

Clinical Hazards in Patient Safety

A Student-Delivered Patient Safety Seminar for Pre-clinical Undergraduate Medical Students

Adrian Hayes, Poppy Roberts, Sarah Watson, Adam Figgins, Rosalind Pool, Siobhan Reilly,
Christopher Roughley, Thomas Salter, Jessica Scott, Rebecca Woodside
and Dr Vinod Patel

RISC Patient Safety Group

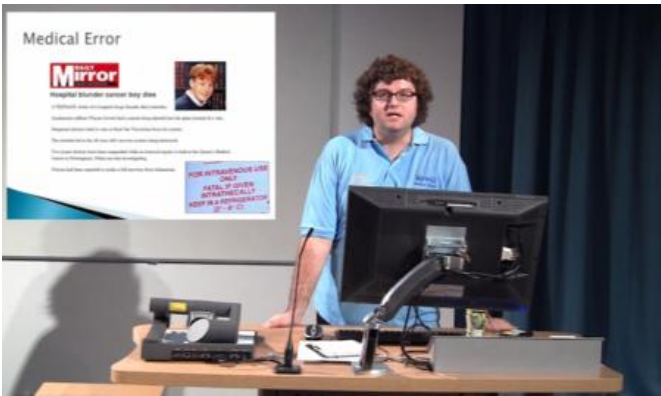
Warwick Medical School

Supported by a grant from the Institute of Applied Teaching and Learning

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Introduction

Patient safety is a topic which has not traditionally been included in undergraduate medical training, but has recently been emphasised by a number of high-profile bodies. This project involved the design, implementation and evaluation of a patient safety seminar for pre-clinical medical students. The seminar aims to introduce students to the concepts of patient safety, allow them to practice clinical skills intended to improve safety, and to highlight the contribution medical students could have on the safety culture within health care environments. It is entitled CHiPS (Clinical Hazards in Patient Safety).

Participation was voluntary, and students in the first two (pre-clinical) years were targeted for attendance. The seminar was designed for 40 students per session, and was run twice. Performance in workshops was assessed overall in the same format as other clinical skills in the curriculum (eg venepuncture and resuscitation) using a 'Tdoc' assessment form (Appendix One). This covers a number of standards in which students are expected to be competent. The seminar was evaluated using questionnaires exploring perceived self-efficacy in the areas covered and satisfaction with the event.

This document is intended as a Teaching Pack, with information on how to run the CHiPS seminar and results of the evaluation. The attached DVD is a demonstration of how our seminar was delivered.

Overall Structure

In this seminar, the concepts of patient safety and error were first introduced in a lecture-style presentation. Participants then split into four groups and took part in a rotation of interactive workshops each focussing on an aspect of patient safety and allowing practice or discussion of a clinical skill.

Each seminar ran as follows:

1900-1930	Welcome, Questionnaire and Introductory Lecture
1930-1945	First Station
1945-2000	Second Station
2000-2030	Break and Refreshments
2030-2045	Third Station
2045-2100	Fourth Station
2100	Questionnaires and Close

Introductory Lecture

Facilitators: Adrian Hayes and Dr Vinod Patel

Objectives

At the end of this session, students will:

- understand the concept of patient safety and error in healthcare environments
- be made aware about how medical students can contribute to patient safety issues and innovations
- be informed of the importance placed by GMC on patient safety for medical students and doctors

Background

Patient safety has been defined as "The freedom from accidental injury due to medical care or from medical error" (Kohn et al, 1999), but could more prosaically be described as 'doing the right thing with the right patient at the right time, getting it right first time'. Error is common in health care, and the Department of Health has estimated that adverse incidents occur in 10% of hospital inpatients (DH, 2000). 'Health care' has been described as one of the most hazardous activities in which one can take part, when considering frequency of contact and number of lives lost (Amalberti et al, 2005).

A patient safety approach to reducing error accepts that everybody makes mistakes, whatever their level of training. However, it aims to ensure that these mistakes do not have adverse outcomes by using a systems approach. This may involve the introduction of checks, such as nurses looking at both prescription and armband, and asking patients to confirm their name, before medication is given. It may involve altering equipment, such as changing the shape of drug containers intended for intra-thecal injection so that they cannot be accidentally be given intra-venously.

Recommendations for the inclusion of patient safety into the undergraduate curriculum have recently been made. In 2009, the World Health Organisation published a Patient Safety Curriculum Guide to encourage the teaching of patient safety to medical students. The guide was featured in a British Medical Journal article (Walton et al, 2010) which further recommended teaching on patient safety in medical schools. The handbook 'Tomorrow's Doctors' published by the General Medical Council (2009) sets out the standards and responsibilities of medical students and their teachers, and has a section on patient safety. One of the standards in this section is "inform students, and those delivering medical education, of their responsibility to raise concerns if they identify risks to patient safety, and provide ways to do this" [p32]. Finally, in guidance on safe handover, the British Medical Association noted that recent developments in medical education have not included organisational aspects of health care such as patient safety, and that students need to be better prepared for this (BMA, 2004). However, a review found no formal teaching in this area in any university core medical curriculum (Sandars et al, 2007).

The influence medical students can have on patient safety in health care settings can be illustrated by the tragic case of Graham Reeves reported by Dyer (2002). Mr Reeves had

been scheduled for surgery in Wales to remove a kidney, however the healthy kidney was removed by mistake. A medical student observing the operation, Victoria Fearne then aged 25, saw Mr Reeves' x-ray and realised the mistake. However, when she attempted to query the surgeon, she was ignored and the operation proceeded. Medical students may also be aware of smaller errors in the course of their clinical placements. The BMA has published specific guidance on whistleblowing (2008), stating that medical students have a duty to report "systematic failings that results in endangering patient safety". It is our belief that medical students are well-placed to receive training on patient safety issues as, due to limited exposure to gain clinical experience, can easily imagine making mistakes as junior doctors and wish to be protected. They can also offer a fresh pair of eyes on aspects of care which may be sub-optimal, with ideas as to how they can be improved. Our own student-led patient safety group (RISC; www2.warwick.ac.uk/fac/med/study/ugr/mbchb/societies/risc) has led improvement projects on handover, sepsis management, and medication errors.

Structure

Welcome, Housekeeping, and Evaluation	(5 mins)
Introduction to patient safety and medical student role	(20 mins)
Movement to group rooms	(5 mins)

Resources

Martin Bromiley video "Just a Routine Operation" (<http://vimeo.com/970665>; see attached DVD)

Slides for presentation presented in Appendix Two

Station 1: Preparing for Surgery

Facilitators: Poppy Roberts and Siobhan Reilly

Objectives

At the end of this session, students will:

- understand the need for surgical preparation to be sterile
- understand how to achieve a sterile procedure
- develop awareness of the surgical safety checklist
- emphasise the importance of pre operative checks.

Background

This station is an introduction to the operating theatre, with a focus on the elements that contribute to patient safety. We have chosen to highlight the World Health Organisation's surgical safety checklist, along with interactive simulations of preparing to operate. Our fifteen minutes will take the students through safety procedures that take place in every operation. We will demonstrate pre-operative preparations, teach the students how to scrub in, and do some basic safety checks. We hope this experience will help students feel prepared when they enter the operating theatre during their clinical years.

The WHO's second global patient safety challenge was launched in 2009. "Safe Surgery Saves Lives" aims to improve the safety of surgery across the globe, by encouraging adherence to proven standards of care. Prior to this a pilot study was launched to assess the effectiveness of the surgical safety checklist, and the results published in November 2010 (de Vries et al, 2010). The study compared theatres using the checklist to theatres not using it, and found that by using the checklist "surgery complications were reduced by more than one-third and deaths reduced by almost half".

One element of the WHO surgical checklist is that in the operating room, before the procedure has started, the patient should be orally identified, along with the site of operation. This feature of the checklist is based on the recognition that communication breakdowns are a major source of error. In a worldwide study in 8 cities and 3955 patients, confirmation of the patient's identity and site of surgery occurred 54% before implementation of the checklist and 92% afterwards. Along with the other improvements, implementation of the WHO checklist was associated with a reduction in the mortality and complication rates (Haynes et al, 2009).

In the 19th century physicians discovered that infection can be spread from contaminated hands, and this knowledge has evolved in today's "scrubbing in" procedure (George et al, 2010). The rationale behind hand hygiene is to prevent the transmission of microorganisms to and from patients via the clinician. It is indicated after contact with a patient's skin or work surfaces in the patient's immediate environment and after glove removal. Current methods of antisepsis include alcohol-based gels, chlorhexidine and iodine based aqueous solutions. In a systematic review of randomised controlled trials comparing methods of

antisepsis, supporting data were found for all methods to reduce the chance of patient infection. There was no difference between alcohol and aqueous based rubs in reducing surgical site infections (Tanner et al, 2008).

Structure

The station will be divided into three general areas; Preparation, Sterility, and Checklist. The students will be move around the room from the “anaesthetics” area to the “operating theatre” when they are scrubbed in and ready.

Introduction - brief explanation of the logistics of the station	(1 min)
Preparation and Demonstration	(3 mins)
Sterile dressing	(6 mins)
Checklist	(5 mins)

Sterile gloves and gowns will be provided, following a demonstration of how to put these on, with a chance for any questions. The student’s technique will be checked using our innovative method. Students will place their hands in powder paint, then be asked to put on sterile gloves and gowns without contaminating themselves (visible by paint marks).

Finally, using the patient scenario below, the students will go through some aspects of the WHO checklist; they will check the correct imaging is available, confirm the patient’s identity and the site of operation. Finally there will be a time-out, and the students will then declare themselves ready to operate.

