Department of
Family Medicine

“The Nightmares Course”

Instructor Manual

Department of Family Medicine

Queen's University

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Welcome to the Nightmares-FM course and thank you for helping us out! We could not function without the continued support of experienced community acute care providers such as yourself! We purposefully recruit people from the community hospitals as we find you provide the course with the pragmatic know-how that can only come from working in places where massive amounts of outside help are not avail able and where creative thinking is required in order to overcome the material or manpower limitations. This is invaluable to our residents who will mostly end up working in similar places.

The Nightmares course is designed to train the Family Medicine residents to respond to on call and ER-based acute care scenarios in rural hospitals and in teaching hospital wards. The assumption is that the resident will be the only MD on the scene for the first 20 minutes or so of the situation and is responsible for running the show without outside assistance except for the nurses present at the start of the scenario.

While most acute care providers readily take to instructing a simulation-based course, there are some underlying assumptions that are best spelled out, as they are probably not routinely seen in medical education elsewhere. Also, we wanted to create a list of common rules that we can all adhere to and thus create a uniform learning environment. This manual is our attempt to create such an environment.

"Schweiss Spart Blut" (Sweat Saves Blood)

French Foreign Legion training motto

"Be hard on yourself and life will go easy on you. Go easy on yourself and you can only hope you get lucky"

Dr Walter Himmel, Yoda of Canadian Emergency Medicine

The Nightmares-FM Golden Rules

We keep the scenarios in "real time" as much as possible and we require physical actions to be completed for an action to happen

There is a great tendency in simulation to provide instantaneous information (X rays show up as soon as they are ordered, labs appear miraculously minutes after they have been drawn, etc) and for interventions to occur without them actually having been done (ie the team leader asks for an IV and a team member informs them seconds later "IV is in").

We do everything as close as possible to real life. If the team leader wants an IV, a team member will physically have to insert it into the IV arm, prime it and attach it to IV tubing. If they want pressurized fluid delivery, someone will need to wrap the pressure bag around the IV and inflate it. Ditto, if an ECG or an X ray is ordered, the Mole instructor (see below) needs to wait a few minutes then "show up" as an ECG tech and go through the physical motions of attaching ECG leads and running the machine. Only then is the ECG provided. Bloodwork shows up at least 10-20 minutes after being drawn.

While this takes time, it provides the team leader with a more realistic feedback about how long the tasks he is assigning take and provides a more realistic "rhythm" of resuscitation. It also avoids "magical solutions" where residents who have no idea how to do, say, an IO, magically place it just by saying they did it.

We do waive this rule for the very last session of the course, which is run under its own rules (which are spelled out at the time)

We keep them "flying the plane" at all times

There is a strong tendency in junior learners to keep a mass of references, electronic or paper, around them and keep referring to them during the scenarios. While there are some benefits to using such aide-memoire, the benefits are far outweighed by the serious drawbacks of their use:

1. It creates a crutch that prevents them from committing the protocols and drug dosages to memory
2. It creates a convenient place to hide when they don't know what to do- they bury their head in the papers when the patient gets worse and it looks like the resident is doing something to solve the situation while in reality he is often just doing it in hope that a solution will be miraculously provided by the papers, or even better, by someone else taking charge.
3. In eliminates their situational awareness completely and for extended periods of time. In aviation, where the use of checklists originated, not a few crashes have been caused by the pilots reading through the checklists when they should have been actively troubleshooting the situation. This is colloquially known as "the pilot forgetting to fly the damn plane". To avoid this, aviation protocols call for the pilot in charge to fly the plane at all times while the second pilot goes through the checklists and reads them out aloud to the pilot in charge

Therefore, to avoid all the drawbacks of aide-memoires but give us the benefits of their use, we use the following rules

1. The team leader is NEVER allowed to use the aide memoires while running the scenario
2. The team leader can direct, if manpower allows, a team member to read the drug tables or protocols to the rest of the team

We keep the learners highly stressed, for all the right reasons

Inducing stress in others, especially junior learners, is not a particularly pleasant experience for anyone. However, it is a key ingredient of a successful acute care simulation course. There are 3 reasons for this

1. The residents need to learn how to operate within the restricted cognitive capacity that comes with high levels of stress, and the only way to do that is to have them problem solve while under stress
2. Because of encoding specificity in learning, we remember things when we are in the emotional state and the surrounding that we learned them in. Thus, if you learn acute care reading it from a manual all relaxed and sipping coffee on a Starbuck patio, you will remember it next time when you are doing that; but the recall in a typical resuscitation environment (in hospital, high stress), your recall will be much, much less. Thus we need them to learn acute care skills while in a high state of stress and in an environment that is as physically close to a typical resuscitation

situation as we can make it (thus the mannequins are in hospital gowns and the rooms are made to look like hospital rooms)

3. The only way to "get over the hump" and decrease personal stress responses to resuscitation scenarios is the same as with any other anxiety-provoking stimulus: graduated exposure. The course has been designed so that it requires simple problem solving at first and then consistently increases the complexity of the problems and the stress levels to give the learners precisely the graduated exposure they need.

