

## CLINICAL SIMULATION SUPPORT UNIT RESEARCH PROJECT GRANT FINAL REPORT FORM

### Project and personnel information

#### A1. Project title:

Investigating the impact of assessor presence on performance in high- and low-fidelity clinical simulations

#### A2. Project duration:

<b>Date commenced</b>	Jan 2014	<b>Date completed</b>	Dec 2014
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#### A3. First named Chief Investigator:

<b>Title</b>	<b>First name</b>	<b>Surname</b>
Mr	Brennen	Mills

#### A4. Other participants:

Please specify if there were any personnel changes made during the term of the research.

<b>Title</b>	<b>Initials</b>	<b>Surname</b>	<b>Organisation</b>	<b>Role</b>
Mr	NP	Ross	La Trobe University, Formerly ECU	CIB
A/Prof	OBJ	Carter	ECU	CIC
Prof	R	O'Brien	ECU	CID
Dr	NA	Strobel	UWA, Formerly ECU	CIE
Prof	CJ	Rudd	ECU	CIF

## B1. Aims and expected outcomes listed in original application

Aim/expected outcome	Met? (Yes, no, partially)
<p>Conduct a randomised comparison trial with n=30 paramedicine students from Edith Cowan University (ECU). Each student to complete four simulation scenarios, systematically rotated as follows:</p> <ol style="list-style-type: none"> <li>1. Low-fidelity/assessor present</li> <li>2. Low fidelity/assessor absent</li> <li>3. High fidelity/assessor present</li> <li>4. High fidelity/assessor absent</li> </ol>	<p>Partially – We first piloted a randomised comparison trial with n=25 students who completed all four study conditions. This original study design proved problematic due to the HiFi simulations taking substantially longer than the LoFi simulations leading to unacceptable backlogs that impacted negatively on the students’ regular learning activities. Our initial analyses of these data also suggested our experimental paradigm was unlikely to find meaningful differences between the HiFi and LoFi conditions. We therefore modified the methodology to primarily investigate the effects of an assessor being present vs. absent in LoFi only. We were able to successfully complete the comparison trial with all study measures with a cohort of 31 students.</p>
<p>Develop materials required to conduct the research including:</p> <ol style="list-style-type: none"> <li>1. appropriate clinical scenarios suitable for study conditions</li> <li>2. objectively structured clinical examination (OSCE) to measure performance.</li> </ol>	<p>Eight scenarios were developed and piloted with n=25 students. We removed two clinical scenarios that proved too difficult for the students. The remaining six scenarios are provided in appendices 1–6).</p> <p>An OSCE checklist to rate students (competent/developing/supervision required) on 15 items was developed after ensuring content validity with a panel of experts (paramedicine clinical supervisors) (see Appendix 7). To rate each student, two qualified clinical paramedic supervisors independently observed videos of the students’ performances. They then conferred to achieve consensus on a final score for each student.</p>
<p>Collect data in the form of:</p> <p><u>Arousal</u></p> <ul style="list-style-type: none"> <li>• heart-rate</li> </ul> <p><u>Performance</u></p> <ul style="list-style-type: none"> <li>• Objectively structured clinical examination (OSCE).</li> </ul> <p><u>Time-to-action</u></p> <ul style="list-style-type: none"> <li>• Duration of simulation (seconds)</li> </ul> <p><u>Proportion of time attending assessor</u></p>	<p>Partially – All measures were successful except for the eye tracking due to equipment failure of the Mobile Eye-XG goggles. These were replaced with Garmin video capture devices strapped to the side of participants’ heads such that the amount of time participants spent conversing with clinical assessors could be inferred by head turns towards the assessors.</p>

## **B2. Summary of the project and its outcomes**

A randomised-comparison trial was conducted with  $n=31$  second-year undergraduate paramedicine students from Edith Cowan University. To align with unit learning outcomes, students completed scenarios in groups of three, with one student nominated as 'delegator' responsible for clinical decision-making and delegation of tasks to the other two students. For example, the delegator might direct one of the other students to take the patient's blood pressure and report the result (see Appendix 8). Each student participated in a total of six scenarios (three with assessor 'present' and three 'absent') acting as delegator for two (one with assessor 'present' and one 'absent'). Students were exposed to each of the six clinical cases in random order.