Resources

- X-ray images
- Mannequin
- Surgical drapes
- Sterile gloves and gowns
- Gowns
- Patient wristband
- Paint/powder and tub
- Copies of WHO checklist (modified as appropriate)

Patient Scenario

64 year old Helen Highwater is scheduled for an elective knee replacement of her right knee. She has had osteoarthritis for several years and decided to have the operation because she was having difficulty climbing the stairs at home. She has had an anaesthetic review and the anaesthetist identified that she has hypertension and asthma, which are well controlled. Her past surgical history is a C-section 34 years ago and an appendicectomy when she was a child.

Station 2: Patient Handover

Facilitators: Rosalind Pool and Adam Figgins

Objectives

By the end of this session, students will be able to:

- understand the process of a hospital handover
- give examples of what makes a good handover
- give examples of things to avoid during a handover
- distinguish between positive and negative symptoms and signs and why it is important to present both
- summarise patient information into a 4 line presentation of the key points

Background

Within the hospital setting, handing over patient information between health professionals is an essential part of safe patient care, and is a skill that needs to be developed over time. The handover workshop station aims to deliver this early education in a structured and introductory fashion. The opportunity for medical students to practice what they have learnt about handover will be offered following a short introduction outlining what happens at a hospital handover, and two demonstrational videos illustrating a 'good' and a 'bad' handover.

When one shift ends and another begins, health care staff meet to discuss their progress, status and plans for care. Handover has come under close scrutiny in the last ten years, with the British Medical Association, Royal College of Surgeons and World Health Organisation all publishing guidance in this area (BMA, 2004; RCS, 2007; WHO, 2007). One of the reasons for the current interest is reduction in working hours due to the European Working Time Directive, making staff changes more frequent. Handovers are thus also more frequent and all the more important for patient safety. These are the times when deteriorating patients can be flagged up for special attention from the oncoming team, and when clinical tasks in progress or not yet completed are passed on.

A number of studies have demonstrated wide variation in practice (Avara & Johnson, 2006; Patterson & Wears, 2010), lack of education or training (Dracup & Morris, 2008; van Eaton, 2010; Solet et al, 2005), and an acceptance that handover is a time when patient care is vulnerable and prone to adverse consequences (Kitch et al, 2008; Woodward et al, 2010). It has also been shown that most mistakes occur due to poor communication (Alvarado et al, 2006). Similarly in nursing, Welsh et al (2010) found that the most commonly reported problems in handover were in variable quality, insufficient information, lack of opportunity to ask questions, interruptions and limited time.

Early education regarding handover procedure, the roles of individuals involved in hospital handovers, and the skill set required, will allow medical students to develop an idea of what they can expect from hospital handovers, and allow them to begin to develop the skills required for an effective handover.

Structure

Handover introduction given by station lead	(2 mins)
Demonstrational videos of 'good' and 'bad' handovers	(4 mins)
Students practice handovers with each other	(9 mins)

The introductory talk will highlight the key principles of a hospital handover and provide examples of how to summarise patient information. Information will also be given about some of the factors involved in an effective handover, and why and effective handover is important for patient safety.

Following from the station introduction, two videos will be played to the students. One representing a 'good' handover, which takes into account all the positive factors mentioned in the introduction, and one which represents a 'bad' handover. Following each video, the students will be asked to give suggestions as to why the 'good' handover was so effective, and why the 'bad' handover was not. The students will also be asked how the 'bad' handover could jeopardise patient safety.

To consolidate what the students have learnt from the introduction and the videos, they will then be split into groups of two to practice handing over patient information to each other. A mock patient's case notes will be projected onto the screen for all to read. This will contain important information as well as information that is not particularly relevant to management and would not be required to be handed over. The students are asked to summarise the key points from the patient case in the form of a handover to the other member of the student pair. The patient information will be tailored accordingly to the knowledge level of the students, and attempt to include only those areas of medicine which the students have covered so far. Following this, the roles within each pair will be reversed to give all the students a chance to practice their handover skills.

During the practice handovers, facilitators will observe each pair and give instant feedback and advice for each student.

A summary will be given at the end of the station.

The timing for the handover practice portion (last 9 minutes) of the station will be as follows;

4 minutes: Each participant reads the patient information.

4 – 6.5 minutes: First participant practices a handover over to their partner, followed by feedback from workstation facilitators

6.5 – 9 minutes: Second participant practices a handover, with feedback from workstation facilitators.

In addition to the evaluation form, each student will be given a handout of the key learning objectives of the workstation, along with a summary of the teaching given during the station and some handy tips for handing over in the future.

Resources

- Patient case notes for scenarios
- Handouts

Example handovers [available on attached DVD]

Video Script: Good Handover

(Handover meeting: all relevant doctors present)

Dr 1: Is everyone here? Are we missing anyone? No, excellent. Lets start then. Does anyone have any patients who need discussing urgently? Any really sick patients?

Dr 2: Yes, I do, I've got two patients who the team are concerned about. I've just been to see Mrs Vera White who is an 88 year old lady with acute kidney injury secondary to dehydration and UTI. She was admitted yesterday and her urea and creatinine are climbing. The team are currently worried about her potassium which has also been climbing and the last result was 6.5mmol/L. She has had calcium gluconate, insulin and glucose, calcium resonium and salbutamol. I asked the nurses to connect her up to the ECG and so we should have a reading by now. The team have discussed the situation with the family and she is for all active treatment. Please could you go and review the ECG and repeat the calcium gluconate if necessary. She will also need more fluids prescribing. She looks pretty sick. I've spent a lot of time with her today.

Dr 1: OK, thanks for that. How about your other patient?

Dr 2: Mr John Spencer, unit number AA1234567, a 85 year old gentleman on the respiratory ward. He came in 2 days ago with shortness of breath, confusion and fever and the team are querying aspiration pneumonia. He had a stroke 6 months ago. His speech isn't very good and he is a bit deaf, but he can understand everything you say, providing you speak loudly enough. He is currently receiving fluids and antibiotics, but cultures should be back later today so could you please change the antibiotics according to the sensitivities. He is awaiting a SALT assessment and is NBM until then. He has had lots of IV fluids but the team are concerned as he has an element of heart failure. The plan is, continue antibiotics and fluids, but please review him in an hour after this bag of fluid has finished to ensure he isn't fluid overloaded. If he isn't, continue fluids then reassess, if he is overloaded, give him some furosemide.

Dr 1: How are his Sats and respiratory rate?

Dr 2: Sats are 98% on 15L oxygen. His RR is raised at 25.

Dr 1: Thanks, I think I'll go and see Mrs White now, and check her ECG, then see Mr Spencer.

(End)

Learning points demonstrated by this video, shows a 'good handover' should include:

- Patient name, unit number and ward
- Summary of what has happened so far
- What you are concerned about
- The team's plan for the patient
- An idea of prioritising
- Handover should be concise
- Doctor should be able to answer additional questions about the patient.

Video Script: Bad Handover

(It is the handover meeting at 8.30pm. Attended by the doctors who are coming onto shift at night and the doctors who have been on during the day/on-call until early evening.)

Dr 1: (Rushing in late, after the meeting has started) Sorry I'm late, have I missed much? I would really like to just handover my patient then go, if that's alright with you?

(Colleagues look unimpressed)

Dr 1: I've been so busy today! I've tried to get most jobs done as I'm going out tonight, but haven't answered my bleep for the last 30 minutes so that I didn't get bogged down with more jobs.

It's probably the ward again. There was this patient who I was told about earlier, Mr Jones, I think, or could have been Brown, or Smith...Hmm. Anyway, he has been in for the last few days, or about a week perhaps. He isn't responding well and the nurses keep bleeping the doctors about it. He had surgery before and they're not sure about it. I don't know how sick he is as I haven't seen him, but just be aware if you have to go up there.

I'm going to run now, or I'll have to queue for ages to get out of the car park.

Here is the bleep, hope you have a quiet night, 'bye!

Dr 2: Wait!.....

(Dr 1 has rushed out of the room, the doctors then handover more patients)

(End)

This video demonstrates that a 'bad handover' may contain the following:

- Being late without a good reason
- There should be an assigned order for handover, declared at the outset, or in the Trust handover guidelines, eg Hospital@night guidelines state to start off with either the sickest patients to be handed over.
- Not identifying the patient properly
- Not identifying which ward the patient is on
- Not giving a reasonable history as to what has already happened with the patient.
- Don't say specifically why the nurses are calling the doctors.
- Don't give any information as to the team's plan.
- Unable to answer further questioning on the patient.
- No idea of how sick the patient is, not enough info to be able to prioritise high or low.

Patient Scenarios

Scenario 1:

Mrs Smith is a 45 year old lady who presented to A&E with tender right upper quadrant pain, continuous in nature and she was also suffering from nausea and vomiting. On history and examination, the SHO noted she was obese (90kg), pyrexial at 38°C and slightly jaundice with a positive Murphy's sign. Mrs Smith's medical notes revealed that she had presented 2 months ago with severe colicky upper abdominal pain radiating around the right costal margin and vomiting. It lasted for 6 hours then spontaneously resolved, she was discharged home for follow up with the GP. She says she has had similar episodes since, and they have been increasing in frequency. But this time she felt hot and the pain had lasted more than 8 hours so her husband brought her into hospital. Her observations showed tachycardia and a swinging fever. Her FBC showed raised white cell count and raised CRP. She had an ultra sound scan of her RUQ which showed a shrunken thick walled gall bladder and a dilated common bile duct. She was diagnosed on the consultant ward round, with acute obstructive cholecystitis. She was booked in for a laparoscopic cholecystectomy. Two days later, she had undergone her lap chole and was recovering well on the ward. She was able to eat and drink and was very happy to not be in pain. Then at 8.25pm, the nurses bleep you (the doctor on call) to review Mrs Smith as her MEWS score had sharply risen to 5 and she seems in distress with epigastric pain soon after eating. You quickly review the most recent blood results and note extensively raised LFTs. You reply that you have to go to handover, but you will handover the message with the bleep to the night SHO.

