Simulation Case Library for Cape Breton Longitudinal Integrated Clerkship Students

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ABSTRACT

Background: The incorporation of high fidelity simulation training in medical education has been growing in popularity in Canadian medical undergraduate programs. It has been shown to be well received by medical students and improves outcomes on exams as well as communication, collaboration, professionalism, and leadership skills, all of which are part of the CanMEDS framework. In Cape Breton, there are currently 4-5 Longitudinal Integrated Clerkship (LIC) students from Dalhousie Medical school that rotate through Cape Breton Regional Hospital during their third year. They currently only have one half day of simulation training dedicated to their level of training throughout the year. As a result, there is a need to expand the LIC simulation case library and increase the number of simulation sessions. The objective of this project was to expand on the current simulation curriculum for medical students in Cape Breton which includes the preparation of pre-simulation reading material and development of additional simulation cases.

Methods: The development of cases was informed by feedback from medical students and evidence from literature review. Each case developed had objectives that correspond to ones outlined by Dalhousie University Faculty of Medicine for clerkship students. Feedback from LIC students was collected from a survey which was released to graduating and incoming LIC students in September 2024. The survey gathers data on prior simulation experiences and cases that the participants have been exposed to, their satisfaction with pre-reading material, and qualitative feedback on their simulation experience and what they hope to see in the curriculum in the future. Qualitative responses were reviewed and categorized into themes. A literature

search was conducted prior to the design of new simulation cases in order to incorporate recent evidence.

Results: Six new simulation case scenarios were created for the case library including: acute pulmonary edema (congestive heart failure), urosepsis/shock, gastrointestinal bleeding from peptic ulcer disease, respiratory failure from pneumonia (with escalation to intubation), small bowel obstruction, and pediatric meningitis.

Conclusion: With the addition of the six new simulation cases, there are now a total of nine scenarios in the LIC case library. The next phase of this project involves the implementation of these new cases for the current cohort of LIC students and to gather their feedback to identify potential areas for improvement.

1. INTRODUCTION

The incorporation of simulation training in medical education has been growing in popularity in Canadian medical undergraduate and graduate programs[1]. Simulation training in the context of medical education refers to a technique that attempts to reproduce clinical scenarios through replicating the environment or situation for the purpose of learning or practice[2,3]. This type of educational activity creates a safe and low stakes learning environment that allows for mistakes without direct translation into adverse patient outcomes. It also gives an opportunity for trainees to gain exposure to "high-acuity low-frequency" situations which they may not have a chance to see during their training. The technology used to aid simulation training in medical education has continued to evolve. In 800 BC, medical disciples practiced their operating skills by using models developed with watermelon, gourd, and reeds[2,4]. This later advanced to using animals to practice surgical skills in the middle ages. Phantom, a model made from a human pelvis and a dead baby, was created in the 1700s and one of the earliest medical simulators in history[2,5-6]. In the last 100 years, the incorporation of advanced computer systems allows models to be created that provide real time feedback, mimic physiological responses, and have higher fidelity. "High- fidelity" models refer to simulation tools that create a high level of realism for the learner and encompasses tools including mannequin, task trainer, and virtual reality. Now, high fidelity models, such as SimMan, are growing in popularity and commonly used in Canadian medical undergraduate and graduate programs.

Although much of the literature surrounds the role of simulation training in postgraduate medical education, there are some articles that are focused on undergraduate students. The literature highlights the benefits of simulation training for medical students. Students find that simulated patients create a more realistic case compared to simple manikins especially for taking

a history and conducting a physical exam[7]. This increased realism can translate to improved scores on Objective Structured Clinical Examination stations[7]. The use of simulation training is more effective than didactic traditional teaching in developing communication, collaboration, professionalism, and leadership skills[8], all of which are part of the CanMEDS framework[9]. The development and improvement of CanMEDS roles is important for all medical students regardless of which specialty they wish to pursue - from family medicine to surgical specialties. The literature also reveals that simulation training is well received by medical students. Learners identified that simulation training improves their teamwork skills, taught them how to systematically approach problems better, and taught them to apply their theoretical knowledge[10]. Of students who were exposed to simulation training, a vast majority of learners had an excellent experience and felt that it should be mandatory in the curriculum[11].

In Cape Breton, there are currently 4-5 Longitudinal Integrated Clerkship (LIC) students from Dalhousie Medical school that rotate through Cape Breton Regional Hospital (CBRH) during their third year. LIC students complete their rotations in emergency medicine, pediatrics, internal medicine, family medicine, OB/GYN, and surgery. Cape Breton also has a family medicine residency program and, more recently, an integrated family medicine emergency medicine residency program. Currently, there are typically 8 family medicine residents and 2 integrated family medicine emergency medicine residents per cohort. The residents typically have simulation sessions with high fidelity models once every 2-3 months and LIC students are also often invited to the sessions for exposure. Each simulation session usually has 2-3 case scenarios that learners rotate through in small teams. When LIC students are invited to the sessions, each team consists of one senior family medicine resident, one junior resident, and a LIC student. During these scenarios, one of the residents assumes the role of team leader and the

other two learners are team members. Depending on the case, one of the learners may be an observer. Although this is excellent exposure for LIC students, often the case scenarios and objectives for the simulation are more advanced than the level expected from a medical student and they are usually observing the scenario play out. Given the vast evidence for the benefit of simulation training, it is important to create a simulation curriculum appropriate for the LIC student level.