To keep them stressed, keep them completely accountable for their performance and the performance of their team. Please see the feedback section for help with this.

We show them the full impact of their decisions

In other words, if they screw up and their actions would harm or kill the patient in real life, please go ahead and harm or kill the mannequin. Unless the error is egregious, we do typically allow them some time to recognize the error and recover- a few minutes or a few corrective actions. If they do not provide realistic corrective action, please go ahead and take the scenario in the direction it would take in real life.

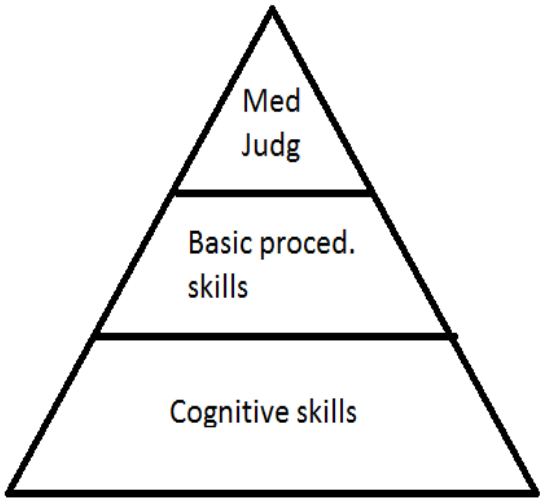
A dead mannequin always leads to a downcast team and a difficult feedback session, but we should not shy from it- it is the perfect time to reinforce the high stakes we play for and why we insist on such high standards of performance. Again, remind them that we do simulation because it allows us to screw up badly without harming live people and that sometimes a mistake like that is much more instructive then a scenarios run with only minor problems.

If the screw up significantly (and the time allows it), we get them to go again

If they screw up significantly and harm or kill the patient, finish the scenario as normal, debrief them as usual (including the death) and then re-load the scenario to the point where they have been struggling or have made the error. Armed with the debriefing information and having had a chance to calm down, they should now be able to resolve the scenario favourably. This reinforces correct actions while getting rid of the "stink of failure". The re-load shouldn't take more than a few minutes but please be cognizant that it does take away from the next person's scenario time, so be efficient about it.

We train and debrief them at all levels of performance

When junior instructors first debrief the learners they tend to focus on the medical judgement/knowledge part of learner's performance: for example whether they recognized the ST elevations on an ECG and whether they knew the right drugs to give and correct dosages. This is very important, but is only the tip of the iceberg of skills that a learner needs to perform well. Conceptually, we represent these skills in a performance pyramid (thanks to Dr Dan Howes for introducing this concept to us)



Cognitive skills represent the basic cognitive processes that allow a learner to effectively process the information and maintain situational awareness. Eg: creating a mental model of the situation, resisting stress, maintaining situation awareness and so on.

Basic procedural skills are the building blocks of physical performance. Eg: effective use of the BVM, proper CPR, correct use of Lifepack 12 or oxygen-delivering devices.

Medical judgement is the applied use of medical knowledge that allows them to navigate a scenario. Eg: recognizing ST changes on ECG as an STEMI and acting accordingly

We need to pay attention to, and debrief, all three levels of performance. As mentioned, the cognitive skills and basic procedural skills are often under-assessed when you start instructing. There is a list of

common errors at these two levels later in the manual to help you structure your observations and feedback.

We give them unambiguous feedback

We created our feedback method based on the ways of the Special Forces and Fighter Pilots- two groups that share with us the need to extract maximum performance from a limited number of training encounters.

Like theirs, our feedback method has one goal:

1. Provide absolutely unambiguous signals when they are meeting the threshold of competence and when they are not

A word on what we mean by threshold of competence: it is common to evaluate a resident's performance according to their level of training ("not bad for a first year resident"). Because we are training them to respond to acutely sick people with potentially lethal conditions, this is not a useful standard. Thus, we will use a standard of a **competent acute care doctor**. Any deviation from this high standard, ie any action that would result in less than optimal management, needs to be debriefed.