Scenario 2

Mr. Jordan is a 52 year old man who was referred to a urologist by his GP, following a bout of shingles on his groin. It became apparent that Mr. Jordan had been suffering from a feeling of incomplete bladder emptying, hesitancy, frequency and post-micturition dribbling.

He also mentioned that he has to wake up 3-4 times in a night to urinate, but that there has been no problems with passing blood in his urine or of any pain on urination. In the past, Mr. Jordan has suffered from asthma, depression and anxiety, diverticulosis and irritable bowel syndrome. His previous surgical history includes an inguinal hernia repair, and doesn't have a recent history of perineal trauma. There is a strong family history of cancer; his father having had surgery for bowel cancer and his mother having hepatocellular carcinoma. Mr. Jordan reported drinking a 70cl bottle of whiskey every weekend for the past year, having drunk significantly less than this in the past. He has a smoking history of 11 pack years, and reports no history of illicit drug use. On digital rectal examination, he was found to have a lobulated hard mass on the left side of his prostate, which led to performance of a trans-rectal ultrasound (TRUS) scan of his prostate. This revealed a 28cc prostate. It was agreed by Mr. Jordan and the urologist that he should undergo a radical prostatectomy. This was carried out and resulted in the removal of the right pelvic nodes, the left obturator node, left seminal vesicle and the entire prostate. Mr. Jordan was placed in ICU following the operation for 2 days, with a urine output at 40-50mls/hr at 3 days post op. He has subsequently made a good recovery and was discharged to the urology ward where he underwent a trial without catheter (TWOC). The nurses have bleeped you to say that Mr. Jordan had his TWOC three hours ago and has not passed any urine, so he needs to be re-catheterised on the ward.

Scenario 3

Mr. Mann, a 21 year old gentleman, was driven by his friend to A&E following a weekend of severe stomach cramps, nausea and vomiting. He was soon admitted as an inpatient under the gastroenterology team. On Friday, Mr. Mann had been drinking heavily and started feeling ill on Saturday. The pain spread over his entire abdomen, and reached a 9/10 when it was at its worse. Some blood was noticed when he vomited on Monday morning, but this was isolated to only two incidences. No change in stool was reported. However, the patient mentioned that he had lost his appetite, and that he has not opened his bowels for 4 days. He was previously diagnosed with Crohn's disease in 2003. He also suffers from asthma and eczema. A transverse colectomy was performed in 2004 due to his Crohn's, and he had an appendicectomy when he was younger. He doesn't smoke, but reports occasional binge drinking. He is worried about upcoming exams, and is quite anxious about getting discharged early so that he can get back to studying. The patient is currently taking mesalazine as maintenance therapy for his Crohn's, with infliximab infusions every two months, but he often forgets to take his mesalazine. The patient had already been sent down for an abdominal X-ray when you saw him. On review of his X-ray, you can see colonic dilatation of his descending colon which is larger than 6cm in diameter, as well as signs of mucosal oedema. At this point, the patient's temperature has risen to 39.8°C, his pulse is 115bpm, and he appears very confused and disoriented. On examination of his abdomen, you can see that it is significantly distended and is very tender on palpation.

Scenario 4

Mrs. Roberts is a 42 year old female who was referred for an appointment at a breast clinic after a lump was found in her right breast. A diagnosis of breast cancer was made and she underwent a skin sparing mastectomy with axillary node clearance with a latissimus dorsi breast reconstruction, along with reconstruction of her right nipple. In addition to this, she has also had another operation to replace the initial implant in her right breast. The lump

was found incidentally on a routine breast exam. Mrs. Roberts had reported at the time, that she hadn't experienced any recent breast pain, nipple discharge, skin puckering or discolouration. Her mother was diagnosed with breast cancer, one month after Mrs. Roberts' initial breast cancer diagnoses. Her mother underwent a mastectomy, and after the revelation that there had been a long family history of breast and ovarian cancer, genetic screening was carried out, which led to the discovery that both Mrs. Roberts and her mother were positive for the BRCA1 gene. After hearing this and learning the implications of being positive for the BRCA1 gene, Mrs. Roberts became very depressed and anxious about her physical health, and the health of her two daughters. She drinks in excess of 15 units of alcohol a day, and has smoked 3-4 cigarettes per day for the past 20 years. She currently lives at home with her husband and two daughters. The recurrence of her breast cancer was a significant concern for Mrs. Roberts, so she requested to have her left breast removed to prevent any further recurrence of her breast cancer. Post-operatively, Mrs. Roberts' spiked a temperature of 38.8°C and her surgical wound became erythematous around the edge. The wound was swabbed and the sample sent for MCS, for which you are still awaiting the results. The nurses are also concerned that Mrs. Roberts' is objectively low in mood and is refusing to eat or drink anything. She was started on broad spectrum IV antibiotics and the nurses have just bleeped you requesting that you resite her cannula before her next dose of antibiotics is due at 10pm.

Station 3: Clinical Error

Facilitators: Christopher Roughley and Thomas Salter

Objectives

By the end of the session, students will:

- have discussed personal experiences of problems with patient care
- understand the concept of systematic error: organisational, equipment issues, team work and management issues.
- understand the impact of background factors: increased workload, stress and fatigue
- understand the concepts of: slips; lapses; mistakes and violations
- have discussed a critical incident report; assessing what has gone wrong, what can be done to prevent a repeat incident
- have discussed how to speak up in the right way, at the right time, with the right people
- be able to identify methods of taking a leadership stance and consider reactions to this stance

Background

This station is designed to introduce the idea of “clinical error” and principles that can be used to reduce the likelihood and consequences of these events.

It is estimated that between 44,000 and 98,000 people die each year in hospitals in the US due to medical errors (Kohn et al, 1999). This has been likened to a fully-loaded Boeing 747 crashing every 1 ½ days. In the UK 12% of all admissions have been found to involve an adverse event (DH, 2000).

For years the medical profession has fostered a blame culture in response to clinical errors, and the effort at reducing unwanted variability in an individual provider’s behaviour has continuously been counterproductive. Campaigns that use the threat of disciplinary and legal action only serve to create an environment of fear and distrust. The idea of naming, blaming and shaming does not encourage people to be open and honest about their mistakes and suggests that human error can be eliminated altogether. The statistics mentioned in the previous paragraph highlight the fact that attributing these errors to individual culpability and incompetence has been unsuccessful in reducing clinical errors to date, and is also supported by findings from Seven steps to patient safety: A guide for NHS staff (NPSA, 2004):

“Studies have also shown that the best way of reducing error rates is to target the underlying systems failures, rather than take action against individual members of staff. It is vital that we confront two myths that still persist in healthcare, as identified by Dr Lucian Leape (2002) from the Harvard School of Public Health:

- The perfection myth: if people try hard enough, they will not make any errors;
- The punishment myth: if we punish people when they make errors, they will make fewer of them.” (NPSA, 2004).

Fortunately this approach is slowly changing and we can look to the aviation industry for examples of more productive “systems-based” models. Put simply, this is the idea that we accept the human condition means we are inherently prone to error. Once we accept this we can focus our efforts on creating systems that do not allow our errors to affect patient safety through modifying the interactions between us, our equipment and the work environment. In effect, we aim to reduce the “downstream” effect of our errors through the implementation of protocols, fostering a culture of open communication and the freedom to speak up when we have concerns.

There are some examples of these system-based improvements in the IHI’s online Patient Safety Courses (available at <http://app.ihi.org/lms/onlinelearning.aspx>). For example:

The private healthcare provider Kaiser Permanente has introduced medication barcodes. Including a barcode on the patients wristband that informs the nurses on the drug round what dose, time and route of medication they have been prescribed.

Brigham and Women’s Hospital in Boston, MA, in the USA has created an “Executive Walkround” that is designed to increase communication between the front-line staff and the leadership of the hospital. These structured interactions have been linked with improvements in teamwork and safety outcomes (Frankel et al, 2008).

The REACT (Rapid Emergency Assessment Care Team) service at UHCW is based on work done in the Liverpool hospital, Sydney, Australia, created to allow specialists to assess those patients most at-risk quickly and provide support to the team in charge of their care. As a result of implementing MET, Liverpool Hospital reduced its cardiac deaths by 65% and overall mortality by 24%. Unsurprisingly then, this model has now been imported to many hospitals in the UK.

Whilst the creation of protocols is perhaps out of our reach as medical students being aware of those that are in place, and understanding why they are, is important for all current and future medical professionals. There are also many simple things we can begin to do now and in our first few years as doctors that will have a positive effect on patient safety. The IHI patient safety courses previously mentioned suggest highlighting these five behaviours as a starting point for all healthcare workers:

1. Follow written safety protocols
2. Speak up when you have concerns
3. Communicate clearly
4. Don’t let yourself or others get careless
5. Take care of yourself

Leadership theory is a broad and much debated field, with several different approaches in existence. Current convention would have you believe leadership to relate to a position of authority, however it could be argued that it is more accurately an action. This complements ‘Behaviourist theories’ which have been found to be favoured by practising managers (Bolden et al, 2003). Trond Arne Undheim, an entrepreneur and director at Oracle Corporation,

stated “Leadership is an attitude, not a position” in his book, *Leadership from Below* (Undheim, 2009). He also likens leadership theory to Judo: “Like good martial artists, leaders take a grounded stance that allows them to make use of the energy of others—even those who are intrinsically more powerful than they are”.