There are various medical simulation case scenarios that are published online and in journals. One well known database of peer-reviewed simulation cases available online is EM SIM CASES[12]. It is a blog which aims to share simulation cases that can be used by emergency medicine programs and the creators encourage educators to use their cases when starting a new simulation curriculum so that they do not feel they are "starting from scratch". The cases on the blog are typically resident level or higher and the topics are more focused on emergency medicine. There are a few published simulation cases in the literature specifically for medical students including cases on bacterial meningitis with cerebral edema in a young adult[13], asthma exacerbation[14], resuscitation of a multisystem trauma[15], and simulated night on-call cases[16]. All these cases serve as sources of inspiration, but the equipment used may be different than what is available at the Cape Breton teaching site and the identified objectives in the cases may be different than the objectives outlined for Dalhousie medical students. Thus, there is a need to create simulation case scenarios that can be executed at the Cape Breton site which address LIC objectives identified by Dalhousie's Faculty of Medicine.

Currently, there are 3 cases that are used for LIC specific SIM day near the end of their clerkship year. There is a case on cholecystitis, pediatric asthma exacerbation, and preeclampsia. These cases were developed by Dr. Sarah Mader for her resident project. Given that there are a

handful of clerkship students that rotate through Cape Breton every year and the fact that a medical school will be opening in Cape Breton in 2025, there will be increased interest and need for simulations. The objective of this resident project will be to expand on the current simulation curriculum for medical students in Cape Breton. This will include the preparation of pre-simulation reading material and development of additional simulation cases.

2. METHODS

The development of cases was informed by feedback from medical students and evidence from literature review. Each case developed had objectives that correspond to ones outlined by Dalhousie University Faculty of Medicine for clerkship students (Appendix A. Topics with Corresponding Objectives in the M3 Dalhousie Curriculum). Each rotation, including emergency medicine, family medicine, internal medicine, obstetric and gynecology, pediatric medicine, and surgery have their own unique set of objectives. This resident project was exempt from REB approval under article 2.5 of TCPS 2.

2.1 Incorporating Feedback from Students for Case Development

A survey was released to Cape Breton's graduating LIC students and incoming LIC students in September 2024 to seek feedback on the current SIM curriculum. The survey closed in December 2024. Table 1 shows the survey questions that were distributed to the LIC students. The results from the survey were used to guide the development of pre-sim preparation material and simulation case development. The survey gathers data on prior simulation experiences and cases that the participants have been exposed to, their satisfaction with pre-reading material, and qualitative feedback on their simulation experience and what they hope to see in the curriculum in the future. Qualitative responses were reviewed and categorized into themes.

The topics for new simulation cases were chosen based on the students' responses to the question "which simulation cases have you been exposed to during your training so far (either as a participant or an observer)?" and "what other simulation cases would you find helpful and would like to see during your training?". The goal of these two questions is to identify topics that

students would like to see in the future but ensure that they will not overlap with topics of past simulations.

Table 1. Survey questions for graduating and incoming LIC students.

	Question
	1. When did you do your LIC year? ● 2023-2024 ● 2024-2025
Exposure to SIMs	2. Which simulation cases have you been exposed to during your training so far (either as a participant or an observer)?
Pre-Reading Material	3. On a scale from 1-10 how helpful was the pre-reading to your learning?
	4. How did you find the volume of the pre-SIMs reading? ● Too light ● Just right ● Too heavy
Feedback for SIMs	5. What did you enjoy most about SIMs?
	6. What do you think could have gone better? How can we improve your experience?
	7. What other SIMs cases would you find helpful and would like to see during your training?

2.2 Incorporating Evidence from Literature for Case Development

A literature search was conducted prior to the design of new simulation cases in order to incorporate recent evidence. The objectives of the search were to 1) identify features and uses of high-fidelity medical simulations that lead to most effective learning and; 2) identify considerations that should be made when designing simulations for the medical student population. Published high-fidelity simulation cases for medical students which were identified in the search were also gathered and reviewed prior to development of the new cases.

The electronic database that was searched included Ovid MEDLINE(R) ALL (1946 to November 22, 2024). The search strategy applied on MEDLINE is shown in Appendix B. Search terms included “simulation”, “medical education”, and “medical student”. Identified articles underwent a title and abstract screen to exclude articles which were irrelevant. Relevant articles were reviewed in full and their findings were summarized into evidence tables. Recommendations found through literature review for the design of the simulation cases were incorporated when feasible to the curriculum and resources available at the Cape Breton teaching site.