To test for arousal, students wore a heart-rate monitors that took measurements at five-second intervals throughout the scenario. Students' performances were assessed by two independent clinical paramedic supervisors using the OSCE scoring template. Video footage of each students' performance was also analysed to quantify the time taken to complete the simulation (time-to-action) and what proportion of their time was spent facing the assessor (assessor 'present' condition only).

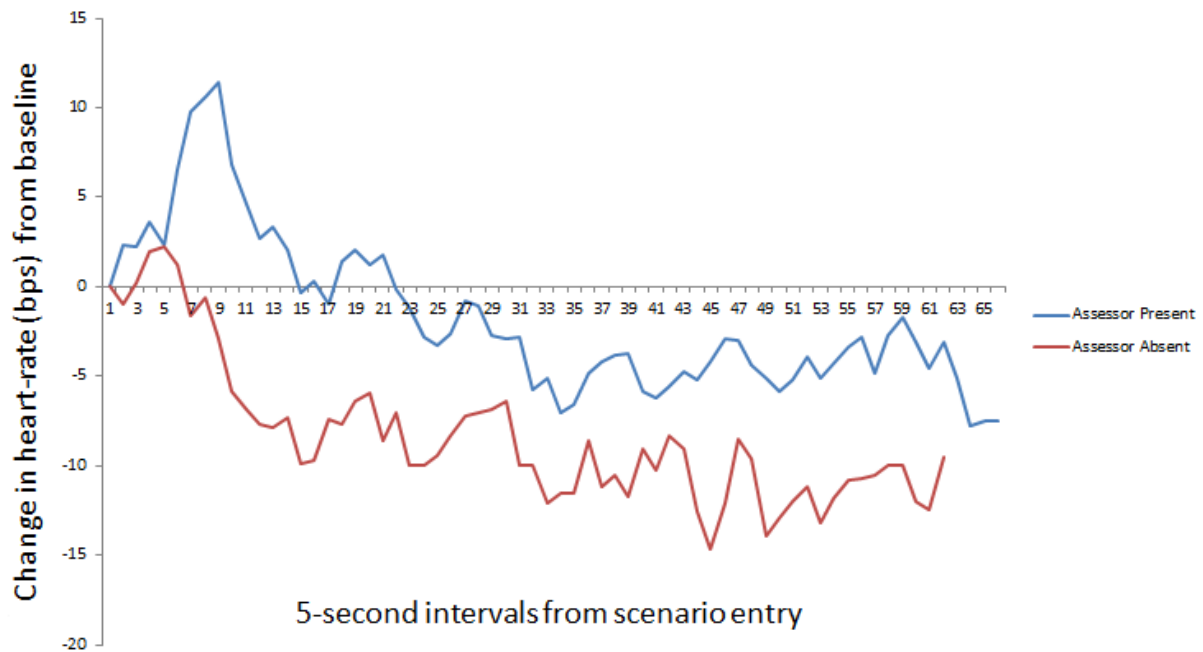
Overall, our measures suggested that the visible presence of an assessor during simulated scenarios significantly increased students' arousal, as suggested by our heart-rate measure, and time-to-action, but had minimal impact on performance. These data provide objective evidence that students undertaking simulated clinical assessments may be better off without an assessor being visibly present as they will be less stressed, will perform the task quicker but will perform no worse.

## **B3. Short summary of results**

### **Results**

#### **Student arousal**

Our first hypothesis was that student arousal, as inferred by heart-rate, will be higher in the presence of an assessor in comparison to no assessor being present ('absent' condition). Peak or maximum heart-rate was higher in the assessor 'present' condition than the assessor 'absent' condition (121.04 vs. 116.11,  $t(26)=2.226$ ,  $p<.05$ ). A comparison of average heart rates during the simulations over baseline suggested the heart rate of students in the 'assessor absent' condition decreased by an average of 9.13 bps from baseline, in contrast to students in the assessor 'present' condition for which it decreased by 4.33 bps. An independent samples  $t$ -test suggested this difference was statistically significant ( $t(14)=-2.261$ ,  $p<.05$ ). As can be seen in Figure 1 below, arousal was consistently greater for the assessor 'present' compared to the assessor 'absent' condition.



**Figure 1: Average heart rate deviation from baseline by experimental condition**

### Performance

Our second hypothesis predicted that students would perform worse in the presence of an assessor compared to the assessor being absent. However, our performance data did not support  $H_2$  as the presence or absence of an assessor did not significantly affect students' performances (71.6% vs. 69.4% respectively,  $t(29)=.689$ ,  $p=.496$ ).