Thus,

1. positive feedback should **only** be provided when this standard has been met without significant flaws
2. corrective feedback should be provided whenever there is a deviation from this standard

That's it.

Please avoid at all cost providing positive feedback when it has not been earned, or skipping some of the corrective feedback even though you might be under great temptation to do so in order to "soften the blows". This only muddies the waters and detracts from our goals of achieving maximum performance under stressful conditions. Remain friendly with your tone of voice and your body language, reassure them that we are doing this for their ultimate benefit, but be absolutely ruthless about what needs to be done.

Please use the provided Debrief Form (provided at the end of the manual) to help you organize your feedback

Remember to debrief at all 3 level of competence: Cognitive skills, Basic Skills and Medical Judgement. For Basic Skills, simple corrective instructions are usually enough (they didn't inflate the O2 bag- It doesn't matter why it wasn't done, it just needs to be corrected); Cognitive skills and Medical Judgement errors often benefit from establishing what their frame of mind and reasons for

decisions/action were so you can offer “deeper” corrections. Be aware of the time, as this can take a while and, on the balance, it is much more useful to squeeze another scenario in and another opportunity to practice then spending 30 min on an ambiguous decision.

Now, you might reasonably say, “Hey wait the second, what if all this ruthlessness shuts them down mentally and makes them unperceptive to feedback?” It is a valid question. I can offer these reassurances:

1. The first session of the course (Cognition in Acute Care) introduces the idea of the need to train under stressful conditions and primes them to accept this feedback method as necessary. This session has been carefully designed to get them to “buy in” into this concept and is generally successful in doing so.
2. The Nightmares manual and the initial “circuit training” session provide them with all the necessary mental and knowledge tools. We do not ask them to do anything we have nor prepared them for beforehand.
3. In interviewing dozens of residents after the course, they almost unanimously recognize the necessity and utility of these high pressure tactics in order to prepare them for the stress of doing acute care for real.
4. In the anonymous post-course evaluations, the method of feedback has been repeatedly praised by residents

“But what if one of them does shut down/break down?” I hear you ask. Several suggestions:

1. Offer a brief pause, then make the shutdown part of the debrief and talk about it as it also happens in real life and we need to learn to deal with it and accept it.
2. Encourage them with the point of view that the only useful response to making a big screw up is having another go at it and trying to do better
3. Thank them for making the error so the whole group can learn from it, as mistakes are often much more instructive then correct performance
4. Remind them that this is the ultimate purpose of simulation- to allow us to harm or kill plastic so that we can avoid doing so to real people
5. Recognize that such experiences, as painful as they are at that moment, are often crucial turning points that force the resident to confront their weaknesses and put in a solid effort to master the material.

Again, please resist the temptation to sweep such an occurrence under the rug or let them off the hook because it happened. Give them a quick break, frame and normalize the experience using the above points then debrief it, and all the other actions that require correction.

We provide feedback in a fixed order

1. The participating team leader
2. The participating team members
3. The observing team
4. The "Mole" instructor (the instructor in the room, see **Instructor Jobs**)
5. The "Wizard of Oz" instructor (the instructor behind the glass, see **Instructor Jobs**)

The purpose of this order is to manifold- it provides the observing residents a chance to learn by asking them to provide a structured critique of others, it allows the performing team to identify their own flaws before someone "above their pay grade" critiques them yet it still culminates with the most senior debriefers fine-tuning the feedback using their considerable knowledge and experience

We have specific jobs

Instructor jobs

1. "The Wizard of Oz"- ie the person behind the glass.
    a. run the scenario according to the scenario instructions and within the time frame given for that scenario- you are the Director of this movie!
    b. react to unforeseen actions by the residents (ie giving Atropine to a tachycardic patient) that are not spelled out in scenario decision trees
    c. modify the scenario if the resident actions require it, or if a better learning opportunity can be had by modifying it (eg the resident is flying through the rapid Afib scenario, so you make the patient go unstable in order to provide more of a challenge; or you see that the resident has failed to recognize the rhythm as Afib but is working on it, so you give him more time then is allocated in the scenario before the patient crashes). There are two useful tools for this job
        i. establishing what the team's mental model of the situation is (ie residents who sees an irregular HR of 180 and low BP and sets up for a cardioversion have made the model of "unstable tachyarrhythmia" in their head. The residents who are looking for p waves for 10 minutes have not established this mental model). You then have to decide if giving more time or clues will serve the scenario purpose best, or should you force them into a decision
        ii. keeping a meter of team leader's cognitive load. You have to gauge this indirectly through how fast they are absorbing new information, their body language and their tone of voice, but with repeated observations, it quickly becomes second nature. I usually like to keep their load at 80-90-% of the

capacity, less if they are struggling (by spacing out the events or new information provided) and they haven't hit the time limits of the scenario. Also, I occasionally go above 100% (by throwing a lot of input at them: EKG comes up, X ray person wants to position the patient for a CXR, the Mole is asking a clarification on the order, and then you quietly change the rhythm to something lethal) in order to induce panic/helmet fire so they can practice being in that mental state and getting out of it.