Medical students may not see the relevance of leadership during their studies, seeing consultants and professors as leaders, but in truth learning to take action is fundamental to their practice and the effective running of a healthcare team. Without the know-how to address problems and seek to improve pathways errors may accumulate and lead to patient harm.

The IHI Open School also offers teaching in leadership and suggests the following goals:

1. Identify ways to take a leadership stance, even if you are not in a formal leadership position.
2. List potential reactions that followers might have when leaders initiate action—and understand what’s behind each reaction.
3. Describe possible approaches leaders use to persuade others to make changes.
4. Describe how to assess the effectiveness of leaders

These ideas do not require hundreds of hours of learning and can open one’s mind to the power that they possess to influence change constructively in the work place. By exploring these issues we can increase our awareness of avoidable errors and have a foundation for moving speaking up and striving for improvement in an appropriate and effective manner.

Structure

Introduction to station	(1 min)
Description of clinical incidents, types of error and violation, problem based learning	(2 min)
Discussion of methods for reducing error and examples of protocols	(6 min)
Small group feedback with advice on and ways to speak-up	(5.5 min)
Summary	(0.5 min)

Intro: Brief introduction to the station to set the scene of current thinking towards intervening and reporting on clinical incidents, drawing on examples highlighted in the welcome lecture and personal experiences. A basic understanding of the types of errors that can occur will be explained. This will cover latent errors, background factors and active errors. To help illustrate the active errors we plan to use a two button prop, one which would offer a good outcome and the other a poor outcome. Each type of error can be acted out on the prop to reinforce the principle.

Clinical incidents: two events will be designed and clinical incident forms of these will be created. The student group will be split into two and each set given one of scenario form. The groups will then be given 6 minutes to read the form and discuss the problems contained

within them and encouraged to generate ideas for systematic changes that may prevent further harm or near-misses. One facilitator will work with each group.

Discussion: A member from each group can feedback their findings and proposals for change to the other. We will then highlight the salient points and discuss examples of protocols and systems that have been developed to counter these problems.

Speaking-up: In this section we will identify the need for speaking up and suggest some methods to do this. The group can be directed to the session handout for further information on leadership and mechanisms by which they can encourage change within the workplace themselves.

Conclusion: Finally, we will summarise the key learning points, chiefly types of error, methods of individually reducing error (such as following written safety protocols, speaking up when you have concerns, communicating clearly and taking care of yourself – examples taken from IHI course pt100) and the need for a systems-based not blame-based approach to tackling error.

Resources

- Chairs arranged around two tables. If greater than 6 people, students are to sit in two groups.
- We will also offer a handout of the topics discussed including information on the characteristics of a leader, PDSA audit cycle methodology and how to reach out to a variety of individuals (Appendix Three).

Patient Scenarios

Thoracentesis

An 81yo man (Mr J) with chronic obstructive pulmonary disease and end-stage congestive heart failure was admitted to the hospital with complaints of increasing shortness of breath. A chest radiograph revealed a moderate sized right-sided pleural effusion. Mr J was treated with diuretics and bronchodilators. However, after 2 days and a net output of more than 2.7 litres, he continued to have difficulty breathing. The team decided to perform a therapeutic thoracentesis (AKA pleural tap or pleural effusion aspiration) to drain the fluid in Mr J's chest. The SHO on the primary team had not performed the requisite number of thoracenteses and therefore could not perform this procedure without supervision. A SHO from another team who had performed the required number of thoracenteses therefore offered to perform the procedure instead. Consent was obtained from Mr J and the SHO performed the thoracentesis.

However, the SHO was unable to draw any fluid, aspirating only a small amount of blood and air. It was at this point she realised that the effusion was on the other side, not the left side she had just tapped. One hour after the procedure, Mr J developed haemoptysis. A chest x-ray was ordered and revealed a pneumothorax on the left and a persistent unchanged pleural effusion on the right.

The SHO immediately told Mr J's wife what had happened. Unfortunately Mr J's condition continued to deteriorate and he died 4 hours later. The SHO was understandably devastated by the error. One week after Mr J passed away his wife called the hospital and asked to speak to the SHO to thank her for her honesty and to check to see if they were doing okay after the event.

(Modified from a report By Colin P. West, MD, PhD. Assistant Professor of Medicine, Mayo Clinic College of Medicine. <http://webmm.ahrq.gov/>)

Takayasu's arteritis

A 26 yo woman (Miss K) was admitted to hospital with severe abdominal pain. She had been diagnosed with a condition called Takayasu's arteritis a decade earlier. This is a vascular disease that results in arterial stenosis. One of the diagnostic clues is a significantly different blood pressure (BP) in either arm. This was true of Miss K and was written in her notes.

Miss K was admitted to the high dependency unit (HDU) at 6:00 pm for monitoring, pain medication, and intravenous (IV) hydration, in preparation for vascular surgery the next morning. The IV, with normal saline, was started in her left arm.

At midnight Miss K's BP was measured in her right arm. It revealed a very low pressure (approximately 70 systolic). The nurse notified the SHO on-call, giving them a concise description of the patient, her primary admitting diagnosis, the surgery plans, and a report of the vital signs. The SHO, who had been given only a brief Handover of the patient (that did not include the history of different BPs in the two arms), was quite worried about the hypotension and ordered norepinephrine (noradrenaline), a powerful vasoconstrictor. He did not examine the patient—if he had, he would have found that her mental status was normal, which might have been a clue that the true BP was not as low as the reading. The nurse took the SHO's verbal order for the medication and administered the drug.

When the surgical team arrived in the morning, they were puzzled by the low BP (since the patient appeared to be otherwise stable) and asked that the BP be reassessed, once in each arm. When the pressure was measured in the left arm, it was noted to be within normal range, even as the pressure in the right arm was still very low. The team immediately discontinued the norepinephrine, believing that the patient's true BP was the one from the left arm, and that the right arm reading was due to local vascular narrowing.

Outcome: Although giving a vasoconstricting medication to a patient with narrow blood vessels could have had catastrophic effects, no adverse outcomes were noted in this case.

(Modified from a report by Elizabeth A. Henneman, RN, PhD. <http://webmm.ahrq.gov/>)

Station 4: MEWS and SBAR

Facilitators: Jessica Scott and Rebecca Woodside

Objectives

By the end of this session students will:

- understand MEWS and know appropriate action to take for a certain score
- be able to calculate scores using a list of a patient's general observations
- use SBAR to communicate patient information in a standardised way
- understand the importance of good record keeping

Background

This station will introduce students to MEWS and SBAR.

Modified Early Warning Score (MEWS)

The modified early warning score (MEWS) is a track and trigger scoring system used when patient observations of vital signs are recorded. It is a patient safety tool that helps to improve patient outcomes by detecting early signs of deterioration. The primary purpose of MEWS is to prevent delay in recognition, and intervention or transfer of critically ill patients (Subbe et al, 2001). It is also useful to identify trends in patient observations and it helps to improve documentation. If all clinical observations are within the normal range no points are allocated and the patient's MEWS is zero. If any of the clinical parameters are abnormal the patient will receive points accordingly (Patel & Morrissey, 2011). The overall MEWS score is then used as a way of quantifying how ill patients are and offers a useful way of communicating this with other healthcare professionals. MEWS helps to identify critically ill patients and patients who are deteriorating, however it is not 100% sensitive or specific and so should be used in conjunction with clinical judgement (Rowan et al, 2010).

SBAR communication tool

Communication failures are a common cause of inadvertent patient harm. Communication failures include the exchange of incorrect, insufficient or unclear information and also failure to exchange important information in a timely and effective manner (Leonard et al, 2004).

SBAR (Situation – Background – Assessment – Recommendation) is an easy to remember communication tool that can be used to structure conversations- especially critical ones – between healthcare professionals. It provides clarity and standardisation of what information should be communicated between members of the healthcare team. SBAR was developed for use in healthcare from a communication tool used in the aviation industry by Kaiser Permanente Hospital in Colorado in the US (IHI, 2005). The aviation industry has shown that adopting a standardised methods and behaviours is a key strategy in reducing risk and improving team work. Effective communication between healthcare professionals

has been associated with improved clinical outcomes and reduced patient morbidity (Uhlig et al, 2002).

SBAR consists of 4 standardised sections:

SITUATION:

- Identify yourself by role and the site/ward you are calling from
- Identify the patient by name
- Describe your concern

BACKGROUND:

- Reason for and date of admission
- Explain significant past medical history (current medications, allergies, prior procedures, comorbidities)

ASSESSMENT

- Vital signs
- Clinical impression

Eg

"I think she may have a pulmonary embolus."

"I'm not sure what the problem is, but I am worried."

RECOMMENDATION

- Explain what you need - be specific about request and time frame
- Make suggestions
- Clarify expectations

Eg "Would you like me get an ABG?"

"Should I organise any investigations?"

"She needs to be reviewed within the hour. When will you be able to get here?"

Structure

Introduce MEWS	(3 mins)
Patient Scenarios	(4 mins)
Introduce SBAR	(2 mins)
SBAR Video	(1 min)
Record Keeping	(2 mins)
Discussion and Questions	(3 mins)

In MEWS introduction, UHCW observation charts and laminated cards detailing how to calculate MEWS will be handed out. MEWS and trigger scores will be explained, including what to do if patient scores MEWS of 4 etc.)

For each patient scenario, students will calculate MEWS for each scenario and decide appropriate action.

In SBAR introduction, laminated cards will be distributed. SBAR will be explained and when it should be used

Video will demonstrate one example of bad communication contrasted with an example of good communication.

In record keeping, facilitators will show example of poor record keeping, show common abbreviations and ask if people know what they mean, show a clerking sheet with unclear past medical history, and show notes sheet without date, time, position or patient sticker, brief notes, no name of senior doctor or bleep number. Students will discuss the importance of good record keeping.

