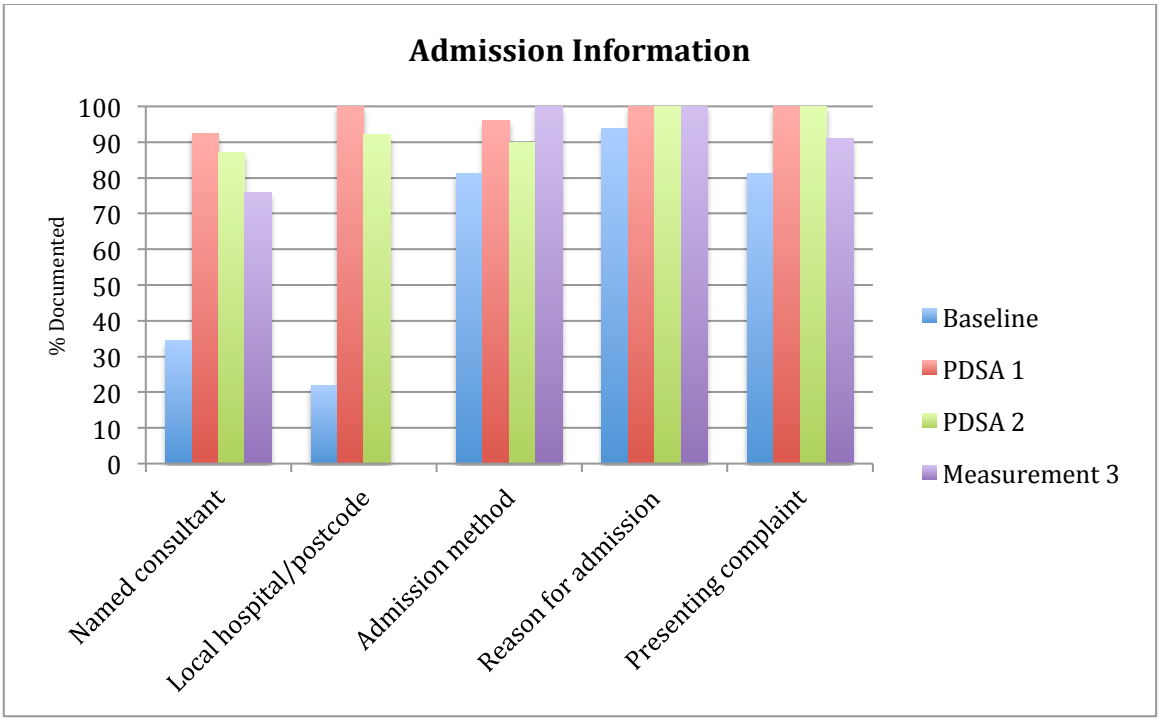
Ethical approval

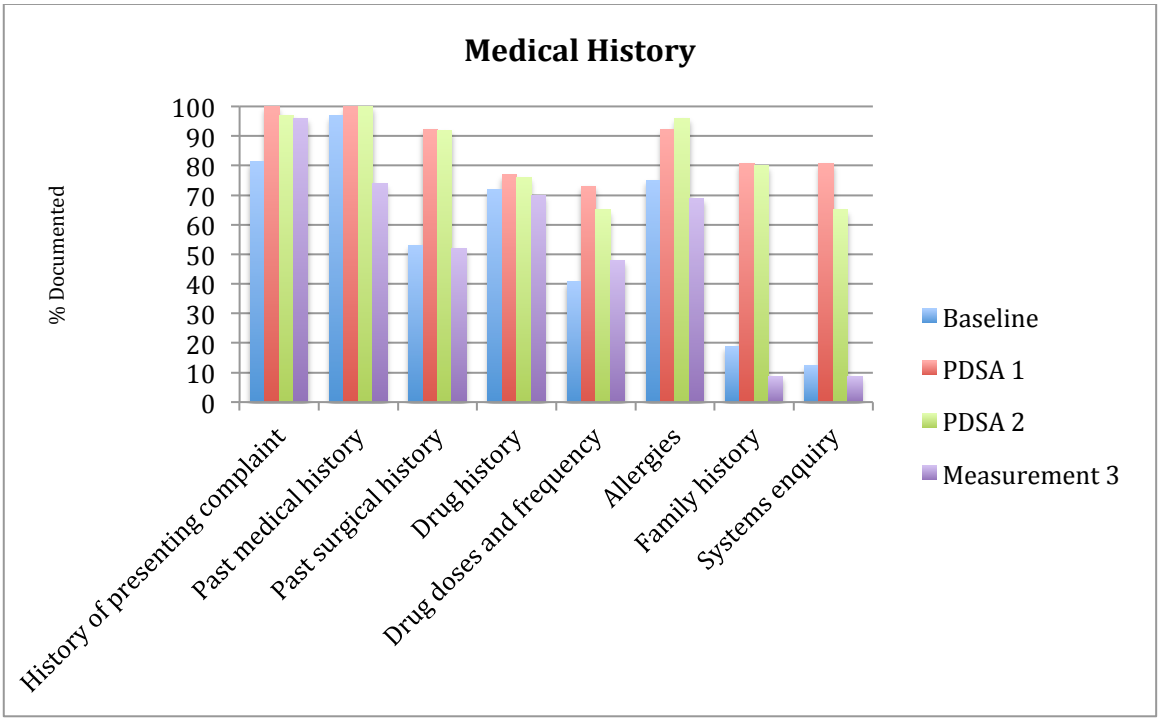
Barts Health uses the following criteria for determining if improvement activities require ethics review: "Audit projects do not require a submission to ethics, although they do need to be registered with the clinical effectiveness unit."