### Time-to-action

Our final hypothesis predicted that participants would have longer time-to-action in the assessor 'present' condition than the assessor 'absent' condition. Our data support this hypothesis, with participants taking longer complete scenarios when assessors were 'present' versus 'absent' (8.4 vs. 6.6 minutes respectively,  $t(29)=4.092$ ,  $p<.001$ ).

### Attending to the assessor

In the assessor present condition, the average amount of time students spent turning away from the simulated patient to face the assessor was 61.4 seconds (SD=33.4 seconds). This equates to 13% of the total time spent in the simulation. 'Attention' was further separated into discussion coded as clinically relevant or not, as well as framed as a question, statement or non-verbal glance toward the assessor. The clear majority of time spent attending the assessor was referring to clinically relevant information (43.4 vs. 17.9 seconds,  $t(30)=5.200$ ,  $p<.001$ ). Relatively equal proportions of this time were spent between asking the assessor questions and explaining decisions to the assessor (28.2 vs. 27.9 seconds,  $t(30)=.058$ ,  $p=.954$ ).

## Conclusions

Our measures of arousal indicated students were calmer when the assessor was not present. Our performance measure did not change between conditions. However, students completed clinical tasks quicker when the assessor was absent. It seems that not only did removing the assessor from the clinical simulation assessment have no impact on performance, but it allowed students to perform tasks quicker. Our interpretation of these data is that students became more focussed on the simulated patient when the assessor was not present, becoming less conscious of the fact they were being 'assessed'. The implication of our results is that visibly removing the assessor from the simulated environment may have positive effects on student performance in clinical assessments occurring in the simulated environment. Furthermore, these results may further justify the additional investment in simulation centres with two-way mirror rooms to be used when performing simulated scenario clinical assessments.

## PART C

### Academic output


A journal publication is currently being prepared for submission to the peer-reviewed journal *Medical Education*.

An abstract will be submitted for the SimHealth Conference 2015.

## PART D

### Certification by Chief Investigator

**D1. I certify the accuracy of the details regarding our participation in this project, as provided in this Final Report.**

Name of Chief Investigator	Mr Brennen Mills		
Signature		Date	18-12-2014

## Appendix 1 – Scenario 1: Burns

### SCENARIO SCRIPT

#### Scenario Theme (for assessor only)

Burns 12% - Advice - Management

#### Scenario Objectives (for assessor only)

To apply your clinical approach  
To consider and discuss an appropriate management  
To consider what advice you would give to the patient

To assess and calculate the percentage of TBSA  
To apply an appropriate management  
To consider and apply your ongoing/long term management

#### Despatch (disclose to student)

You are dispatched signal 1 to a patient who has suffered burns

#### On Arrival (disclose to student)

You arrive at a suburban terrace/shop in Lygon Street, Brunswick East. You are met at the front door of a restaurant and taken to the residence upstairs. You are introduced to the patient who is sitting in a chair in the living room, holding their Right Arm in mid air.

#### Additional Information (for assessor only)

What happened?

I was walking into the living room when I tripped over the rug there on the floor. I went stumbling forward towards the open fire. My Right Arm went into the fire. My shirt caught alight really quickly, it should have a flammable sticker on it or something. Anyway, when I got myself together I stood up and my arm was still burning. I tried waving my arm around to try and stop the flames. I went down stairs to the restaurant and they tipped a pot of water on me. We then called for an Ambulance to check if everything was OK.

What did you do after that?

We then waited for you guys.

#### Towards the end of the task (The assessor needs to advise the delegator)

40 minutes have passed, You have managed your patient's pain and the burned area is almost at body temperature. What is your ongoing management?

**Appendix 2 – Scenario 2: CVA**

<b>Scenario Theme (for assessor only)</b>	
Cerebro-Vascular Accident	
<b>Instruction for Scribe</b>	
This is a CVA. The patient awakens next to their partner, who notices they are drooling, confused with a left sided facial droop.	
<b>Scenario Objectives (for assessor only)</b>	
To identify a patient suffering from a CVA	To appropriately manage a patient with a CVA
To consider transport	To be considerate of time management
<b>Despatch (disclose to student)</b>	
Person unconscious	
<b>On Arrival (disclose to student)</b>	
On arrival you are greeted by the patient's partner who states the information above. They are extremely distressed.	
<b>Additional Information (for assessor only)</b>	
What happened?	
I woke up to find my partner confused and drooling	
When did this happen?	
I don't know	

### Appendix 3 – Scenario 3: Diabetic Hypoglycaemic

#### SCENARIO SCRIPT

##### Scenario Theme (for assessor only)

Altered conscious state 2 - diabetic hypoglycaemia & Mild hypothermia

##### Instruction for Scribe

This is a diabetic hypoglycaemia patient. The student is to identify the cause, and treat accordingly. The patient requires at least 10 minutes for recovery back to GCS 15, in which the scenario ends once the delegator and crew have confirmed return full consciousness.