Resources

- Laminated SBAR and MEWS cards
- MEWS sheets from a hospital
- SBAR cards for each student
- Examples of good and bad record keeping (Appendix Four)

Scenarios

Bad SBAR Script

Person 1 – Hey I am calling from the ward, that lady from ward round isn't well.

Person 2 – What lady, what is wrong?

Person 1 – Brown hair, medium height, I think her surname is Smith. She's just not right, she's not herself and seems to have dipped a bit since this morning.

Person 2 – Well give some fluids or painkillers and keep an eye on her. I'll see her after clinic this morning.

Person 1 – Err, I'm not sure if she needs seeing a bit sooner

Person 2 – Well I don't have time for this now just do what you can and I will see her when I am free.

Good SBAR Script

Person 1 – Hello. This is an SBAR communication. I am Dr, the F1 doctor, calling from ward 15 about Mrs Denise Smith, hospital number she has deteriorated since this

morning. She was admitted 2 days ago with shortness of breath, and this morning scored a MEWS of a because her resp rate was, her pulse and sats were, Following this I have given her 15 L of oxygen on a non-rebreathe mask but her MEWS is still I think she needs reviewing within the next hour. What would you like me to do?

Person 2 – Thank you for letting me know. Increase obs to half hourly, keep the oxygen going and I will come to review her in the next half hour.

Patient Scenario 1

Mr. S is a 72 year old retired school teacher. He lives alone. He was gardening this morning when he developed a crushing pain in his chest. He has a history of angina. He takes an aspirin every day and keeps a glyceryl trinitrate spray in his pocket, but rarely uses it. He has been admitted to the cardiology ward.

You are the medical SHO on-call. At 22:00, you receive a phone call from one of the nurses on the cardiology ward. She tells you that Mr. S is experiencing chest pain rated 9/10 on the pain scale. His blood pressure is 90/52. Heart rate is 120. Breathing is laboured at 36 breaths per minute. Oxygen saturation was 85% on room air, he is now on 2L of oxygen and his oxygen saturation has improved to 91%. ECG shows ST changes. The nurse has given Mr. S a glyceryl trinitrate tablet sublingually. No relief to his chest pain.

Patient Scenario 2

Mr. O is 63 years old. He felt dizzy and light-headed at home. His wife has brought him by car to A&E. He has no significant past medical history. The only regular medication he takes is ibuprofen for chronic back pain. 2 hours after arriving at hospital he passed a large, black tarry stool and was complaining of not feeling well and of diffuse abdominal pain rated 7 on a scale of 1-10. After this episode his blood pressure is 102/84, pulse 98 and regular, and his respiratory rate 18, his oxygen saturation is 98% on room air. He is afebrile at 37.0°C.

Reflection

Following delivery of the seminar, the team reflected on our experiences. We thought about what we felt we had achieved and what we would do differently if running the event again. We also considered what we learned from the experience and how our skills and attitudes had been affected.

Adrian

The CHiPS seminar was very much a student project from the beginning. A group of us had been interested in patient safety for a while and felt it should be included in the medical teaching, but in a fun and practical way. We had all been involved in peer mentoring the previous year, which involved teaching topics in short, interactive stations with students rotating between rooms. We thought this approach would be helpful in providing opportunities to learn and practice new skills. The topics we chose were based on aspects of the health care environment which we felt were important for medical students and junior doctors, but which were not currently taught at medical school. Our own experience of clinical placements had shown, for example, that students are expected by theatre staff to know how to 'scrub in' and keep sterile in surgery. We also included the session on dealing with clinical error because we had all witnessed or heard of unsafe acts and found it difficult to how to act in these situations.

I delivered the introductory lecture giving an overview of patient safety. I found it personally useful to do this as it focussed my mind on the key principles. In the past I had sometimes struggled to give a clear description to other students of what patient safety involves. Finding examples of events where safety had gone wrong was also interesting, and improved my own awareness of the role played by doctors. Although my session was not interactive, I felt my audiences were attentive and interested in what I was saying. It seemed to be about the right length so that students got a flavour of theory but soon got onto the more exciting content.

Along with Sarah, I was also in charge of logistics on the two nights. The planning was quite difficult as we were using six different rooms with careful time-keeping required. Sarah kept us extremely organised with paperwork, and this was essential as we had handouts for students at the start, evaluations for them to complete at the beginning and end, and certificates to collect after the seminar. These all had to go to the right people at the right time. We kept the stations very rigidly to time, giving facilitators 2-minute warnings, and announcing when time was up. Although facilitators had all practiced their stations, there were some initial timing problems when student participation was factored in. After the first couple of sessions, each station seemed to manage to get through all their material. On the second evening, we gave them an extra minute for each station as we had received feedback that some facilitators seemed rushed. This, alongside their increased experience, seemed to make all the difference.

Planning and running the seminar was exhausting at times, but I thoroughly enjoyed the experience. I'm sure I learned a lot in terms of organising events, as well as teaching large and small groups. The team worked together extremely well with everyone putting in a lot of effort, and I would like to thank everyone for their hard work.

Poppy and Siobhan

We delivered two sets of evening workshops about surgical safety each with four groups of junior students. The first section of the workshop involved demonstrating sterile techniques for putting on surgical gowns and gloves. As trainers, this topic was one which both of us had found difficult when first encountered in theatre and we felt that we would have benefitted from having more formal training before going into theatre as students. This experience meant that we had insight into the aspects of the procedure that the students may find difficult and we were aware of when the students needed more help when they were practicing their techniques.

In particular, we recognised that the technique for putting on gloves was challenging and many of the students found this part difficult as they were doing it for the first time. As it is a skill that will improve with practice and familiarity, hopefully the students who attended the course will now feel more comfortable when confronted with this task when scrubbing in.

The group sizes ranged from 7 to 13. Whilst there was space in the room for the larger groups, there were times when we recommended that they worked in pairs to help each other. In the smaller groups it was not as significant for the students to work in pairs, as there was plenty of space and the trainers had time to assist students and offer feedback on their techniques. When working with students on a more individual basis, students had the chance to ask questions not only about surgical safety, but also about our experiences in theatre and surgical rotations. On the whole, the students coped well with the exercise and the absence of powder paint on their gowns, in most cases, signifies that they now have the necessary skills to maintain a sterile field in theatre.

Being a trainer at the workshop was an experience that I enjoyed and found very worthwhile. Receiving positive feedback from the students made the evening feel even more worthwhile. I feel that I have improved my own skills and will now feel more comfortable when explaining practical procedures to groups of students.

Rosalind and Adam

During the station, students were attentive and were keen to ask questions about what goes on during a handover process, and the sort of information that would need to be divulged about a patient for an effective handover. The students were very capable of identifying the flaws in the 'bad handover' video, and were then able to point out the key positives following a demonstration of a 'good handover'. It was clear that most of the students were utilising what they had learnt in the first part of the station, during the second part, which was focused on student interaction. However, an issue which became apparent was that the level of medical knowledge was very variable amongst the students, allowing some to grasp the concept of information exchange a lot faster than others, given that they could pick out the key medical issues from the patient information during the interactive segment of the station. Another issue that became evident was length of the workstation, and that it seemed to be very rushed in the 15 minutes time slot. An alteration of the structure and the content of the interactive part of the workstation, allowed the station to run very smoothly afterwards. Technical issues whilst playing the demonstrational videos were minimal, and did not detract from the ability of the students to learn from the presentation.

The overall response to the handover station at the CHiPS workshop was very much a positive one, reflected in the feedback that was given to us by the students, both verbally and on the feedback forms. Most of the comments we received were focussed on requests for more teaching about handovers. This demonstrated to us, that the station had succeeded as an introduction to handovers, by inspiring the students to want to know more, and to be able to put their knowledge into practice. For me, taking part in the CHiPS Workshop was a satisfying experience, which made me feel as though I had helped the students become better prepared for their time in the clinical phase of their course. Not only did it give me some valuable experience in medical education, it also tested my ability to cast my mind back to the earlier stages of medical school, and to pitch the information at a level which would be beneficial for the students.

Chris and Thomas

Our station “Clinical Error and Speaking Up” was delivered to over 80 1st and 2nd year students on the 20th and 22nd September 2012. Each evening, we provided four fifteen-minute sessions with 10-12 students. During each of the sessions we aimed to facilitate a discussion between the members of the groups, where they could begin to explore the types and causes of clinical error. Additionally we encouraged them to discuss how they felt about the prospect of facing incidents of clinical error in the future. In addition we attempted to empower them with methods of addressing clinical errors that they may come across as students or junior doctors.

In this regard we feel the station was successful. We were able to include the proposed case-based discussions, offer some of our own experiences, provide a framework of reporting clinical error and identify individuals and teams that the students are able to contact. All of the students engaged in the case-discussion and all were responsive throughout the event to questions and suggestions made by the facilitators. Interestingly each group seemed to identify different ideas when discussing the cases and seemed interested when we discussed those differences afterwards.

Due to the rehearsals and preparatory sessions our station was prompt and we were able to remain on time throughout the two evenings. This allowed for a smooth transition between the various stations.

I am particularly pleased with the integration our station provided with the three other stations of the workshop. We chose the cases to discuss so that they would highlight the importance of good communication and handovers. Moreover the cases brought up the issue of patient identification and touched upon the idea of “wrong-site procedures”. The overlap of ideas seemed to work well. Those in the later groups who had already discussed some of these patient safety issues were much more confident in identifying areas for improvement when we examined the cases together.

Areas for improvement for the station could be to include information about different types of error on each table so that the groups can refer to that during their discussions. Moreover, I think a list of contact details for students who find themselves faced with a clinical error or want to get more involved with patient safety audits may be useful.