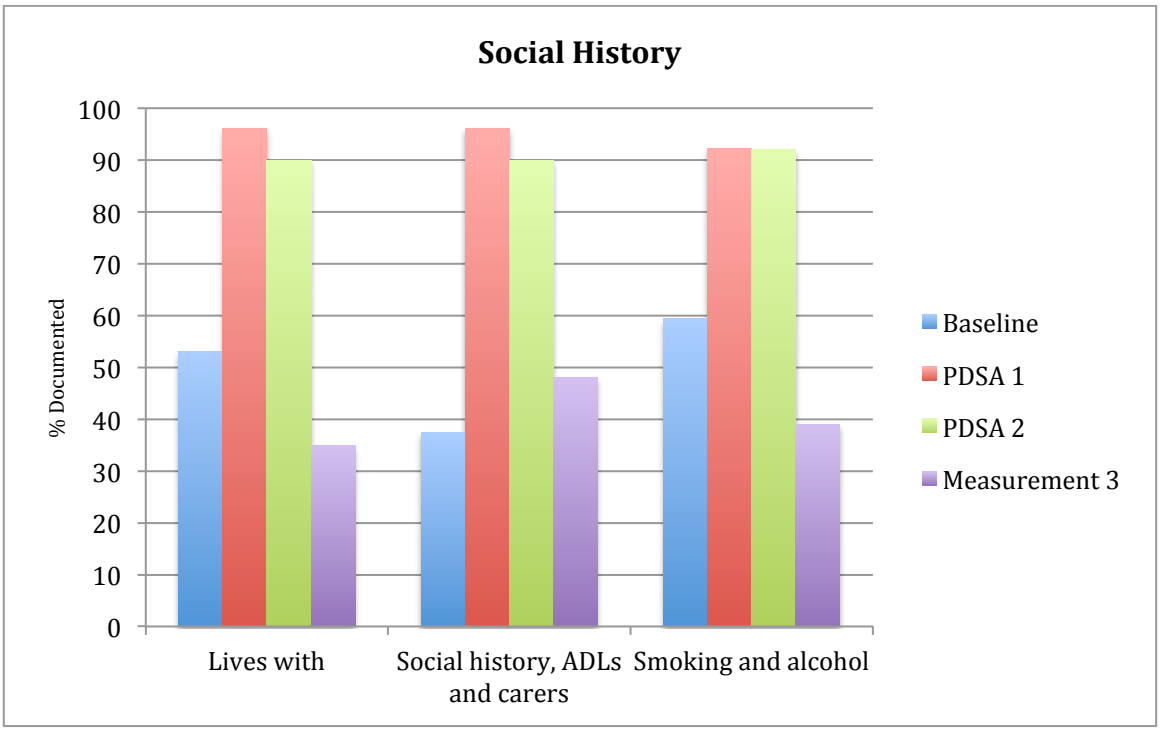
Ethical approval must be sought "if the research involves access to, or processing of, the confidential information of patients or service users by researchers outside the normal care team without consent."

Our work meets this criterion, as it was registered as an audit project, and patient documentation was collected and reviewed only by their normal care team.

Baseline: Initial audit of documentation from admissions directly to the ward
PDSA 1: Audit of ward admissions immediately after introduction of a pro forma
PDSA 2: Audit of ward admissions six weeks later
Measurement 3: Audit of admission documentation for ALL patients admitted under vascular surgery