d. be the ultimate debriefer as you have the most information about the scenario and what the intent and learning points behind it are

2. "The Mole"- ie the person in the room
    a. provide the initial information and then provide the rest of the information at strategic intervals, as agreed between you and the Wizard
    b. perform ancillary team member actions (eg ECG tech, X ray tech)
    c. be the primary observer of residents' actions. The Wizard will often miss things because he/she is busy running the scenario. Thus, we get the Mole to debrief before the Wizard, as they often have a more complete picture of the residents' actions. This is easier said than done as you need to monitor 4 people at 3 levels of performance (cognition, basic skills, medical judgement) and in a number of performance categories (initial assessment, diagnostic work up , etc). Use the form to help you with this.

The Big Bad List of Errors

This is a list of errors that commonly come up in the Nightmares course. They are organized according to our performance pyramid and include errors with cognitive skills and basic procedural skills. Medical judgement errors are not listed as they are too varied.

Cognitive errors

Fixation error: eg ECG comes up, everyone goes to look at the ECG for 5 minutes, while no one is watching the patient. This is a common cognitive error in ambiguous situations, like an unstable patient without a clear cause at the beginning of a sim scenario. In such instances, the learner is desperately trying to find a high salience point that will allow them to shortcut the decision making process and come up with an answer as to what is going in. ECGs, bloodwork, X rays and so on are just such high salience data points.

Tips: explain that this is an extremely common error but that it is a bad one to make because it makes the leader and the team lose the situation awareness. Direct them to use a "diving method"- when "diving in" to interpret a piece of data requiring all your attention, designate a replacement who will keep a situation awareness while you focus on the data; and only allow yourself 1-2 minute "dives" into being preoccupied with the data interpretation before you "come up for air", and look around you and re-orient yourself to the general situation. It might take several such "dives" before you finish processing a piece of complex data.

Premature closure: eg: the patient is weak, confused and sweaty, HR is 150 and BP 80/60, the team leader decides that it is an unstable tacchyarrythmia that needs to be cardioverted. She doesn't take the time to get a 12 lead which would have told her that it is a sinus tachycardia or get a temperature which is high due to this patient's septic shock.

This is an error connected to fixation error. In unambiguous, high-stakes situations, learners will look for those high saliency points, and once they find them (in this case, high HR, low BP), they might use heuristics (rule of thumb reasoning) to come up with a rapid decision without taking into consideration the alternatives (in cognitive psychology, this is called" what you see is all there is"). The tendency is there because our brains find uncertainty taxing and wants to get out of that state as soon as possible.

Tips: Explain why this error happens and encourage the leader to use the alghorithms we established in the manual as a safe guard against such errors (in this case, first step of rapid HR protocol is: sinus or not sinus). Also, encourage them to verbalize their understanding of the situation to the team before doing

high-stakes actions (like cardioversion) as it allows the team-mates to pitch in and correct or supplement the mental model the team leader has.

Helmet fire: eg: 2 minutes into the scenario, patient is having a large anterior STEMI, the team leader is busy shouting orders for Heparin, Plavix and to call a cath lab. He has just picked up a syringe of TNK when the patient goes in the pulseless VTach and becomes unresponsive. The team leader is overwhelmed by the situation and just stares at the monitor with the TNK syringe in his hand.

Helmet fire happens when there are more inputs requiring decisions then the person is capable of integrating and acting upon. Everyone has such a limit, and the limit varies with each person and each situation based mostly on how familiar the situation is and how stressed the person is.

Tips: explain that this is another very common error and that everyone has a limit. Explain that it has three reasons: stress, unfamiliarity and a large number of "things" happening at the same time. The solution is to first work on your stress response- take a deep slow breath, calm the panicked inner dialogue and then proceed to simplify the situation into basic alghorithms (like ABCs)- eg the Vtach unresponsive patient has a patent airway but no breathing or circulation- thus we must provide both with BVM and CPR until we decide on the further course of action. Once the stress has been reduced and the situation simplified and acted upon, the person usually finds they have overcome their helmet fire and can process the situation further.