2.3 Design of Simulation Cases

The standardized EM Sim Cases simulation template was adapted for the design of the new simulation cases. This template was published by EM SIM CASES after a rigorous process involving multiple focus groups and rounds of feedback from interprofessional simulation educators[12]. The use of the template and alteration to the template is encouraged by the authors as long as the footer at the bottom of the page remains unchanged. The template has the following sections: case summary (brief description of case; goals and objectives; learners, settings, and personnel; scenario development), patient information (initial and additional information), technical requirements/room vision, Sim actor and standardized actor patient roles and scripts, scenario progression, appendix (laboratory and imaging results), and facilitator cheat sheet and debriefing tips.

Once the topics were identified for the case development through the results of the survey, similar case scenarios were identified in the EM SIM CASES database and modified to (1) address clerkship learning objectives outlined by Dalhousie’s Faculty of Medicine, (2)

incorporate feedback from students identified through the survey, and (3) incorporate recommendations found through literature review when feasible. If an appropriate case scenario was not available for a topic, a case was created inspired by the author's experience of a real clinical case. Each case will be accompanied with suggested pre-reading material for students.

Following the development of the simulation cases they were reviewed by Dr. Mader and emergency department physicians for feedback.

3. RESULTS

3.1 Results from Survey

There were a total of 5 respondents to the questionnaire between September 2024 and December 2024. 40% of the respondents were current 3rd year LIC students and 60% of the respondents were 4th year medical students who recently completed their LIC year.

Prior exposure to simulation training. The 4th year medical students who recently completed their LIC year report that they have been exposed to the following cases through being invited to resident simulation sessions: pediatric diabetic ketoacidosis, bradycardia (requiring transcutaneous pacing), arrhythmia (requiring cardioversion), delirium, acute psychosis, stroke, anaphylaxis, and status epilepticus. Specific LIC focused SIMs they were exposed to include pediatric asthma exacerbation, pre-eclampsia, and acute cholecystitis. Majority of the current LIC students were exposed to a trauma case in pre-clerkship and the first session of resident cases completed in August 2024 (anaphylaxis and status epilepticus).

Pre-reading/preparation. On a scale of 1-10, students found the pre-readings to be 7.8/10 in terms of helpfulness. Majority (60%) of the students found the amount of prep for SIMs “just right”, whereas 20% found the reading to be too heavy, and 20% found the reading to be too light.

What LIC students enjoy about simulation. The qualitative responses provided by the students were categorized into themes. Overall, LIC students enjoy working with an interprofessional

team during SIMs, the safe learning environment, and found the debriefing sessions informative. They found that the repetition and application of knowledge helpful in their learning and the experience was beneficial for their exam preparation. Responses to this question are outlined in Table 2.

Table 2. Responses to the question “what did you enjoy most about SIMs?” categorized into themes.

Themes	Quote
Students enjoy working with an interprofessional team.	“Learning with the whole team - IPE in a safe space.”
Students find the repetition and application of knowledge helpful in learning.	“It is a great opportunity to practice translating book knowledge to clinical practice. In some cases, it allows you to gain knowledge about the hospital system (such as observing different PPO's [pre-printed order sets] used).” “Allows me to practice clinical decision making in a more real scenario.” “The practice! Repetitions are so helpful. Practicing team communication, the process, and decision making is so helpful and really hard to replicate in a non-SIM, non-clinical environment.”
Helpful preparation for exams.	“I remember them and what we do. I drew on the learning for exams.”
Safe learning environment	“A great place to learn with low consequences.” “The ability to make mistakes without it being real life consequences, it’s a safe space to try to test your knowledge.”
Beneficial discussions outside of the simulation.	“Introduction to debrief was professional, very helpful, thorough, and overall very beneficial to learning.”

Suggestions for improvements. LIC students have suggested areas of improvement regarding the design of cases and on how the simulation training is delivered. The students would like more cases to be designed with involvement of an interprofessional team because they found that they learned a lot from other members of the team. Additionally, they would like the design to incorporate an option to "call the staff/resident". They state that "a big part of clerkship is learning how to conduct referrals and present cases [to residents and staff] over the phone, so this is excellent to include in simulations". In regards to the delivery of simulation, one student acknowledged that although it is beneficial to watch how more senior members of the team would approach a problem, they would also like more of an opportunity to be involved during a case. They say, "it felt like a lot of my time was watching the residents and seeing their approach (which was also a good learning experience)". This comment further highlights the importance of LIC specific simulation days. Many students also stated that they would like more simulation sessions throughout their LIC year.

Ideas for other simulation cases. Students have identified that they would like to see more of: obstetric and gynecology cases, pediatric cases, intubation, cardiology focused cases, neurology focused cases, respiratory and cardiac arrest, trauma, gastrointestinal bleeds, and post-op complications.

3.2 Results from Literature Review

A literature search was conducted on December 8, 2024. The search strategy is attached in Appendix B. A total of 417 articles were identified with the search. After screening, 6 articles

were identified which either 1) identified features and uses of high-fidelity medical simulations that lead to most effective learning or, 2) identified considerations that should be made when designing simulations for the medical student population. The 6 articles were summarized into evidence tables in Appendix C.