Social History
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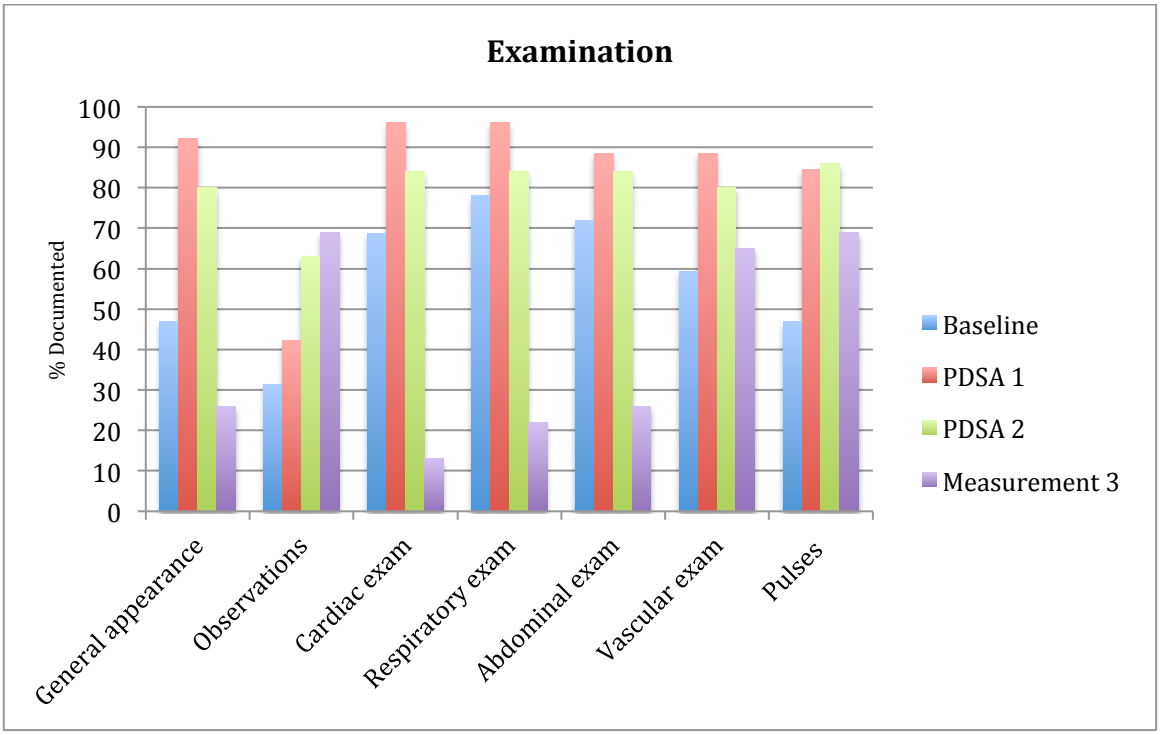
Lives with
Social history, ADLs and carers
Smoking and alcohol
Baseline
PDSA 1
PDSA 2
Measurement 3


Examination
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Respiratory exam
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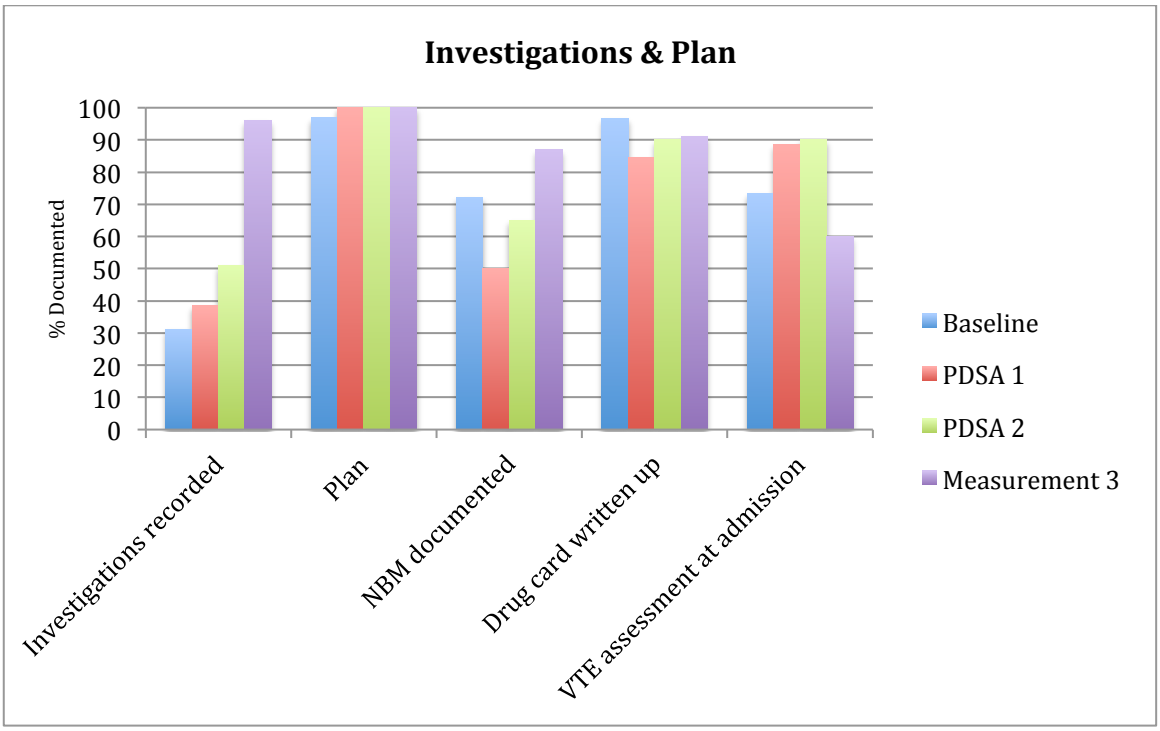
Pulses
Baseline
PDSA 1
PDSA 2
Measurement 3