Losing emotional control. Eg, the patient just became unresponsive and the team leader is wide-eyed and shouting a million instructions at his team without regard to whether they can execute them or not. He jumps on the BVM, starts bagging at 30 breaths per minute, then rushes off to operate the Lifepack 12 as it looks like the team isn't operating it appropriately.

This is the twin face of helmet fire and also happens because the person's cognitive and emotional limits have been exceeded. But, instead of paralysis, the person becomes hyperactive, loses situational awareness, agitates his team and generally makes everyone life more difficult. The less dramatic version is a wide eyed leader with a tremulous high pitched voice and shaking hands.

Tips: normalize the situation. It happens to everyone from time to time. Remind them, however, that if one person loses emotional control, the rest of the team tends to get infected with panic too and that in turn makes the team members less effective. At best, another team member may be able to re-establish the calm, at worst, the whole team gets panic-stricken and disintegrates. Panic tends to reduce our cognitive capacity, narrow our situation awareness and makes physical tasks more difficult to execute. Like in helmet fire, taking a big slow breath, calming the panicked inner voice and proceeding to process the situation in very simple, algorithmic terms (we have a patent airway, we don't have breathing or circulation- we need BVM and CPR) tends to get people over the crisis moment. Remind them also that,

while unpleasant, dealing with panic is an essential feature of this course and they will only get better at it by repeated exposure.

Indecision: eg. the patient is short of breath. He has been placed on BiPAP and CXR shows a bad pneumonia. O2 sats keep dropping down and the patient says he is getting more and more tired. There is no anesthesia or RT immediately available. The team leader thinks that the patient is deteriorating but is unable to commit herself and her team to an intubation. She keeps waiting around and debating the alternatives until the patient crashes and becomes apneic.

Indecision errors happen when the person has a full understanding of the situation but is unable to commit herself to a course of action that she perceives to be risky or difficult, even though the situation clearly calls for it and there are no viable alternatives. It happens because the person either doubts her ability to complete the action or because she can't or won't pay the mental price of making a high-stakes decision (or is unwilling to be held responsible if the action goes wrong) but thinks that by not acting they are avoiding paying the cost of a difficult decision

Tips: Get the resident to go though their mental processes and decisions. Once they say that they recognized the patient was getting worse and a corrective action was called for, ask them to list the reasons they decided against the action, and what their perceived outcome would be if they stayed inactive. This usually demonstrates that they overestimated the difficulty of the action and underestimated the consequences of being inactive. It is useful to go through this step because in the indecisive person's mind, indecision is often confused or identified with prudence and thus they don't think that they have made an error at all. Once they are taken through the chain of events and likely outcomes, they tend to recognize and admit the error. Once the recognition has occurred, correction can begin. If the error was due to resident's lack of confidence in their ability to perform an action, coach them through the action until they are comfortable with it. If they were indecisive because they were unwilling to pay the mental and other prices of making a difficult decision, remind them that if they fail to make a decision, circumstances will make the decision for them, usually for the worse. Finally, ask them to use the "self talk mantra" to quiet their doubts: "This needs to happen now, there is no one else who can do it, but I can and I got it". This simple self talk is remarkably effective in quieting the doubting voices in one's head and encouraging action taking.

Failure to establish a mental model: eg. The team leader is staring at the patient who is confused and weak, ECG shows irregular narrow complex tachycardia at 160 and BP of 60/40 yet the leader is unable to integrate separate data pieces into a cognitive schema of "unstable tachycardia". Often due to simple lack of knowledge, sometimes because the person has trouble integrating facts, either due to stress or because of innate lack of ability in that regard. Luckily, it is a very trainable ability with repetition.

Tips: establish whether it happened because the person simply didn't know enough about the topic to form a mental model. If that is the case, coach them with relevant information. If they had the

knowledge but simply couldn't put it all together, encourage them to verbalize their thinking to the team by listing all the salient data points and asking the team for an interpretation: "ok team, we have a guy who is tachycardic, confused and hypotensive. What do you guys think it going on and what should we do?". Explain that asking such a thing does not make them less of a leader- it is not their job to know everything, but rather to direct the actions of the team. Once the team has pitched in with opinions, they can make a decision and resume control of the situation.

Confusing continuous and intermittently sampled variables (otherwise known as "forgetting to cycle the BP"). Because most of the variables on the monitor (HR, O2sats, RR) are continuously sampled, the team assumes that all the variables on the screen are continuously sampled. Thus, they get an initial BP and then assume that the BP is continuously updated and always current.