##### Scenario Objectives (for assessor only)

To identify a patient suffering a hypoglycaemic episode

To appropriately manage a patient with diabetic hypoglycaemia

To consider the management of resources

To be considerate of time management

##### Despatch (disclose to student)

Unknown problem, third party caller

##### On Arrival (disclose to student)

On arrival you are greeted at the door by a young person who does not disclose their identity. They inform you the house is a share house, where approximately 8 people live. They don't really know each other. All this person says is they found this dude lying on the kitchen floor this morning. They lead you to the person then walk off. You ask them to hang around, but they keep walking away and say "I don't want anything to do with it". The patient is lying supine, with their head elevated.

##### Additional Information (for assessor only)

What happened?

No-one is around to provide this information

When did this happen?

Unknown

##### Other/Variables:

The crew may call for backup with SITREP

The patient requires at least 5-10 minutes to improve from GCS 7 to GCS 15.



Extra points for the delegator and crew if they encourage the patient to eat a substantial meal once normal GCS has been achieved, and to also follow this episode up with their Dr. They may also ask if there has been any precipitating events that may have lead to this episode, such as illness (virus etc.) or substance abuse etc.

Whilst the GCS improves to 15 after 5-10 minutes, if any GCS is performed inbetween, make one up that indicates improvement (Eg. GCS 13)

## Appendix 4 – Scenario 4: Knife wound

### SCENARIO SCRIPT

#### Scenario Theme (for assessor only)

Haemorrhage - Street Fight-Alcohol Involved-Knife Wound to Leg-LAC to Head

#### Instructions for Scribe

This scenario requires a focus on both the patient condition and potential threat. It is a emotion-fuelled environment, so extended awareness to surroundings is important. Remember that most trauma scenarios involve strong elements of 'fight or flight' response.

#### Scenario Objectives (for assessor only)

To ensure/apply safety precautions and Danger awareness  
To apply/consider deescalation/reassurance techniques  
To apply wound care and bandaging to Leg and Head.

To consider and apply fluid resuscitation therapy  
To consider and apply appropriate analgesia  
To consider and discuss the priority of management

#### Despatch (disclose to student)

You are dispatched Code 1 to a Stabbing of a 20 year old Male

#### On Arrival (disclose to student)

You arrive to a bar. You notice a large group of people who are waving for you to come over to them.

As you approach the crowd they make a path for you through to the patient. You see a Male sitting on the ground leaning on a park bench. You notice that the patient's face appears to be covered with streaks of blood running down his face. The patient appears to be applying pressure to his forehead/hairline. A Male friend appears to be leaning on the the patients right inner thigh, where you notice a pool of blood on the ground (~350mls) and the friends hands covered in blood. The patient is swearing a lot and as much the friend is applying pressure to the patient's leg, he is trying to keep the patient calm and sitting on the ground.

#### Additional Information (for assessor only)

Q - What happened?

This macho trash tried hitting on my girl, so I went and fronted him about it. We had a few words and I pushed him. That is when somebody came up and smashed a bottle over my head and then I felt a sharp pain in my leg. I can't beleive that the F'n coward took out a knife and stabbed me.

Q - Did you lose consciousness?

No I don't think so.

## Appendix 5 – Scenario 5: Wrist and ankle fracture

### SCENARIO SCRIPT

#### Scenario Theme (for assessor only)

School Yard Fall-Sprained Ankle-Fractured Wrist

Instructions for Scribe

This scenario is designed to develop skills toward working with children, and how in many situations, kids don't disclose all information.

#### Scenario Objectives (for assessor only)

- |  |  |
|--|--|
| To apply Paediatric normal values                            | To apply bandaging to a patient                                    |
| To apply Paediatric weight calculations                      | To apply a formidable arm Splint                                   |
| To apply Paediatric analgesia guidelines                     | To consider and discuss the Hypovoleamia guideline                 |
| To manage a soft tissue injury (RICER)                       | To consider and discuss the Time Criticality of this patient       |
| To apply an appropriate approach to a Paediatric (eye level) | To consider and discuss history taking techniques with Paediatrics |

#### Despatch (disclose to student)

You are dispatched to a Fall.