Investigations & Plan
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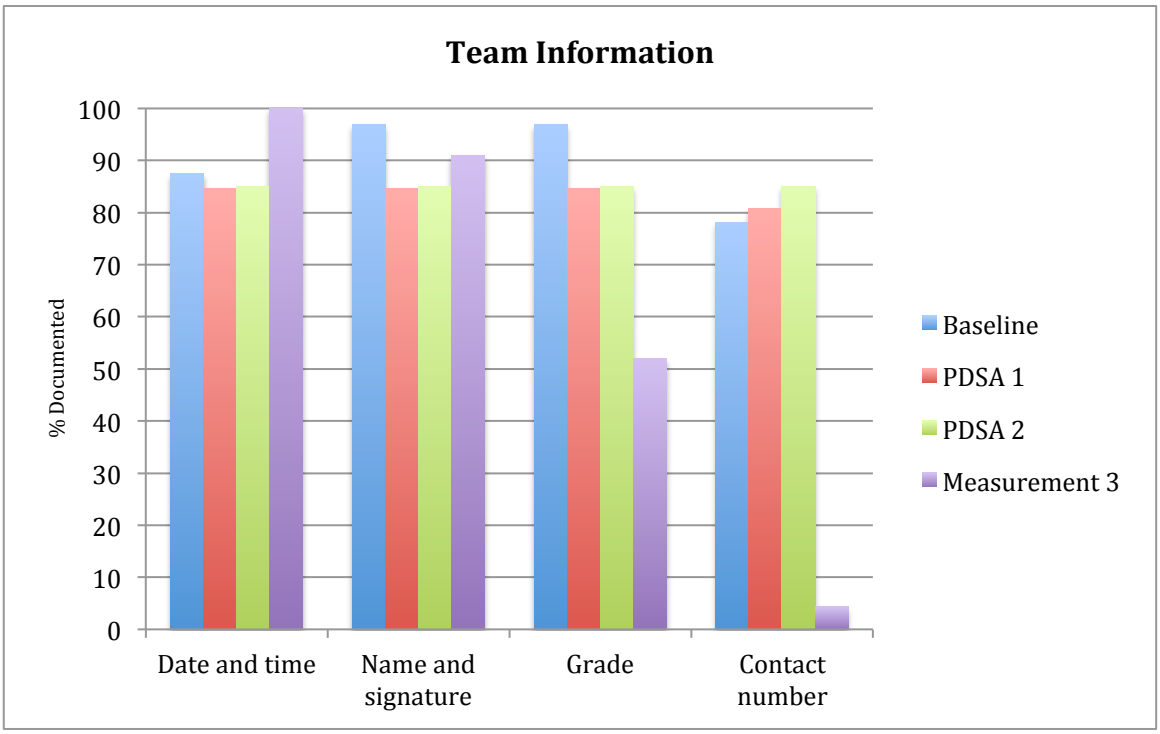
VTE assessment at admission
Baseline
PDSA 1
PDSA 2
Measurement 3


Team Information
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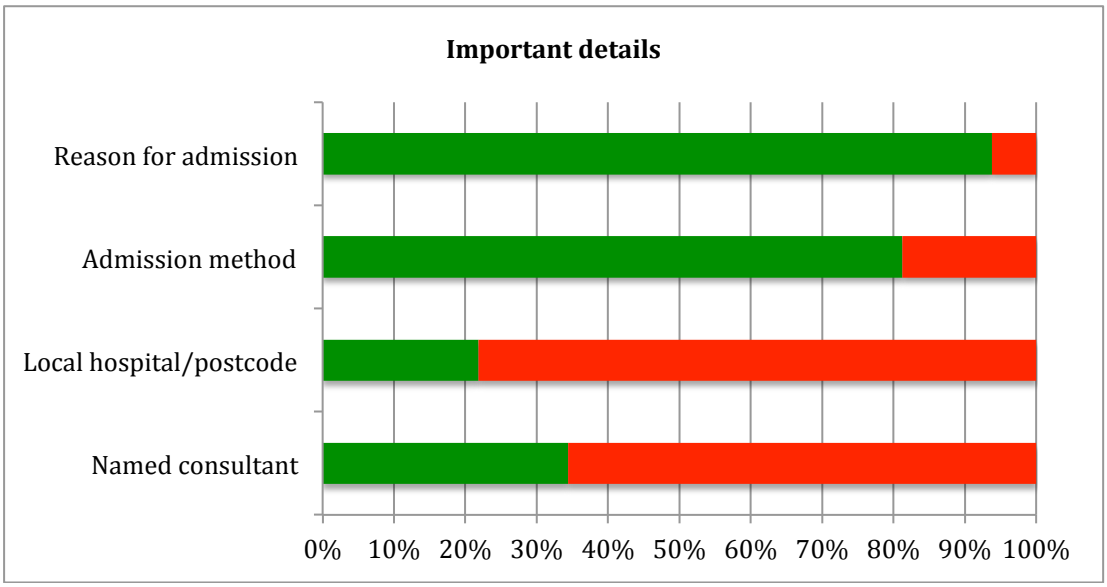
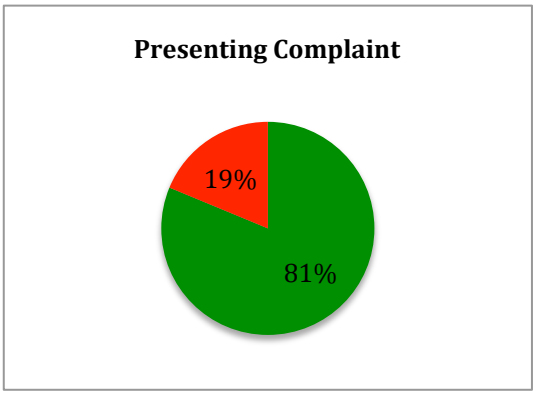
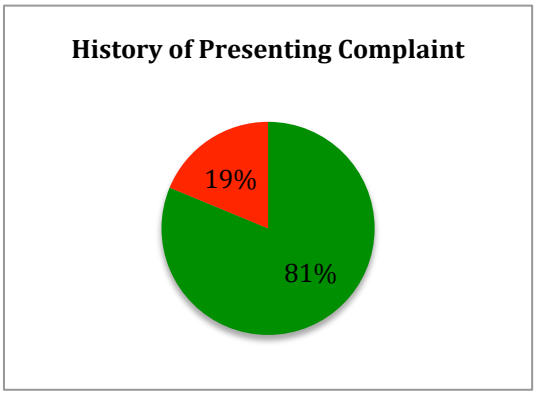
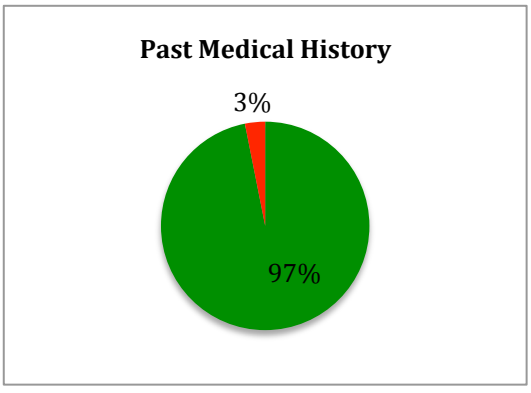
Date and time
Name and signature
Grade
Contact number
Baseline
PDSA 1
PDSA 2
Measurement 3