Rebecca and Jess

The development and provision of teaching regarding the two patient safety tools, MEWS and SBAR, was an enjoyable and rewarding experience. The students that came to the seminar were enthusiastic and interested in learning more about patient safety and ways they can improve the care patients receive both now as medical students and in the future as doctors.

The session on MEWS and SBAR was well-structured and we managed to deliver the planned material in a timely manner in the 15 minutes available. Students appeared to enjoy the interactive aspect of the session when working through the case scenarios provided and calculating each patient's MEWS score. This was the first time some students had seen and used an observation chart. The two examples we used showed that MEWS can be a useful tool to assess a patient's condition, but it is just a tool and should not supersede good clinical judgement. Discussion regarding SBAR communication followed on well from considering MEWS scores as it provided a clear example of the use of SBAR when asking for senior input if your patient is deteriorating. The video showing communication between a nurse and a doctor was well-received and was an excellent depiction of how SBAR can structure and standardise communication, dispelling unnecessary and irrelevant information.

The delivery of this material to students highlighted some aspects of the session that could be improved if it took place again in the future. Different groups of students worked differently and at varying speeds when calculating MEWS scores. In some sessions there was very little discussion and students calculated the scores in silence, whereas in other groups students discussed the material and how it should be plotted. It may have been better to work through each scenario as a group to ensure discussion took place in all of the sessions. This would have ensured every student understood the concepts involved and were recording the information correctly. If there was more time available, it would be helpful to identify more situations where medical students can use SBAR communication to make the material as relevant as possible for the students.

Evaluation

Method

Participation in the seminar, and its evaluation was entirely voluntary. We aimed for 40 participants on each of the two nights, and slightly overbooked places to ensure full attendance. A sign-up sheet was kept at the medical school reception with 25 spaces for 1st and 2nd years per night. A reserve list was also kept for cancellations. The seminar was advertised by posters in the medical school, an email sent to 1st and 2nd years, and a 'shout-out' before one of each year's lectures.

The evaluation was carried out by a questionnaire study. Two questionnaires were designed; one investigating self-efficacy, and the other satisfaction. The full questionnaire pack with consent forms and information sheet is presented in Appendix Five. The first questionnaire was developed to look at general attitudes to patient safety, and specific self-efficacy in using the skills taught in the seminar. This was administered at the beginning of the seminar, and immediately afterwards. It will also be sent out to participants six months after the seminar to assess medium-term maintenance of skills. The satisfaction scale was administered at the end of the seminar, including both closed and open questions.

The data were entered into a spreadsheet and explored statistically. Specifically, t tests were used to detect differences in perceived self-efficacy before and after the seminar, and descriptive statistics to show satisfaction results.

Based on high or low satisfaction scores, four participants took part in a qualitative interview. These focussed on what the participants feel they learned from the session, how it could be improved, and the possibility of it being a mandatory part of the curriculum. Each lasted around ten minutes. Interviews were transcribed verbatim and any identifiable information removed. These were used to provide some context to the quantitative results.

Results

Sign-up sheets were full the day after the seminar was advertised. Although some cancellations were made in the week leading up to the seminar, places were offered to students on the reserve list. Altogether, 86 students attended and 79 (92%) completed evaluations.

Table 1 shows the response for the self-efficacy questionnaire, both before and after the seminar. T test results show that increases in scores were statistically significant for every item on the questionnaire ($p < 0.001$). Scores for each skill were very low at the beginning of the seminar at five out of ten or less, as was a general understanding of the concepts of patient safety.

Table 2 shows responses for the satisfaction questionnaire. All participants agreed or strongly agreed that they enjoyed the seminar. All but one (77; 99%) would recommend other students to take part, and 72 (92%) thought it should be made a mandatory part of the undergraduate medical curriculum. When scores were assigned to each item (1=Strongly Disagree to 5=Strongly Agree), the total score was 48.8 out of 55 ($sd=4.01$). One-way

ANOVA did not show any statistically significant difference in total satisfaction score between session (20th vs 22nd September) or year group (1st vs 2nd) ($p > 0.05$).

Comments from the open questions showed one major similarity; 81% independently recommended that the session should have been longer. No other comment was noted by more than five people. The qualitative interviews showed that the seminar was appreciated, in particular that it was run by current students, and in small groups. All said they learned a lot from the event but that it was quite exhausting, run as it was in the evening of a busy day of lectures. Three of the four interviewees felt some of the stations seemed rushed, or that they would have liked more time in each one. One suggested that the stations were not able to actually teach a new skill in the time provided, but rather raised awareness of what is required.

There was some discussion of where teaching on patient safety could best be placed within the curriculum. Most felt the practical sessions would be most useful at the transition from Phase I to Phase II (pre-clinical to clinical) as that is the point when the skills would be used by students. Two suggested that the theory of patient safety could appropriately be taught earlier, within pre-clinical teaching.

Conclusion

There was a good response to the seminar, in terms of interest and attendance, as well as satisfaction and increase self-efficacy. The format appeared to be an effective way of teaching the principles and skills of patient safety, and the stations identified areas where students were not already proficient. Patient safety is not taught in the core undergraduate medical curriculum, but this project has shown that interest is high in this area, and that students find it a relevant and interesting topic.

Table 1: Self-Efficacy

	Before Mean (SD)	After Mean (SD)	T Tests
I understand the concepts of patient safety and quality improvement	5.08 (1.86)	8.24 (1.14)	t(77)=-15.3, p<0.001
I think patient safety is an interesting topic	6.66 (1.61)	8.56 (1.10)	t(78)=-12.1, p<0.001
I believe that medical training will prevent me from making mistakes	7.25 (2.23)	8.29 (1.63)	t(78)=-5.53, p<0.001
I think patient safety should be an important part of the medical curriculum	8.53 (1.21)	9.22 (0.94)	t(78)=-5.45, p<0.001
I believe that medical students can positively affect patient safety in health care settings	7.77 (1.53)	8.67 (1.14)	t(78)=-5.36, p<0.001
I feel able to keep myself sterile in surgery	4.52 (2.30)	7.80 (1.30)	t(78)=-12.62, p<0.001
I feel able to give a patient handover to a member of hospital staff	2.99 (1.95)	7.13 (1.38)	t(78)=-19.87, p<0.001
I feel able to perform clinical observations on a patient and act on them	3.44 (2.16)	6.70 (1.51)	t(78)=-15.35, p<0.001
I feel comfortable speaking up if I come across an adverse incident in hospital	5.34 (2.01)	7.11 (1.37)	t(78)=-8.53, p<0.001

Table 2: Satisfaction Scores

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
	N (%)	N (%)	N (%)	N (%)	N (%)
I enjoyed the seminar	-	-	-	25 (32)	53 (68)
I found the lecture section of the training useful	-	-	1 (1)	37 (47)	40 (51)
I found the stations a useful way of teaching the various skills/principles	-	-	-	27 (35)	50 (65)
I feel my knowledge of patient safety issues has increased	-	-	-	34 (44)	44 (56)
I found Station 1: Preparing for Surgery useful	-	-	-	27 (35)	51 (65)
I found Station 2 Handover useful	-	1 (1)	1 (1)	29 (37)	47 (60)
I found Station 3: Clinical Error useful	-	-	5 (6)	38 (49)	35 (45)
I found Station 4: MEWS and SBAR useful	-	-	8 (10)	30 (39)	40 (51)
I thought the course was long enough to cover the material	3(4)	17 (22)	14 (18)	37 (47)	7 (9)
I would recommend that other medical students attend the seminar	-	-	1 (1)	27 (35)	50 (64)
I think the seminar should be a mandatory part of the undergraduate medical curriculum	-	-	6 (8)	30 (38)	42 (54)

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Appendix 1: TDoc

Name..... WMS No.....

T-DOC: Clinical Hazards in Patient Safety

<p>Preparation for Surgery</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Able to put on sterile gowns and gloves. <input type="checkbox"/> Understands the correct technique of patient identification. <input type="checkbox"/> Understand the need to positively identify patient images. <input type="checkbox"/> Able to complete an abbreviated version of the surgical safety checklist.
<p>Patient Handover</p>	<ul style="list-style-type: none"> <input type="checkbox"/> understands the theory of a good and bad handover <input type="checkbox"/> able to analyse patient information and then deliver a concise and relevant handover to another healthcare professional. <input type="checkbox"/> able to make appropriate notes in receipt of a handover <input type="checkbox"/> able to prioritise based on information given in handover.
<p>Clinical error</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Understands the severity of clinical error <input type="checkbox"/> Shows a basic understanding of types of error <input type="checkbox"/> Shows a basic understanding of causes of error <input type="checkbox"/> Demonstrates willingness to engage in discussion <input type="checkbox"/> Demonstrates a professional attitude <input type="checkbox"/> Listens to/engages with presentations
<p>MEWS and SBAR</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Understand the importance of MEWS monitoring <input type="checkbox"/> Participate in calculating MEWS scores <input type="checkbox"/> Recognise the appropriate action accompanying a MEWS score <input type="checkbox"/> Use SBAR handover appropriately <input type="checkbox"/> Understand importance of accurate and timely notekeeping

Global Assessment

Below Expectation	Borderline	Satisfactory	Above Expectation

Assessor Name	Date	Signature

Appendix 2: Lecture Slides

Warwick
Medical School

RISC
Patient Safety



Clinical Hazards in Patient Safety

20th and 22nd September 2011

IATL

Acknowledgements

- ▶ Facilitators
 - Adam Figgins
 - Adrian Hayes
 - Rosalind Pool
 - Siobhan Reilly
 - Poppy Roberts
 - Chris Roughley
 - Tommy Salter
 - Jessica Scott
 - Sarah Watson
 - Rebecca Woodside
- Dr Vinod Patel, WMS
- Institute for Applied Teaching and Learning

Plan

- ▶ 7:00 – 7:30 Introduction
- ▶ 7:30 – 7:45 Station 1
- ▶ 7:45 – 8:00 Station 2
- ▶ 8:00 – 8:30 Refreshments
- ▶ 8:30 – 8:45 Station 3
- ▶ 8:45 – 9:00 Station 4

Evaluation

- ▶ Consent Form
- ▶ Questionnaires
 - Before and After
- ▶ Interviews
- ▶ Follow-up
- ▶ Please complete Before questionnaires now

What is Patient Safety?