Tip: tell them to cycle the damn BP. This usually requires a few repetitions before they really get into the habit of doing. The easiest fix is to set the BP to automatically cycle every 2-3 minutes once the initial BP has been obtained.

Common basic skills errors:

Not attaching the oxygen tubing to the O2 outlet, or not turning on the outlet, or not turning it on wide enough that the bag on a non rebreather or a BVM inflates.

Improper BVM technique leading to leaks or the patient's face being pushed down and compressed rather then placed in a jaw thrust position

Bagging too fast and with too much volume (1 second in, 3 seconds pause, only 1/3 of the bag volume with each breath)

CPR too shallow- usually their speed is ok, but they are too shallow, as identified by the mannequin's CPR detector. Usually because they are using their arms rather than their body weight. Lock elbows fully, lean over the patient's chest and move from your body, rather than arms

Putting the monitor leads on the Lifepack 12 and turning it on, only to see an interrupted flat line on the Lifepack's monitor. This is because when it turns on, the Lifepack assumes it will need to defibrillate, so it senses from the paddles, rather than monitor leads. The situation is fixed by either putting on the paddles or by pressing the "Lead" button on the left side of the Lifepack's button area to switch the sensing to, say, lead II.

Confusing pacer and defibrillator buttons. You don't need to press sync button to pace someone. Also, no electricity goes through the patient's body until they manipulate the "Current" button to more than 0 mA. Also, the rate at which they pace has no effect on the chance of successful pacing- if they can't get capture, or they lose it, the only action is to check for proper pads contact then increase the current.

Assembling the Epi/Atropine/etc injectors- opening it upside down (ie opening the top of the package, rather than the bottom)- remind them that “if you can read it (ie it is right side up), you can open it”, at the bottom of the package

Fluid boluses: forgetting to pressurize or squeeze the bags- without pressure it takes 7-8 minutes to infuse 1L of fluid, with pressure and a 16-18 GA needle, takes 2-3 minutes.

Intubation- not placing the patient’s head at the head of the bed, not putting his head at waist level, removing the pillow before laryngoscopy. Once the laryngoscope is in, rocking it rather than lifting at 45 degree angle. Letting go of the tube once they have intubated the patient, and slamming the BVM/CO2 detector/whatever on top of it, driving the unsecured tube deeper into the patient’s bronchus. Failing to recognize an esophageal intubation.

Queen's Simulation NM Course Scenario Performance Assessment

Primary Assessment and ongoing re-assessment	
Would keep:	Would change:

Diagnostic Workup	
Would keep:	Would change:

Therapeutic Actions	
Would keep:	Would change:

Communication and team organization	
Would keep:	Would change:

Course structure

Purpose of sessions

1. Manual

2. Circuit training (1 half day during initial 2-day session in July)
3. Specific modules (3 half days during initial 2-day session in July)
4. Enhanced difficulty (1 half day usually in October)
5. Transport (1half day usually in January)
6. Muscle Memory (1 half day usually in May)

1. Manual provides the necessary medical knowledge and simplified, physiology-based cognitive schemas that should allow them to problem solve any instance of, say arrhythmia or shortness of breath, within the confines of these schemas
2. Circuit training provides basic procedural skills training as well as team-work skills training through the use of blindfold exercises
3. Specific scenario modules is where we start to use high fidelity simulation for real. These modules cover one of the core topics of NM at a time (arrhythmias, then shortness of breath and so on) and are designed to reinforce and practice the schemas presented in the manual. Particular attention should also be paid to cognitive skills and basic procedural skills as this is the first time when they get to use them in high complexity scenarios.
4. Enhanced difficulty scenarios are designed to get them to work with scenarios where they don't know right off the bat what core topic is going to be utilized and also where more than one core topic is utilized at the same time (eg PE with hypoxia, hypotension and decreased LOC). Thus increases uncertainty, pushing their stress levels and cognitive loads higher, and it forces them to integrate their knowledge across the self-contained core topics
5. The transport scenarios have a twofold goal- to provide a practical primer on the difficulties of transporting critical patients and to provide an extra layer of complexity to further increase the stress and cognitive load. The scenarios are brutally hard, and for a reason- they are all based on real life scenarios. Thus, if they complain about the difficulty, tell them that life is hard and that is all there is.
6. Muscle Memory scenarios. This is by far the most important session after the initial course. Here, we scale the difficulty back and run them through the 16 scenarios that compromise the core of majority of acute care. Also, we are using the high number of scenarios and the lack of breaks to provide a high operational tempo that puts them in the mode where they are continuously working on the scenarios for prolonged periods of time without letup. This method is commonly used by the military as it is remarkably effective in producing "muscle memory" that sticks long after the conscious knowledge of the topics has expired. For this to work, it is CRUCIAL that you do not break the cycle of continuous work by providing long feedback sessions or giving them breaks. The reduced complexity also provides them with a sense of mastery of the course content that will hopefully enable them to face real life acute care with confidence. The details of how these scenarios are run are provided before the session.