The main takeaways from literature review that will be used when designing new LIC cases include:

1. Designing cases in a way where there are no additional purposely placed added stressors outside of the already stressful situation of being in a simulation[17].
2. Ensuring that sessions are designed so that there is adequate time to provide feedback[18].
3. Structuring the simulation curriculum in a way that students have multiple opportunities to be involved in simulation through multiple sessions[19]. More exposure to simulations in different sessions can reduce learner stress and translate into better learning outcomes in the later sessions.
4. Inclusion of optional pre-reading on mindfulness to help manage stress during a simulation environment[20].
5. Include cases that require telephone communication with specialty consult service and highlight objectives relating to communication during the debriefing session[21].
6. Providing a handout with guided questions for students to reflect on when observing[22].

3.3 New Cases Developed for the LIC Case Library

From incorporating the feedback of both graduating and incoming LIC students, the following additional topics were added to the simulation case library: acute pulmonary edema (congestive heart failure), urosepsis/shock, gastrointestinal bleeding from peptic ulcer disease,

respiratory failure from pneumonia (with escalation to intubation), small bowel obstruction, and pediatric meningitis.

Prior to all sessions, students who are observing will be provided with a handout with guided questions so that they are still actively engaged. A copy of this newly developed handout is provided in Appendix D. Students will also be advised that at any point of the case, they can call a resident for advice. They would be encouraged to present the information they have gathered so far and to have specific questions they want the resident to address. These instructions and link to handouts are provided in the facilitator notes for all cases. The new cases were also designed so that they would require a consultation to a specialty service at the end of the case. For all cases, there were no additional purposely designed added stressors. In regards to the pre-reading material, an email will be sent out to students at least one week prior to the simulation date with some "suggested reading" material which is based on the medical content of the case, as well as "optional reading" material which would include a resource for mindfulness. These details will also be found in the facilitator notes section of each case.

The specific objectives identified from the M3 curriculum that were used in the development of cases can be found in Appendix E. The newly developed cases can be found in Appendix F.

4. DISCUSSION

A total of 6 new cases have been created for LIC students rotating through Cape Breton. The cases focus on acute pulmonary edema, urosepsis/shock, gastrointestinal bleeding due to peptic ulcer disease, respiratory failure from pneumonia, bowel obstruction, and pediatric meningitis. The development of these cases was guided by feedback from LIC students as well as insights obtained from a comprehensive literature review.

Similar to the literature, the survey responses from LIC students indicated a desire for increased simulation experience. The addition of these 6 cases to the existing library aims to provide medical students with enhanced opportunities for simulation during their training. Additionally, students expressed that they often find themselves observing residents conducting simulations while part of the team. Although they appreciate the opportunity to witness the approaches of residents, students are eager for more hands-on experience. Consequently, these new cases have been specifically designed to allow medical students to take the lead; while there are instances where they may consult a resident or specialist by telephone, the medical students are positioned as the primary decision-makers. Recognizing that medicine is fundamentally a team-oriented discipline, the students have indicated a desire for greater exposure to interprofessional collaboration, which has been addressed in several cases featuring embedded respiratory therapists and nurses.

One limitation stems from the small sample size. The LIC feedback was collected from only five students across two cohorts. This limited data may not accurately represent the broader perspectives of future medical students rotating through Cape Breton. It underscores the necessity for ongoing data collection and curriculum enhancement to ensure that the simulation experiences remain relevant and effective.

Furthermore, the expansion of the simulation curriculum faces various challenges[23]. One main barrier is the resource-intensive nature of the sessions. They are human resource intensive and require, at minimum, a team consisting of a simulation technician, a content expert (usually an attending physician), a resident physician, and other interprofessional healthcare professionals as dictated by the simulation case. Additionally, the integration of simulation-based learning into the demanding schedules of medical students poses logistical difficulties. High fidelity simulators also tend to be expensive. Fortunately, the existing infrastructure and equipment at Cape Breton Regional Hospital mitigates some costs associated with expanding a simulation curriculum. The new cases were designed with the existing equipment in mind.

The next phase of this project involves the implementation of these new cases for the current cohort of LIC students. Simulation sessions are typically a half day long and 3 cases are completed during that time. Currently, there is only one simulation day per year for clerkship students. Given the introduction of additional cases, it will be necessary to schedule additional time in the simulation lab. Considering the longitudinal nature of the clerkship, it would be reasonable to plan these dates closer to the end of the clerkship year, after students have had exposure to a majority of the rotations. Following implementation, it will be crucial to gather their feedback to identify potential areas for improvement and additional cases they would like to see developed.

The proposed framework for the 2024-2005 LIC cohort entails the scheduling of three half-day simulation sessions between June and August 2025. These sessions will each run through 3 cases and the sessions will be spaced approximately three to four weeks apart. It is pertinent to note that new LIC students typically commence their training in September; thus, these three months represent the concluding period of the current cohort year. Additionally,

during the summer months, Cape Breton's family medicine residents generally take a brief break from simulation training to allow the newly initiated residents—who begin on July 1—to settle into their roles. This timeline will make scheduling time in the simulation lab easier due to the reduced demand in those three months. Subsequent to each simulation session, a feedback survey will be disseminated to the LIC students, facilitating the identification and implementation of any urgent adjustments prior to the next scheduled session. Following the completion of all the simulation sessions, feedback from the LIC students will be reviewed and incorporated to modify the existing case scenarios, create new case scenarios as requested, and modify how the simulation cases are delivered for the next cohort of LIC students.