- ▶ **The freedom from accidental injury due to medical care or from medical error**
(Institute of Medicine 2000)
- ▶ **'doing the right thing to the right person at the right time, getting it right first time'**
(Ambrose, 2009)

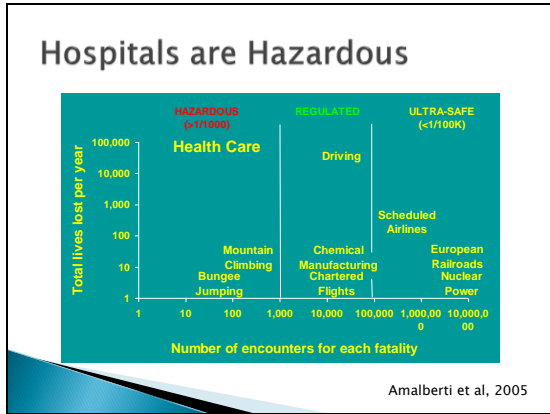
Hospitals are Hazardous

"If you fly on a plane, you have a one in 10m chance of being killed.

If you go into hospital, you have a one in 300 chance – and not from the illness you went in with."

Richard Branson

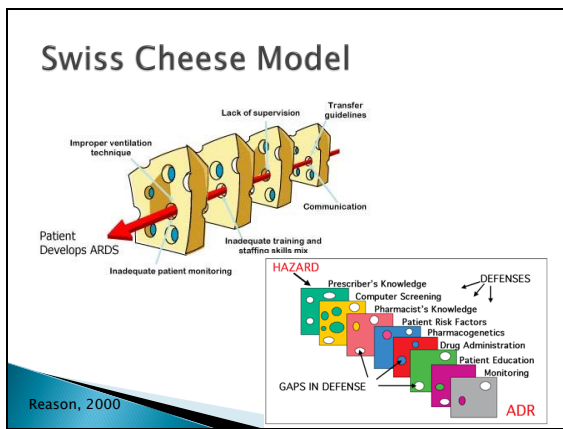
Appendix 2: Lecture Slides



Everyone Makes Mistakes

- Why?
 - Heavy workload
 - Fatigue
 - Stress
 - Shift work
 - Reliance on memory
 - Reliance on vigilance
 - Noise
 - Distractions
 - Unnatural workflow

Watson, 2010



Medical Error

BMJ helping doctors make better decisions
 BMJ 335:456 doi:10.1136/bmj.39475.402650.80 (Published 7 February 2006)

Editorial

Medication errors caused by junior doctors

James McLay, senior lecturer in medicine and therapeutics, Sarah Ross, lecturer in medicine and therapeutics

Author Affiliations
 j.mclay@abdn.ac.uk

Association with depression and burn-out remains uncertain

The effects of medical errors on patient morbidity and mortality have been highlighted in the United Kingdom and the United States.^{1,2} Preventable medication errors account for 10-20% of adverse events in patients admitted to hospital.³ In the UK, up to 1.5% of hospital prescriptions may contain a medication error, and a quarter of these could result in potentially serious effects.⁴ The situation is similar in Australia and the US—medication errors occur in about 1-2% of patients admitted to hospital, resulting in around 7000 deaths a year in the US alone.^{5,6}

Although junior doctors are responsible for most medication errors in hospital,⁷ investigations to date have mainly focused on the role of system failures, rather than factors in prescribers, such as burn-out or depression. The mental health of junior doctors has been studied widely, but no data are available on the possible association between depression and burn-out in prescribers and medication errors. In their accompanying cohort study, Fahnstiel and colleagues report levels of depression and burn-out and associated medication errors in junior doctors working in two paediatric hospitals.⁸

Medical Error

DAILY Mirror

Hospital blunder cancer boy dies

A TEENAGE victim of a hospital drugs blunder died yesterday.

Leukaemia sufferer Wayne Jowett had a cancer drug injected into his spine instead of a vein.

Desperate doctors tried in vain to flush the Vincristine from his system.

The mistake led to the 18-year-old's nervous system being destroyed.

Two junior doctors have been suspended while an internal inquiry is held at the Queen's Medical Centre in Nottingham. Police are also investigating.

Wayne had been expected to make a full recovery from leukaemia.

**FOR INTRAVENOUS USE ONLY
 FATAL IF GIVEN INTRATHECALLY
 KEEP IN A REFRIGERATOR (2° - 8° C)**

Medical Error

BBC NEWS

Friday, 22 January, 2004, 19:30 GMT

Printable version

Two surgeons suspended over op blunder

Two surgeons have been suspended from practising for 12 months for removing the wrong kidney from a patient who later died.

Consultant urologist John Gethin Roberts and registrar Mahesh Goel were both found guilty of serious professional misconduct by the General Medical Council.

Both men had denied the charges.

Graham Reeves, 59, died five weeks after the operation at Prince Philip Hospital in Llanelli.

He had been awaiting surgery to remove a diseased right kidney, but his left one was removed when the surgeons looked at an x-ray back-to-front.

The Telegraph

Surgeons 'ignored student's warning over fatal error'

By Richard Alleyne
 12:04AM GMT 13 Jan 2002

Two surgeons whose patient died after they took out the wrong kidney ignored a medical student who pointed out their mistake as they operated, a court heard yesterday.

John Roberts, 59, the consultant urologist in charge, and Dr Mahesh Goel, 39, who carried out the operation, had not checked their case notes correctly or properly cross-referenced to an X-ray, Cardiff Crown Court was told.

As a result they removed the one healthy kidney of Graham Reeves, 70, a veteran of the Korean war, instead of the diseased organ, leaving the patient without a chance of survival.

Victoria Fern, a medical student observing, warned Goel that she thought he was making a mistake during the operation after studying the X-rays in the operating theatre. But her opinion was ignored, the court was told.

Leighton Davies QC, prosecuting the surgeons for manslaughter, said "She told Mr Goel that she thought it was the right kidney that was not functioning and the left one was compensating for it. Mr Goel told her she had got it wrong."

Appendix 2: Lecture Slides

Medical Error

- ▶ [Just a Routine Operation](#)

Patient Safety Solutions



Patient Safety Solutions

- ▶ Protocols and checklists
- ▶ Constraints
- ▶ Forcing functions
- ▶ Encouraging function
- ▶ Discouraging functions

- ▶ Leadership and Culture



Medical Curriculum

- ▶ Recommendations
 - BMA
 - GMC
 - WHO
- ▶ Little formal teaching
Walton et al, 2010
- ▶ RISC initiative



CHiPS Stations

- ▶ How to prepare for surgery
- ▶ How to hand over a patient
- ▶ How to recognise an ill patient, and what to do about it
- ▶ How to spot an unsafe clinical event, and what to do about it

Appendix 2: Lecture Slides



RISC
Patient Safety

- ▶ 3rd and 4th year students
- ▶ 3 grants
- ▶ 1 publication (in press)
- ▶ 17 projects
 - Handover
 - ED Admissions
 - Sepsis
 - Medication Error Audits
 - Surgical Safety Checklist
 - iPhone App
 - Uniforms for Medical Students

**Get
Involved!**

Conclusion

- ▶ Patient safety is important (and interesting)
- ▶ Medical students can contribute

Appendix 3: Clinical Error Handout

Problems with Patient Safety & Speaking Up Handout

Workshop handout: This document seeks to provide information on how to take a leadership stance, i.e. tools on how to speak up. Much of the information comes from the Open School England. These are simply tips to consider and will hopefully place you in a more considered position when speaking up for patient safety issues and more.

According to Gardner, the nine tasks of leadership are:

- Envisioning goals
- Affirming values
- Motivating
- Managing
- Achieving a workable level of unity
- Explaining
- Serving as a symbol
- Representing the group externally
- Renewing

Key leadership practices:

- **Creating a shared story**
 - Emotions inform us of what we value and enable us to express motivational content of our values to others. If you can use a story that draws on an emotion you can express your value by making your audience feel it, not just think about it.
- **Creating a relational commitment**
 - Gain an understanding of how you can work with others to reach your goal through open dialogue and a shared story.
- **Creating a shared structure**
 - To promote team capacity and development
- **Creating a shared strategy**
 - Knowing your roles and aims will enable effective action
- **Creating shared action**
 - Ensure your goals match the work that is carried out and that work is distributed appropriately.

The above points can also be applied to a team and how to make them successful:

- 1) **Action**:- work of the team should match your goals
- 2) **Capacity**:- learn how to work effectively and develop to ensure sustainability
- 3) **Learning**:- team work supports individual growth
- 4) **Interdependence**:- divide work equally and develop clear roles for each member
- 5) **Explicit norms**:- set clear expectations for your group to govern yourselves and how to work together.