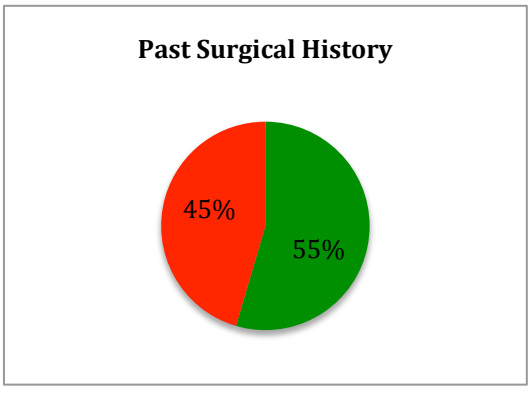
Graphs to show compliance in each recommended RCP domain. Green represents the patients in which this was recorded and red represents the patients in which it was not.

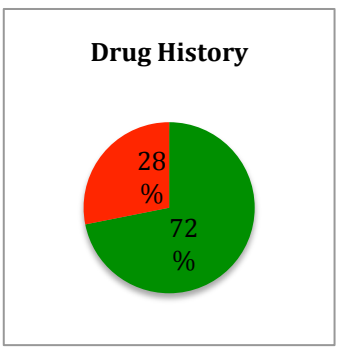


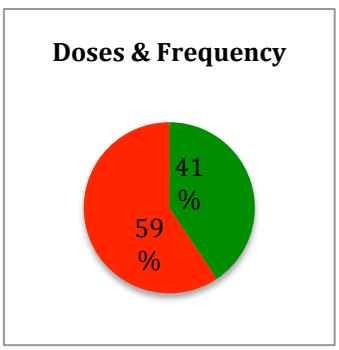


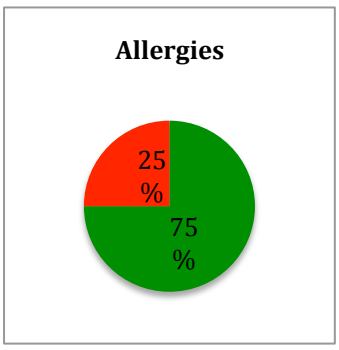


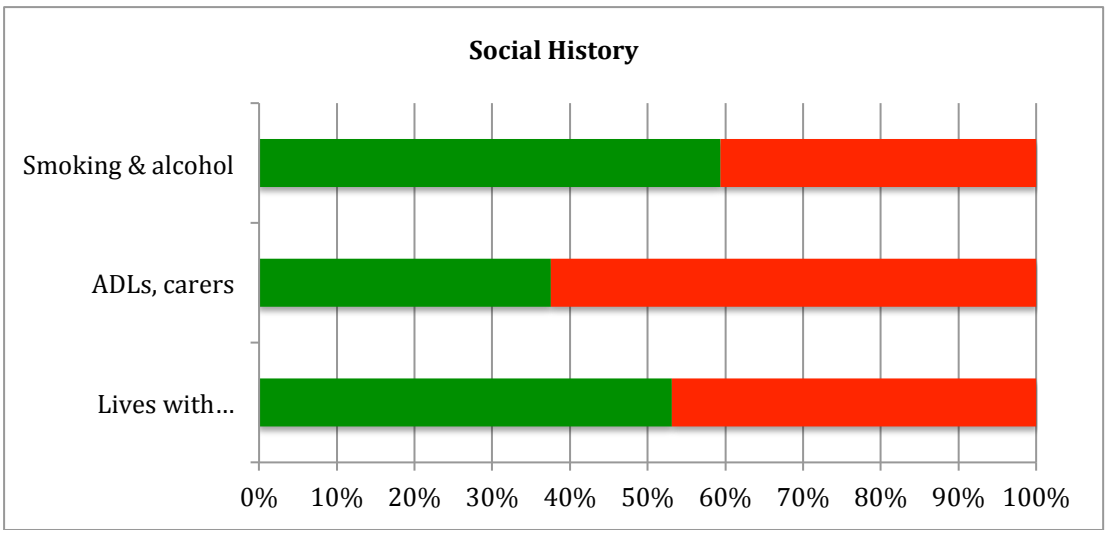