With the establishment of a new medical school in Cape Breton anticipated for 2025, there will be a substantial increase in third and fourth year medical students completing their rotations in Cape Breton. It is beneficial to have additional case scenarios available in the case library for senior medical students so that cases can be cycled and not identical each year. As a future step, faculty can also implement pre and post simulation testing to see whether there is a measurable change in knowledge and skills. It will also be valuable to explore opportunities for pre-clerkship students to engage in high-fidelity simulation experiences. Previous studies[24] have highlighted the positive impact of simulation in this demographic, although it remains essential to adjust the difficulty of the cases accordingly.

5. CONCLUSION

Six new simulation case scenarios were created which align with the clerkship learning objectives outlined by Dalhousie University Faculty of Medicine. The design of these cases was informed by feedback from LIC students and evidence from literature review. The next phase of this project involves the implementation of these new cases for the current cohort of LIC students and to gather their feedback to identify potential areas for improvement. As a future step, faculty can also implement pre and post simulation testing to see whether there is a measurable change in knowledge and skills.

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7. APPENDIX

A. Topics with Corresponding Objectives in the M3 Dalhousie Curriculum

B. Search Strategy for Literature Search

C. Evidence Tables for Relevant Articles Identified Through Literature Review

D. Guided Questions for Observers Handout

E. Objectives from the M3 Curriculum Used in the Development of LIC Simulation Cases

F. LIC Simulation Cases

- F.1 Acute pulmonary edema (congestive heart failure)
- F.2 Urosepsis/shock
- F.3 Gastrointestinal bleeding from peptic ulcer disease
- F.4 Respiratory failure from pneumonia (with escalation to intubation)
- F.5 Small bowel obstruction
- F.6 Pediatric meningitis

A. Topics of Each Rotation with Corresponding Objectives in the M3 Dalhousie Curriculum

Internal Medicine	**Emergency Medicine**
Atrial Fibrillation Congestive heart failure Coronary artery disease Gastroesophageal reflux disease Gastrointestinal bleeding Diabetes Breaking bad news Hypertension Delirium-Dementia Anemia Thromboembolic disease Fever Cancer Urinary tract infection Chronic kidney disease Fluid, electrolyte, and acid-base disorders Dying patient Obstructive Lung disease Pneumonia Respiratory Failure	Shortness of breath Ocular emergencies Toxicology Emergency Medicine PoCUS Vertigo and Syncope Approach to Trauma Chest pain Vaginal bleeding Shock
Surgery	**Obstetrics**
Acute abdominal pain Abdominal trauma Gastrointestinal bleeding Intra-abdominal abscess Peptic ulcer disease Gastric cancer Bowel obstruction Paralytic ileus Intestinal ischemia Abdominal hernia Appendicitis Inflammatory bowel disease Diverticular disease Colorectal polyps Colon/rectal cancer	Antepartum hemorrhage Rh Alloimmunization Fetal Health Surveillance Amenorrhea and Puberty Abnormal Uterine Bleeding Cervical Cancer Prevention Genetics Gestational Trophoblastic Disease and Vulvar Cancer Prenatal care and prenatal screening Contraception Endometrial cancer and precursors Female sexual function Vaginal delivery and management of third stage of labor Pelvic examination, pap testing, and swab collection Hypertensive disorders of pregnancy

Toxic megacolon Fistulas Stomas Benign anorectal diseases Pilonidal disease Liver masses Biliary disease Pancreatitis Pancreatic cancer Spleen Breast	Infertility Wound closure Urinary catheterization Normal labor and delivery Pelvic mass and ovarian cancer Reproductive mental health Preterm labor and preterm ruptured membranes Urinary incontinence and pelvic organ prolapse Postpartum period
Family Medicine Abdominal pain Chest pain Cough, chronic cough Diabetes Type II Family Violence Fatigue Fever/Common infections Headache Hypertension Maternity Care Metabolic syndrome/obesity/dyslipidemia Mood disorders MSK Palliative care Preventative health care Rash/skin disorders Risk factor modification/counseling Vertigo/dizziness Gynecological care Preventative health in family medicine Well baby/child Hypertension Rashes Maternity care, breastfeeding	**Pediatrics** Common pediatric urinary problems Hypertension Fever/infections Grown and puberty Chronic abdominal pain Pediatric x-ray interpretation Headaches Seizures Learning problems in school-aged children Limb and joint pain Nephrology Nutrition Newborn health Chronic diarrhea and malabsorption Anemia/bleeding ADHD Child protection Childhood diabetes Common childhood behavioural problems Dermatology Developmental concerns in young children Heart auscultation Respiratory distress/cough Asthma Constipation Failure to thrive Febrile seizures Pediatric head and neck concerns Decreased level of consciousness Neonatal jaundice

	Paroxysmal event Kawasaki disease Dehydration and fluid replacement The vomiting infant Adolescent care

B. Search Strategy for Literature Search

Database: Ovid MEDLINE(R) ALL <1946 to November 22, 2024> Search Strategy:

1 Simulation.mp. (540023)
2 Medical Education.mp. or Education, Medical/ (113690)
3 1 and 2 (5429)
4 medical students.mp. or Students, Medical/ (72828)
5 medical learners.mp. (370)
6 medical school.mp. or Schools, Medical/ (51944)
7 4 or 5 or 6 (109401)
8 (develop or create or design).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] (2923657)
9 3 and 7 and 8 (471)

C. Evidence Tables for Relevant Articles Identified Through Literature Review

Citation	Objective, Design and Population	Results and Conclusions	Application to New Simulation Case Design and Rationale
Ontrup G, Vogel M, Wolf OT, Zahn PK, Kluge A, Hagemann V. Does simulation-based training in medical education need additional stressors? An experimental study. Ergonomics. 2019 Oct 31;63(1):80–90. Reference 17.	**Objective:** To assess how added stressors in a simulation environment affect learning outcomes in medical students. **Population:** Medical students from Ruhr University Bochum (Germany) in their 7-9th/10 semester of study. **Design:** Single-blind experimental design. Students were randomized into two groups for a cardiopulmonary resuscitation simulation. - Control group (n=20): Functioning equipment group. - Intervention group (n=21): Equipment failure group (defect defibrillator) **Outcomes:** - Salivary cortisol and sAA levels (before simulation, after simulation, and after questionnaires) - Participant's perceived stress during simulation (four-point Likert-scale) - OSCE scores (as a measure of performance) - Episodic memory (28 multiple choice questions relating to simulation scenario)	**Results:** - Cortisol and sAA levels followed the same pattern in both groups (increased after simulation and decreased towards the end of the day). - The experimental manipulation did not cause differential responses in physiological stress markers. - Participants within the 'functioning equipment' condition reported a significantly higher perceived subjective stress during the simulation. - No significant difference in OSCE scores between the two groups. - No significant difference in episodic memory scores. **Conclusions:** Participants who encountered the equipment failure subjectively reported less stress. There was no difference in terms of physiologic stress or performance scores. Additional stimuli may exhibit an unwanted effect regarding attribution of performance.	**Application to Simulation Design:** Cases will be designed for medical students in a way to reduce any unnecessary additional stressors (no screaming confederates, purposeful equipment failure, etc.). **Rationale:** It is important to be wary of attribution theory if additional stressors are added to the case. The study found that participants within the 'equipment failure' group were able to attribute their struggles and stress to the failing device. Participants of the 'functioning equipment' group in contrast were not 'offered' an external cause. They did not have the chance of attributing their stress to anything else but their skills and actions, which in turn might have led to a bigger subjective perception of stress. This raises the question whether additional stimuli exhibit an unwanted effect regarding attribution of performance.
Issenberg SB, McGaghie WC, Petrusa ER, Lee Gordon D, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. Medical teacher [Internet]. 2005;27(1):10–28. Reference 18.	**Objective:** What are the features and uses of high-fidelity medical simulations that lead to most effective learning? **Design:** Systematic review. The six steps were: (a) identify the final cohort of BEME research coders; (b) BEME research coder training; (c) literature search strategy; (d) research study selection; (e) data extraction and coding; and, (f) data analysis and synthesis. **Outcomes:** Four screening criteria were used to reduce the initial pool of 670 journal articles to a focused set of 109 studies. Data was extracted by independent coders and synthesized.	**Results/Conclusion:** The weight of the best available evidence suggests that high-fidelity medical simulations facilitate learning under the right conditions. These include the following: - providing feedback (47%) - repetitive practice (39%) - curriculum integration (25%) - range of difficulty level (14%) - multiple learning strategies (10%) - capture clinical variation (10%) - controlled environment (9%) - individualized learning (9%) - defined outcomes (6%) - simulator validity (3%)	**Application to Simulation Design:** Ensuring that sessions are designed so that there is adequate time to provide feedback **Rationale:** 47% of relevant journal articles in the systematic review reported that educational feedback is the most important feature of simulation-based medical education.