Structure of the initial 2 day session

0830-0900 Cognitive aspects of resuscitation (see primer at the end of the manual). 1 group

-normalizing the stress response

-short term memory data limit (7+/- 2)

-beginner vs expert cognitive schema comparison

-use of System 1 vs System 2

-sources of stress (unexpected situation, a life on the line, fear of inadequate knowledge, fear of being judged by peers, helmet fire)

-how nightmares will help

9:00-10:30 Circuit Training. 3 groups rotating 30 min each station

1. Station: Airway and breathing

-FiO2 escalation- Nasal prongs at 5L (40%)- Non rebreather (70%)- Non rebreather + Nasal prongs at 15L+ (100%)

-Assembling, dosages and use of nebulizer masks. Noting that FiO2 is quite low (~40%) so should be used early

-NIPPV via CPAP/BiPAP: how does it work, when to use and when not to use

-can't have a disfigured airway

-can't be claustrophobic

-can't be actively vomiting or bleeding

-preferably conscious. If not, requires 1:1 observation and rapid removal of mask if vomiting

-NIPPV via BVM

-can attempt on anyone

-proper BVM technique: C+E, 1 full second to squeeze 1/3 of the bag (500cc) every 4-6 seconds. Nice and slow to prevent insulfating the stomach

-Supraglottic devices- King LT, LMA: how to use, when to use and when not to use

-use when NIPPV is failing or has failed

-much easier to place then ETT

-avoid if actively bleeding/vomiting or airway closing

-good initial choice in most other situations

-need sedation

If there is time

-Intramuscular Epinephrine for anaphylaxis and asthma(doses and delivery)

-Nitro and Lasix for CHF- doses/indications/contraindications

-Magnesium IV, Epi IM, Ketamine for asthma

2. Station: Circulation

-Monitor leads placement

-white is right, smoke over fire

-Operating the Life pack 12

-how to attach the paddles and the monitor leads to the Lifepack

-how to turn on the Lifepack 12

-recognition that when turned on, it will sense from the paddles. If monitor leads only are attached, will see interrupted flat line

-how to use the “Lead” button to change the monitored lead from Paddles to leads II or III

-how to use the 3 electrical modules: defibrillator, cardioverter, pacer

-Crash cart drugs primer- when to use and how to assemble

-overview of common colour-coded meds on crash cart (Epi, Atropine, etc)

-how to open the packages: if you can read it, you can open it (from the bottom)

-how to assemble the injectors

-Vassopressors primer

-Dopamine: overview of dosage range (5-20 mcg/**kg**/min) and when to use

-good for any type of shock but causes extra tachycardia

-can cause tachyarrhythmias (mostly Afib) in cardiogenic shock

-Phenylephrine: overview of mixing, dosage and when to use

-10mg in 100cc: 100mcg/cc concentration

-use 1-3cc at a time, once an effective bolus dose found, hang it and drip it at that many cc/min

-good for any shock except cardiogenic

3.Station: CPR/BVM/Supraglottics practice

-CPR: proper technique, rate, dept and how to minimize interruptions: **10 min**

-practice individually and as team to minimize interruptions

-use of the mannequin CPR monitor to asses quality of CPR

-insist on PERFECT CPR. DO NOT accept anything else

-BVM: practice of proper technique: **10 min**

- proper BVM technique:

-C+E

- 1 full second to squeeze 1/3 of the bag (500cc) every 4-6 seconds. Nice and slow to prevent insulfating the stomach

-insist on PERFECT technique

-Supraglottics: King LT and LMA: **10 min**

-practice placing them

11-12am: **Principles of code leadership practice using rapid ACLS scenarios 3 groups**

-Use SVT, rapid Afib, VTACH with and without pulse, VFib, Brady in a random order

-leader is blindfolded and stands with hand on the femoral pulse

-team-mates are forbidden from taking any action without specific leader instruction, although they can report on what is happening

-rapid debrief about the principles of code leadership

-clear identification of roles

-closed loop communication

-maintenance of situation awareness

-whole scenario and debrief should be no more than 5 min. Rapid turnover to another leader an another scenario