Social History
Smoking & alcohol
ADLs, carers
Lives with...
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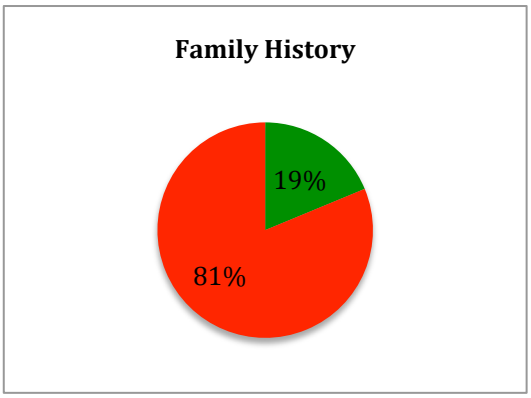
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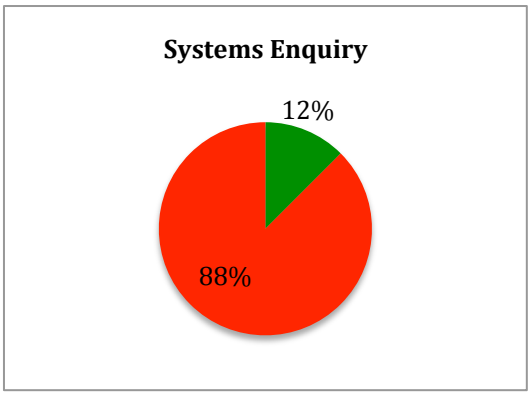
Systems Enquiry
12%
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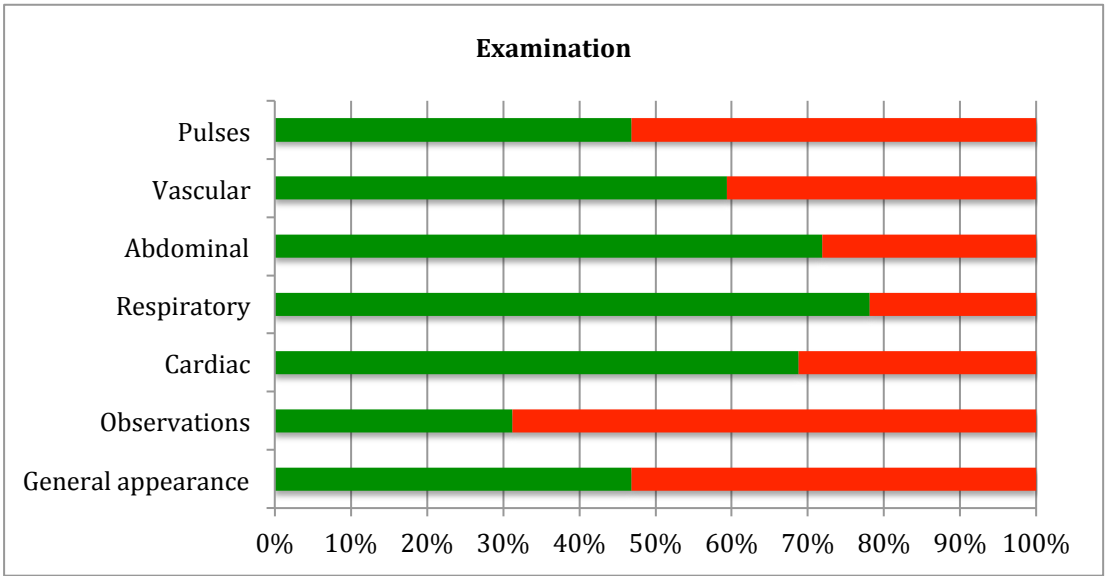