M Nachiappan, P Bikramjit, Aung WT, H K S Htoo, P Sudipta. The impact of stressors on the learning outcome of high-fidelity patient simulation in undergraduate medical students. Medical journal of Malaysia. 2020 May 1;75(3):209–15. Reference 19.	**Objective:** to analyze the impact of stressors and its relevance on the learning outcome of high-fidelity patient simulation. **Population:** final year medical students from Melaka-Manipal Medical College (Malaysia) **Design:** Quasi-experimental time series design. Participants (n=347) were randomly divided into three groups which were assigned one of the following simulation scenarios: hypovolemic shock, tension pneumothorax and head injury. The same team then participated in the simulation of the same scenario after one week (second simulation session) and at three/four weeks (third simulation session), followed by final debriefing **Outcomes** - Perceived stress (measured by Likert scale at four time points: pre-lecture, post sim 1, post sim 2, post sim 3) - Validated stressor questionnaire - Knowledge assessment post sessions.	**Results:** - Pre-test simulation assessment score was significantly different from post-test simulation assessments II and III - The total score of knowledge assessment had significantly improved in all three post-test simulations compared to pre-test simulation. Highest stressors in study (13 stressors studied): 1. “Death of the simulated patient” 2. “Feeling of incompetence in managing patient” 3. “Need to do well (self-expectation)” All these stressors showed a significant drop in scores with repeated simulation sessions except in the category of “Death of a simulated patient” where the stress was unabated among the participants in all simulation sessions. **Conclusions:** Stress significantly decreased as the students were exposed to more sessions of HFPS which ultimately translated into better learning outcomes.	**Application to Simulation Design:** Structuring the simulation curriculum in a way that students have multiple opportunities to be involved in LIC level simulation cases through multiple sessions. **Rationale:** Stress may significantly decrease as LIC students are exposed to more sessions of high fidelity simulation which will ultimately translate into better learning outcomes.
Łoś K, Chmielewski J, Cebula G, Bielecki T, Torres K, Łuczyński W. Relationship between mindfulness, stress, and performance in medical students in pediatric emergency simulations. GMS Journal for Medical Education. 2021 Apr 15;38(4). Reference 20.	**Objective:** to determine whether the technical and non-technical skills of medical students in the course of pediatric high fidelity simulations are related to their mindfulness and stress. **Population:** graduating medical students in three Polish medical simulation centers. **Design:** observational cohort study - Students were split into groups and completed simulations in: supraventricular tachycardia, febrile convulsions, bronchial asthma, ketoacidosis, anaphylactic shock, and paracetamol intoxication. - 166 students - each were leader once and 166 simulations analyzed - Collected data on: age, sex and the fact of participating in mindfulness training or other secular or religious meditation **Outcomes:** - Mindfulness assessed before simulation (Five Facet Mindfulness Questionnaire) - Stress and its impact on simulation (5-step scale completed by participants) - heart rate and blood pressure after the simulation - technical skills (assessed on the basis of checklists designed for each scenario) - non-technical skills (Ottawa Crisis Resource Management Global Rating Scale)	**Results:** - Stress and students’ mindful presence: the lower perception level of stress before simulation was related to total mindfulness and lower reactivity. - Stress and performance: there was a positive correlation between the subjective feeling of stress before the simulation and the obtained results in terms of team management and communication in the team. All non-technical skills improved along with the number of high-fidelity medical simulations performed by a given team. - Mindfulness and performance: the results of the students obtained in checklists in the area of technical skills did not correlate with their mindfulness. Avoiding fixation error (situation awareness skills) was positively associated with conscious action on the mindfulness scale. **Conclusions:** The perception of stress among students was lower and more motivating if they were more mindful. Mindfulness of students correlated positively with avoiding fixation error. In the consecutive simulations the leaders’ non-technical skills improved, although no change was noted in their technical skills. Further research is needed to show whether mindfulness training leads to improvement in this field.	**Application to Simulation Design:** Inclusion of mindfulness resources in the optional pre-reading list. Further research still needs to be done to see if mindfulness training leads to improved performance, as a result, the mindfulness reading will not be mandatory for students. **Rationale:** In the study, mindfulness influences the non-technical skills and the perception of stress of medical students.
Henn P, Power D, Smith SD, Power T, Hynes H, Gaffney R, et al. A	**Objective:** to analyse the structure and content of telephone consultations to identify any areas of deficiency within structure and content in the effective transfer of clinical	**Results:** 30% of students did not positively identify themselves, 29% did not identify their role, 32% did not positively identify the	**Application to Simulation Design:** Include cases that require telephone communication with speciality consult service and highlight

metric-based analysis of structure and content of telephone consultations of final-year medical students in a high-fidelity emergency medicine simulation. BMJ Open [Internet]. 2012 Jan 1 [cited 2023 Dec 18];2(5):e001298. Reference 21.	information. **Population:** final year medical students (n=113) **Design**: An educational study Twelve scenarios of high-fidelity emergency medicine simulation. The students' performances including telephone calls were recorded using the installed audio-visual system in the simulation centre for use in debrief. The telephone calls were later analysed using an agreed metric. **Outcomes:** Identified deficiencies (omitting an item of the metric) in recorded telephone consultations.	recipient of the phone call, 59% failed to positively identify the patient, 49% did not read back the recommendations of their senior colleague and 97% did not write down the recommendations of their senior colleague. **Conclusion:** The study identified a deficiency in students' skills to communicate relevant information via the telephone, particularly failure to repeat back and write down instructions. The authors suggest that this reflects a paucity of opportunities to practice this skill in context during the undergraduate years.	objectives relating to communication during the debriefing session **Rationale:** The study identified deficiency in communication skills of medical students. Our cases will incorporate an opportunity to call a resident or speciality service. Discussion regarding how successful the transfer of information was will be included as a debriefing point.
Zottmann JM, Dieckmann P, Taraszow T, Rall M, Fischer F. Just watching is not enough: Fostering simulation-based learning with collaboration scripts. GMS Journal for Medical Education. 2018 Aug 15;35(3). Reference 22.	**Objective:** to assess whether collaborative scripts for students observing the simulation would improve individual and collaborative learning processes as well as individual learning outcomes. **Population:** medical students in their 7th to 12th semester at Tuebingen University (Germany) **Design**: Experimental study Control group (n=20): no collaboration script Intervention group (n=14): intervention script - In each group, four to five students handled an incident and rescued the patient. The remaining six to eight students in the course observed the actions taking place. **Outcomes:** - Individual elaboration - Collaborative elaboration (collaboration questionnaire) - Knowledge acquisition (Heuristic strategies skills test)	**Results:** - Individual elaboration of CRM heuristics: none of the notes from the learners in the control condition group contained segments that could be coded as heuristic strategies. - Collaborative elaboration: control condition learners did not refer at all to CRM heuristics during the collaborative phases. Learners who were supported with the script asked significantly more questions, shared significantly more thoughts, and were more involved than learners in the control condition -There was no significant difference between the experimental conditions regarding performance in the heuristic strategies skills test. However, learners in the control condition perceived a significantly higher gain of CRM skills throughout the course than did scripted students. **Conclusion:** Findings suggest that simulation-based training in medical education can be enhanced with additional instructional support in the form of collaboration scripts designed to turn observational course phases into more active and better focused learning experiences.	**Application to Simulation Design:** Providing a handout with guided questions for students to reflect on when observing. **Rationale:** Giving guided questions to the observers can help to turn observational phases into more active, mindful, and better focused experiences. This can translate into more interactive and productive debriefing sessions (students with the collaboration scripts were found to asked significantly more questions, shared significantly more thoughts, and were more involved).