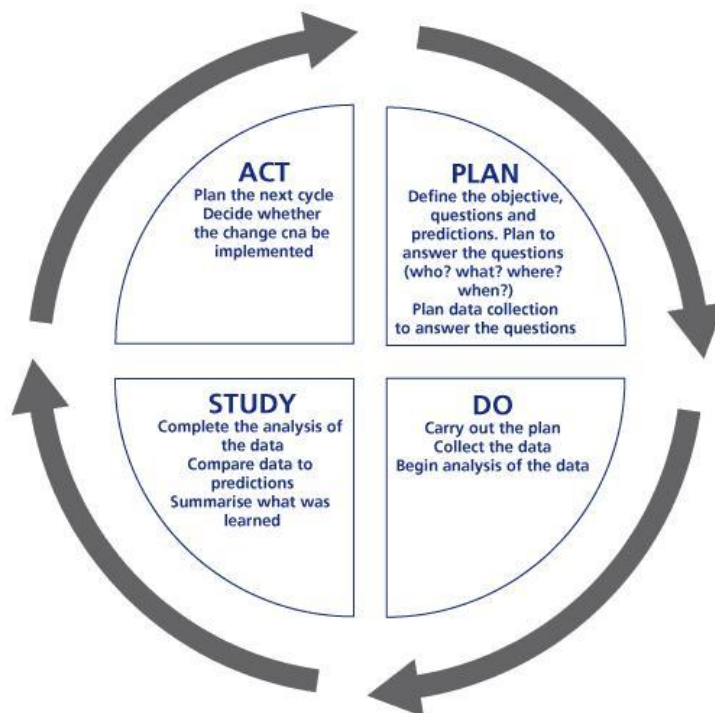
Ensure to articulate the teams purpose to create a shared purpose.

Appendix 3: Clinical Error Handout

Plan, Do, Study, Act Cycles

(PDSA³)

You can use PDSA cycles to test an idea by temporarily trialling a change and assessing its impact. This approach is unusual in a healthcare setting because traditionally, new ideas are often introduced without sufficient testing. The four stages of the PDSA cycle are shown in the image alongside.



When thinking about a problem or how to go about PDSA cycle the following points may help:

http://www.institute.nhs.uk/quality_and_service_improvement_tools/quality_and_service_improvement_tools/plan_do_study_act.html

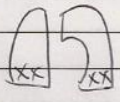
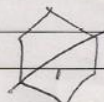
1. Form a clearer picture of the real situation—by gathering data, not just listening to opinions. Ask, how big a problem is this, really?
2. Reframe the problem so that it broadens the issue, and removing any connotations of blame
3. Connect the problem of the powerless to the strategic and business concerns of the powerful: gain facts to give your concern evidence. This will help you consider how to measure change also
4. Connect the problem of the powerless to the hearts of those in power: tapping into people's emotion will help motivate them towards your cause
5. Seek out a powerful ally: to provide support and guidance
6. Start looking for strong ideas about how to solve the problem
7. Put it together in an action plan:

When considering sharing your story and speaking up for a cause, it is useful to consider an effective approach that will win over all types of individuals you may face. Some feel there are three kinds of people:

1. Some people are **logical** (or “rational”): they will be moved by data, evidence, and carefully crafted logical reasoning—and nothing else.
2. Others are more **formal** (or “physical”) in their approach to any problem, and will be looking for signs that those with power and authority think that you are on the right track. They will be watching the political signs in the room, and will not get on board until the change is formally endorsed as a policy, or they see something in writing.
3. But the majority of people—in any room—tend to be influenced most powerfully not by logic or formal authority. For these **emotional** people, you will need to connect your issue to their hearts.

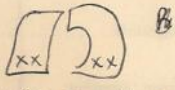
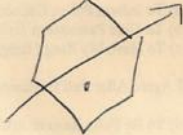
Addressing all of these people within one speech can be difficult to deliver but if you prepare beforehand you will be in a better position to try.

Appendix 4: Record Keeping

DATE	I.P. O.P.	HISTORY SHEET H.M.R.4.	PATIENT'S NAME	Hospital No.
		PAEDIATRICS	ADDRESS	
			Date of Birth	Age
			Sex	Marital Status
		Called to ward		
		HR 107 BP 100/60 T° 38 RR 26		
		↑ SOB		
		O/E  HS I+II +0  B ₅ present		
		Imp/ Pneumonia		
		Plan - Bloods		
		CXR		
		AXR		
		ABG		
		Sputum Culture		
		Senior r/v with w/ results		

TNT24

Appendix 4: Record Keeping

EMERGENCY DEPARTMENT		PAGE 2 TRIAGE / GO DOCUMENTATION					
Does patient meet criteria for react referral		Resps	O ₂ Sats	On Air On O ₂	Peak Flow	Last Tetanus	
YES	NO						
DATE OF INCIDENT	«IncidentDate»	Pulse	Blood Pressure		GCS / AVPU	Pupils Size: L R Reaction: L R	
TIME OF INCIDENT	«IncidentTime»				E4/ M6/ V5/		
CLINICAL PRESENTATION		Temp	Pain Score 0-3	Blood Glucose	Visual Acuity		MEWS
BIBA 73 ♂					R L /6 /6		
c/o SOB on E ↑ last 2/52							Medical History
3/7 ↑ T° 38°C ↑ sputum production							OPE XXXXXXXXXX
Could walk 400 m → 100 m now							OCVA
PMHx → COPD for 10 years							Medications
High cholesterol							
HTN 17 years							Allergies
Meds - Salbutamol PRN							NKDA
Biclohexasone 4 puffs BD							
Gaviscon							
Simvastatin 40mg OD							
Surghx → Cholecystectomy 2006							
TKR @ 2003							
Sochx - lives alone independent in ADLs							
family close by							
Ex smoker pack years 60							
No pets							
Occhx - Ex engineer retired at 60							
O/E							
							
HS 1+11 +0							
							
Date	Time	Fluid / Drug	Volume/Dose	Route	Prescribers Sig	Given By	Time Given

Appendix 5: Evaluation Materials

CHiPS Seminar: Participant Information Sheet

This seminar was designed to introduce patient safety into the undergraduate curriculum. The aim is to introduce issues that we have encountered during daily practice in Phase II and suggest appropriate action to increase patient safety. The seminar involves participating in several interactive workshops, including; Preparing for Surgery, Handover, Clinical Adverse Incidents, and MEWS & SBAR.

We intend to evaluate the seminar to determine whether it is relevant and useful for pre-clinical medical students. We will ask you to complete a questionnaire at the beginning and end of the seminar to assess your confidence in dealing with certain situations. We will ask you to complete a further satisfaction questionnaire after the seminar.

In order to determine if any improvements to confidence are maintained, we will ask for your email address so we can send the questionnaire out again three to six months after the seminar.

We may also contact you to take part in a short interview concerning your experiences of the seminar and your views on improving the session for the future. This will take 10-20 minutes and will be conducted by a student not directly involved in the delivery of the seminar.

All information you provide will be kept confidential, and only used for the purposes of the research project. It will only be accessed by student members of the research team. We will not publish any identifiable data. If you wish to withdraw from the evaluation at any time, email a member of the team and your data will be destroyed.

The seminar will be filmed and a DVD made for our training pack so other universities are able to put on similar events. We will ask your consent to be filmed. If you do not consent to this, you can still take part in the seminar.

For further information, please contact Jess at Jessica.Scott@warwick.ac.uk

CHiPS Seminar

Consent Form

Please initial each of the following and sign the bottom to indicate agreement:

I wish to take part in the questionnaire evaluation as detailed above.

I am happy to be contacted in future for an interview about my experiences of the seminar

I understand that my responses will remain confidential.

I understand that I am free to withdraw from the seminar at any time.

I am happy to be filmed and understand I may appear in a training DVD for future sessions.

Signed _____

Print _____

Date _____

CHiPS Seminar Questionnaire

Complete BEFORE seminar

Year of Study _____

Research ID: _ _ _

Seminar Date: _____

Email Address _____

1: I understand the concepts of patient safety and quality improvement.

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2: I think patient safety is an interesting topic

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

3: I believe that medical training will prevent me from making mistakes

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

4: I think patient safety should be an important part of the medical curriculum

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

5: I believe that medical students can positively affect safety in health care settings

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

6: I feel able to keep myself sterile in surgery

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

7: I feel able to give a patient handover to a member of hospital staff

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

8: I feel able to perform clinical observations on a patient and act on them

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

9: I feel comfortable speaking up if I come across an adverse incident in hospital

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

CHiPS Seminar Questionnaire

Complete AFTER seminar

Research ID: _ _ _

1: I understand the concepts of patient safety and quality improvement.

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2: I think patient safety is an interesting topic

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

3: I believe that medical training will prevent me from making mistakes

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

4: I think patient safety should be an important part of the medical curriculum

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

5: I think that medical students can positively affect safety in health care settings

Not at all

Very much

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---	---	---	---	---	---	---	---	---	----

6: I feel able to keep myself sterile in surgery

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

7: I feel able to give a patient handover to a member of hospital staff

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

8: I feel able to perform clinical observations on a patient and act on them

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

9: I feel comfortable speaking up if I come across an adverse incident in hospital

Not at all

Very much

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

CHiPS Seminar Questionnaire

Complete AFTER seminar

Research ID: _ _ _

I enjoyed the seminar (please circle)

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I found the lecture sections of the training useful

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I found the stations a useful way of teaching the various skills/principles

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I feel my knowledge of patient safety issues has increased

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I found Station 1: Preparing for Surgery useful

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I found Station 2: Handover useful

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I found Station 3: Clinical Error useful

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I found Station 4: MEWS and SBAR useful

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I thought the course was long enough to cover the material

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I would recommend that other medical students attend the seminar

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

I think the seminar should be a mandatory part of the undergraduate medical curriculum

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

CHiPS Seminar Questionnaire

Complete AFTER seminar

Research ID: _ _ _

Please give any positive or negative comments here:

Do you have any recommendations for how the seminar could be improved?

Thank you for coming!