Examination
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Observations
General appearance
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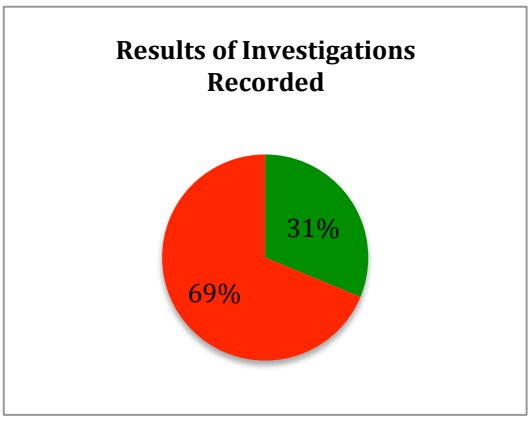
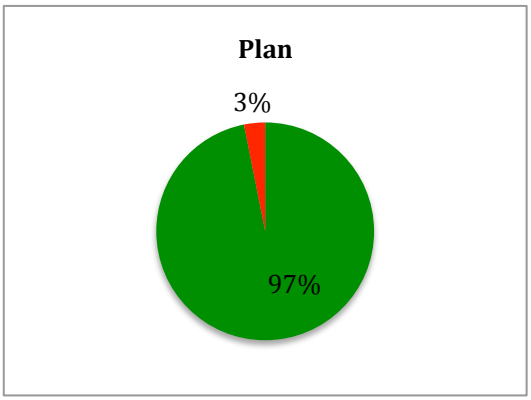
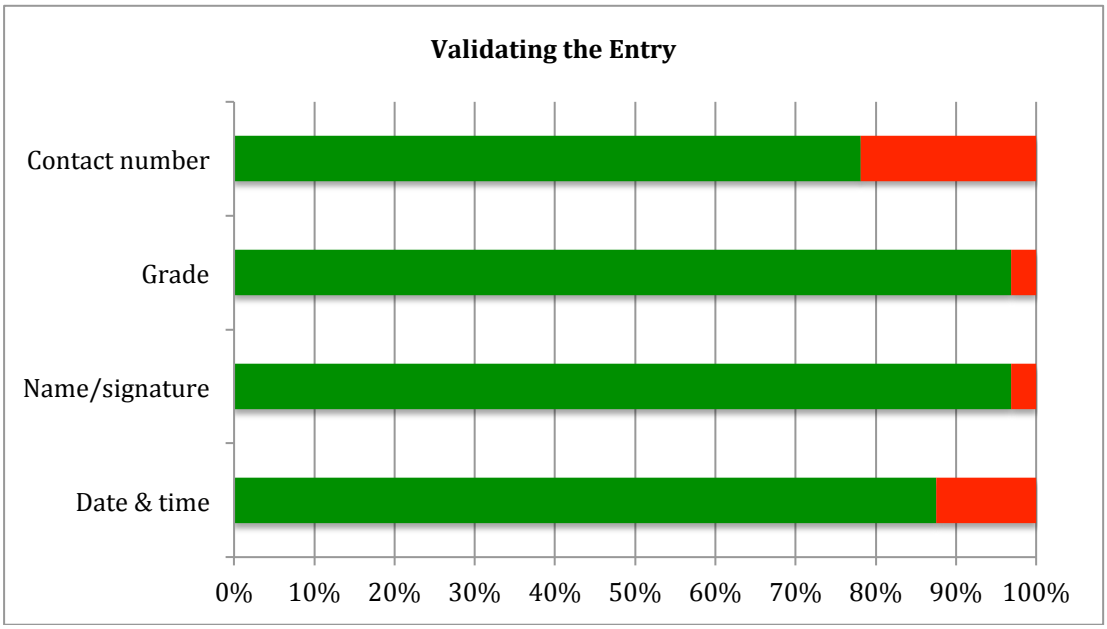
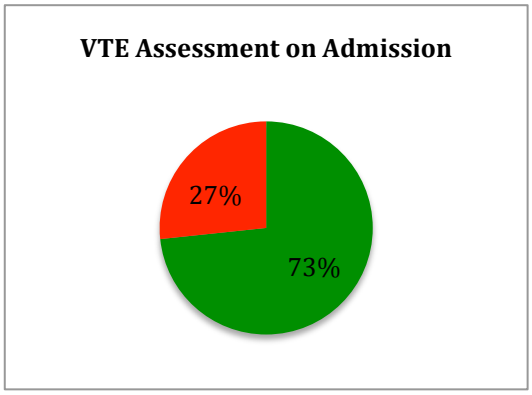
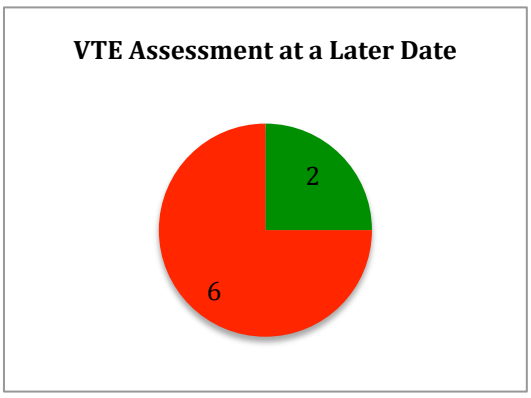