-should accomplish 10-12 turnovers in the one hour

12pm-1pm ***lunch with tachyarrhythmia lecture*****. 1 group**

1pm-3pm – **tachyarrhythmia scenarios module. 3 groups**

3-4pm ***Shortness of breath lecture*****. 1 group**

All scenarios are 20-25 min- 10-15 min for doing them, 5-10 minutes for feedback and changeover. All scenarios done in teams of 3-4, with the other 3-4 watching. 2 instructors per group of 6-8

2nd day

8:30-10:00. **Shortness of breath scenarios module. 3 groups**

10:00-10:30 ***Shock Lecture*. 1 group**

10:30-12:00 **Shock module. 3 groups**

12:00-13:00 ***LOC lecture with Lunch*. 1 group**

13:00-15:00 **LOC scenarios module. 3 groups**

15:00-16:00 **Open time with instructors. Instructors + group practice whatever they think the group or individuals need to improve upon. 3 groups**

Cognitive aspects of Resuscitation: primer

Ask them to imagine they are on call, have just fallen asleep at 2 am, when a "Code 99" is called in a room of one of their patients who was admitted 2 days ago with a NSTEMI. As they rush into the room, a nurse says, "Doc, it looks like he is re-infarcting". The patient looks ashen and sweaty and his BP reads 80/60. What are your first thoughts?

1. HOLY CRAP! I am not even awake yet and I got to be the boss here????
2. HOLY CRAP! I just met his two kids, they are gona lose their dad if I mess up!
3. HOLY CRAP! I don't really remember the dosages or names of the drugs!
4. HOLY CRAP! If I mess up my resident and staff will think I am an idiot!

And then, and only then, maybe

5. Do we have an IV?
6. Is he on a monitor?
7. We should put some oxygen on him!

I put 7 items, because that is how “wide” our short term memory is, 7+/- 2 items. And that is when we are not stressed. When we are, it goes down to 3-4. Thus, for most people, when faced with such a situation, the only thing in their head will be HOLY CRAP! It will be our job in this course to move you beyond this feeling, also known as “helmet fire”, where more things are happening then you have cognitive capacity to process.

Now let us look at how an expert might deal with this situation

1. HOLY CRAP! (yes we still get scared, mostly about what our colleagues will think if we mess up. You just get better at hiding it)
2. IV-O2-monitor
3. 12 lead for STEMI vs NSTEMI
4. Cardiogenic shock: BETA1 agonists, aortic balloon pump if I can get it
5. ASA-Plavix-LMW Heparin
6. TNK vs Angio if STEMI
7. What chocolates are they selling in the vending machines? I'll be hungry after this....

The expert has several advantages. As we learn, we make cognitive schemata of various complex situations. Thus, an expert will have a schema like “cardiogenic shock” with information on how it usually looks like, what medications or procedures are useful, etc. Thus, he or she does not need to think about every individual piece of information, but simply executes the whole schema while monitoring for any deviations from the usual script (thus “IV-O2-monitor” instead of “Hmmm do we have an IV, oh and while we are at it, put him on a monitor and, of yes, get some O2 as well”). This

clustering of information is akin to how chess masters are able to play many games of chess simultaneously- they are not remembering every individual piece, they are just remembering that Table 1 is playing the Queen Gambit, Table 2 is playing the King' Gambit, etc.

The second major advantage of an expert is that his or hers learning has already occurred. When we are learning a new skill, we activate our frontal, conscious cortexes and the process of learning occupies all of our cognitive ability. This is because the frontal cortexes have very limited working memory (7+/-2), can execute only 30-40 cognitive functions per second, are easily crowded and reduced by emotional states; and deliberate thought and attention must be paid to every aspect of what you are doing and every action needs to be consciously monitored. Thus it is hard to pay attention to what the patient is doing when all your attention is occupied with what YOU are doing, whether you should be doing it, whether you are doing it correctly, and what you should be doing next.

When learning has already occurred, all those processes have been moved to the back of the brain, to the automatic behaviour centres. These have vastly more processing power (1-2 billion operations per second), come to conclusions faster than conscious decision making and are less crowded by emotional states. When combined with rich cognitive schema that contain a lot of information in a very compressed package, it allows an expert to size up a complex situation in a very short period of time, while leaving the precious conscious, frontal cortex, cognitive capacity free to act on monitoring the progress and noting any deviations from the expected course of events.

In the NM course, we will strive to give you denser schema of acute care situation through lectures and scenario feedback, simulated stress to give you graduated exposure that will hopefully reduce the stress of real life situations, and enough repetition to move your decision making processes to the back of the brain. All this should make you far less likely to have a “helmet fire” and able to retain effective decision making capabilities in acute care scenarios.