#### On Arrival (disclose to student)

You arrive at a primary school where you are met by a teacher who escorts you to Tom. Tom is sitting , screaming, crying, holding his left arm and you notice an ice pack on his left ankle. The teacher informs you that Peter, Tom's Friend, came to say that Tom was hurt. Peter took us to Tom on the Footy field where he appeared to be in a lot of pain.

#### Additional Information (for assessor only)

Prior to any pain management- Tom refuses to let any body touch or look at his arm.

- |                                   |  |
|-----------------------------------|--|
| <b>Methoxyflurane (Penthrane)</b> | Little to No effect (10-9/10). Or Patient does not like the Taste.                       |
| <b>Fentanyl Citrate (IN)</b>      | Good effect, but takes several doses for pain to reduce to 2/10 (8/10, 6/10, 4/10, 2/10) |

Q - What happened?

**(Patient too distressed at the start, he can only answer the question after some Narcotic Analgesia)** I was playing footy with the other kids (Sob). Peter and I were going for the ball when my foot twisted and I fell over.....  
.....(Hushed voice feeling ashamed) That is when I started crying because my arm hurt.

\*\* You may notice that the ankle injury is distracting from the wrist injury, which will only be found during further investigations.

## Appendix 6 – Scenario 6: Asthma

### SCENARIO SCRIPT

Scenario Theme **(for assessor only)**

Simple Asthma

### Instructions for Scribe

Time criticality should be identified early with this patient and potential to deteriorate.

### Despatch (disclose to student)

Despatched to 'shortness of breath' - possible anaphylaxis

### On Arrival (disclose to student)

You notice a patient, sitting in the tripod position. She looks up gives a very brief smile. Her parents are standing beside her.

### Additional Information **(for assessor only)**

This patient has been rowing in a competition, hence being wet (not from skin changes)

The patient only improves in VSS 'after' treated with Salbutamol. Until then, the patient remains with severe RSA.

Ideally, the crews should ask for back up, based on the possibility for deterioration, as hinted by her history and previous ICU admiss.

There is no anaphylaxis. There is no systemic involvement, purely respiratory/wheeze.....

.....That's just a curve ball as the girl had just finished lunch, and has many allergies/? Anaphylactic history

**Appendix 7 – OSCE checklist**

Sim number: \_\_\_\_\_ Scenario number: \_\_\_\_\_ Group number: \_\_\_\_\_

Delegator name: \_\_\_\_\_ Location:      D1      D2      S1      S2

Competency Area		Supervision Required	Developing	Competent
1.	Scene Assessment/Control/Safety			
2.	Team / Emerg. Services Communication			
3.	In-Depth History / Social Assessment			
4.	Clinical Assessment / Survey (1 <sup>0</sup> )			
5.	Identification of Patient's Primary Complaint			
6.	Rationale for Treatment Explained			
7.	Clinical Treatment Competency			
8.	Clinical Assessment / Surveys (2 <sup>0</sup> )			
9.	<b>End point</b> - Stable patient being transferred with proper monitoring and treatment strategies			
10.	Practices within approved scope of practice (i.e. measurement/calculation/formulae)			
11.	Applies infection control procedures minimising risk to patients/others			
12.	Follows applicable health & safety legislation (i.e. safe lifting/handling of patient)			
13.	Practices within the legal boundaries of paramedic practice			
14.	Patient Questioning / Rapport / Empathy			
15.	Conduct & Professionalism			

Assessor name: \_\_\_\_\_

Assessor signature: \_\_\_\_\_

## Physician Model for Scenarios

### Frequently Asked Questions

#### Question

*Am I allowed to talk to the patient, or do I have to ask my paramedics to do all the history taking and talking?*

**Answer:** Yes, you can speak directly with your patient.

Whilst you don't have to get your hands dirty, you can still engage with your patient and ask them as many questions as you like. Imagine yourself as a crew of 3, where you are the senior clinician and the other two paramedics are doing all the hands on work perform the skills for them.

The whole reason for using this model for scenario work is to free you from hands on skills, allowing you the opportunity and space for thinking and clinical decision making. Historically, and anecdotally, students tend to get too bogged down and perceptually narrowed into particular skills (such as cannulation or Donway splint application) during complex scenarios. When this happens, they lose focus on the bigger picture of patient management, communication, critical thinking and clinical reasoning. This innovative format provides you with an environment that helps you to develop these capabilities. Whilst you generally work in a crew of 2 on road, this format allows you the time to hone your thinking skills before you enter third year and/or the workforce.