Results of Investigations Recorded
31%
69%


Plan
3%
97%


Validating the Entry
Contact number
Grade
Name/signature
Date & time
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%


VTE Assessment on Admission
27%
73%


VTE Assessment at a Later Date
2
6

Vascular surgery Clerking Proforma

Barts Health NHS
NHS Trust

Date: ___/___/_____

Name:

Hospital number:

Date of Birth:

Postcode:

Named consultant:

Type of admission:

Elective

Emergency

From clinic

Patient's local hospital/trust:

Royal London ☐

Whipps Cross ☐

Homerton ☐

Newham ☐

Other: _____

Diagnosis/Intended Procedure:

Presenting Complaint:

Limb ischaemia

Limb	Left / Right
Claudication distance	_____m
Rest pain	Yes / No
Non-healing ulcer	Yes / No
Necrosis	Yes / No

Carotid artery stenosis

Right side	____%
Left side	____%
Symptomatic?	Yes / No
_____	

Abdominal aortic aneurysm

Aneurysm size	____cm
Symptomatic	Yes / No

Other:

History of Presenting Complaint:

Patient name: Hospital number:

Past Medical History:

Hypertension ☐	High cholesterol ☐	Diabetes mellitus ☐	Renal failure ☐
MI/Angina ☐	COPD/Asthma ☐	Heart failure ☐	Stroke/TIA ☐
Liver disease ☐			
Other ☐			

Details:

Past Surgical/Procedure History:
(Previous EVAR/Angioplasty?)

Drug History:

Information source: Patient GP
Other_____

Allergies:

Social History:

Lives in:

Lives with:

Stairs:

ADLs:

Exercise tolerance:

Occupation:

Smoker / Ex-smoker / Non-smoker (please circle)
Pack years:

Alcohol Yes / No
Units a week:

Patient name: Hospital number:

Family History:

Systems Enquiry:

AMT (patients >60 years)

DOB	☐
Age	☐
Address (to recall at end)	☐
Year	☐
Time	☐
Place	☐
Two persons	☐
Year WW2 ended	☐
Monarch	☐
20-1	☐

Score /10

General Examination:

General appearance:

Blood sugar: Weight: _____Kg

Temperature:_____°C GCS ___/15

Cardiac

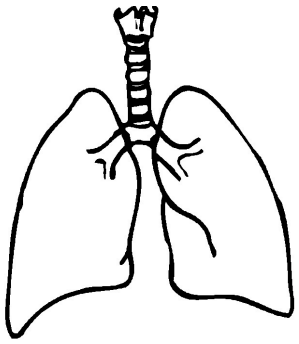
Pulse: _____/min BP: ____ / _____mmHg Heart sounds:

JVP: Peripheral oedema:

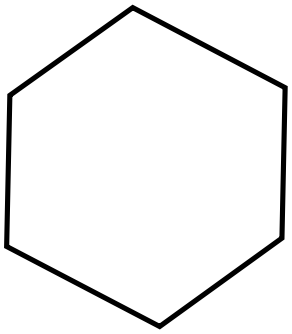
Respiratory

Respiratory rate:

Oxygen saturations:

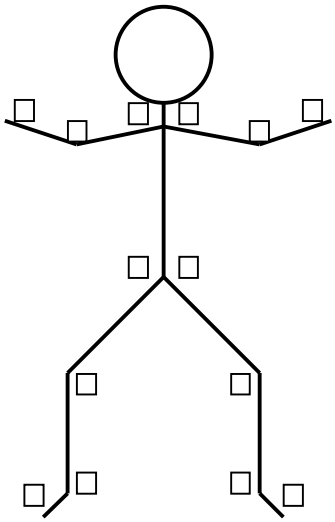


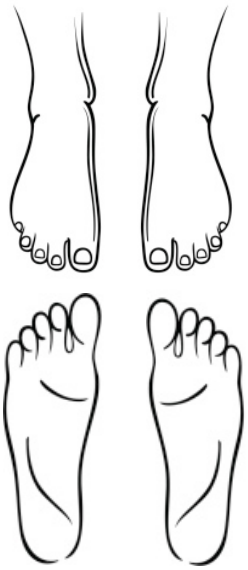
Abdomen



Patient name: Hospital number:

Vascular: (please annotate pulses and any areas of ulceration, gangrene, cellulitis etc)





+ = present

– = absent

Neurological symptoms: ABPI:

Plan:

Checklist

Bloods + cannula ☐

Group and screen ☐

ECG ☐

Echo ☐

Drug chart ☐

VTE prophylaxis ☐ (Avoid TEDs in peripheral vascular disease)

Antibiotics (if required) ☐

Nil by mouth +/- sliding scale +/- IV fluids ☐

Casenote location ☐

Print out relevant clinic letters, arterial duplex reports + Anaesthetic assessments on EPR ☐

Signature	Grade	Bleep
Print name	Date ___/___/_____	Time