#### Question

*Can I simply ask my paramedics to "do a primary survey", or do I need to walk them through the whole process?*

**Answer:** You can do either.

It is up to you, *so long as you are happy with the outcome*. This therefore, requires your attention to what they do, ensuring they have performed the tasks to your satisfaction. Remember, the patient is ultimately your responsibility. If they omit an important component of the task, it is your responsibility to correct the situation. Either way, you are demonstrating to the assessor that you know your clinical approach.

PA



## Question

*What if my paramedics perform a skill really poorly, or they do some dodgy cannulation or do CPR badly, do I get marked down?*

**Answer:** No you don't get marked down if your paramedics perform a skill poorly.

Don't panic. Remember, you are not being assessed on the hands-on skills per se (that is one of the benefits of this format). That is what CWI assessments are for. Their poor cannulation technique will not affect your assessment. Don't be surprised if the assessor makes mention of the dodgy cannulation after the scenario, however this conversation will be directed at the paramedic who performed the skill, not you.

## Question

*In order to pass, do I need to tick off EVERY item in EVERY box that is highlighted in red?*

**Answer:** No, however this answer must be explained in full.

There are two components to the marking process. The first component requires the delegator to, *as bare minimum*, address at least one component in every red box. This means that if there is only one criterion in a red box, it has to be addressed. Examples of this would be "Primary Survey Managed?", "PHx" or "Rx contraindications". Also remember that the hurdle requirements vary depending on the context of the scenario. Some scenarios such as cardiac arrest scenarios may not require VSS and GCS for example, and are therefore not applicable in those situations. It is up to the delegator to demonstrate their understanding and ensure that all appropriate managements are performed.

If there is more than one criterion, such as in the PSA for example, you at least have to address one component of that box. Using the PSA for example, you need to AT LEAST get a BP, or a pulse, or skin changes. This hurdle requirement highlights to the assessor that you are, at bare minimum, thinking *and* addressing at least one aspect of each component of your clinical approach.

This does not mean you automatically pass the scenario; this leads me to component 2. You must then demonstrate that you have *competently* managed your patient. You may think "but why shouldn't I pass if I have at least addressed every red box once"? Well, let's use an asthma patient as an example. If you only obtained a respiratory rate during an RSA for an asthma patient, you have not demonstrated adequate clinical reasoning to the assessor. This is where the second component comes in. As a student paramedic (in the making), you are now expected to move away from simply 'checking off' a list, to now demonstrating that you are capable of managing a patient, the scene and your crew collectively in an appropriate, timely, safe and effective manner.

So, if you're worried that you haven't splinted or spinally collared a patient whose only presenting problem is diarrhoea after eating at JimBob's Souvlakis at 3am, you can relax - you better understand the marking criteria.

## Question

*Do I need to verbalise every step of the GCS, or can I get my paramedics to perform this skill?*

**Answer:** Either

Remember that whilst the GCS is a skill, it is also an assessment. You can simply say to your paramedics "please perform a GCS", or you can walk your paramedics through it step by step.

*Ideally, you can interact with your patient as well, asking GCS questions yourself and engaging with the patient.*

Either of the three is acceptable.

## Question

*Do I need to categorise every PSA and RSA that I do?*

**Answer:** No, at least not verbally.

It is not a hurdle requirement to verbally categorise every patient, however...

Keep in mind that, in order to determine the level of intervention, many of your treatments require some degree of categorisation anyway. Therefore, it only makes sense to consider how they are placed (categorised) regarding GCS, perfusion and respiratory status assessments. Assessors/invigilators will be able to determine whether there is any incongruence between your management and patient assessments.

Having said this, clinical staff welcome as much narration as possible (between delegator and paramedic crew only), as it helps to indirectly 'demonstrate' to the assessor exactly what you are thinking, and reduces the margin for error.

## Question

*Do I need to justify any of my management to the assessor?*

**Answer:** No

Remember that the assessor is, for all intents and purposes, not in the room. Whilst you may wish to narrate, and discuss things with your crew (and naturally the assessor will hear this), you are not to engage with the assessor at all. The assessors are skilled in both clinical management and student assessment, and possess the skills and ability to delineate *why you are doing what* in the first place.