D. Guided Questions for Observers Handout

List the events that took place during the simulation:

List the Ddx:

1.

2.

3.

List something you thought the team did well:

List something you thought could be done differently:

Comment on the team's:

Communication (with team, patient, family)	Resource utilization (personnel, equipment, and cognitive aids)
Situational Awareness	Prioritization of tasks

E. Objectives from the M3 Curriculum Used in the Development of LIC Simulation Cases

E.1 Acute Pulmonary Edema (Congestive Heart Failure)- Objectives from Internal Medicine

1. History-taking skills: Students should be able to obtain, document, and present an appropriate medical history.

2. Physical exam skills: Students should be able to perform a focused physical exam to help establish the diagnosis of CHF and estimate its severity.

3. Differential diagnosis: Students should be able to generate a differential diagnosis

4. Laboratory interpretation: Students should be able interpret specific diagnostic tests and procedures that are commonly ordered to evaluate patients who present with heart failure (acute pulmonary edema).

5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan.

E.2 Urosepsis/Shock - Objectives from Emergency Medicine

Objectives from M3 Curriculum:

1. Causes of shock.

2. Recognition of shock.

3. Definition of shock.

4. Dealing with shock.

5. Responding to shock.

Additional objectives:

1. Early recognition of sepsis and identifying a likely source of infection

2. Timely implementation of broad-spectrum antibiotics and source control

3. Eliminate other differential diagnoses of shock.

4. Management of a hemodynamically unstable patient with fluid resuscitation.

5. Appropriate hospital disposition of the patient.

E.3 Gastrointestinal Bleeding from peptic ulcer disease - Objectives from Internal Medicine and Surgery

1. History-taking skills: Students should be able to obtain, document, and present an appropriate history that differentiates among etiologies of disease.

2. Physical exam skills: Students should be able to perform a physical examination to establish the diagnosis and severity of disease.

3. Differential diagnosis: Students should be able to generate a differential diagnosis recognizing specific history and physical examination findings that suggest a specific etiology for GI bleeding.

4. Laboratory interpretation: Order and interpret diagnostic and laboratory tests based on the differential diagnosis.

5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan for patients that includes: establishing adequate venous access, administering crystalloid fluid resuscitation, ordering blood and blood product transfusion (with consenting), determining when to obtain consultation from a gastroenterologist or a general surgeon.

E.4 Respiratory Failure from Pneumonia - Objectives from Internal Medicine

1. History-taking skills: Students should be able to obtain, document, and present an appropriate medical history.

2. Physical exam skills: Students should be able to perform a physical exam to establish the diagnosis and severity of disease.

3. Differential diagnosis: Students should be able to generate a differential diagnosis recognizing specific history and physical exam findings that suggest a specific etiology of pneumonia and other possible diagnoses

4. Laboratory interpretation: Order and interpret diagnostic and laboratory tests based on the differential diagnosis.

5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan for patients that includes: selecting an appropriate empiric antibiotic regimen.

F.5 Small Bowel Obstruction - Objectives from Surgery

1. Understand the presentation, investigations, and management of SBO.

2. Understand the common etiologies of SBO and risk factors.

3. Knowledge of surgical indications in SBO including at presentation and delayed

4. Knowledge of complications of SBO.

E.6 Pediatric Meningitis - Objectives from Pediatrics

1. Recognize that a child with decreased level of consciousness is an emergency.

2. Given a child presenting with decreased level of consciousness, conduct a history and physical exam to develop a differential diagnosis considering common and important causes including: metabolic (e.g. hypoglycemia), intoxication/poisoning, infection (sepsis/meningitis/encephalitis), head injury.

3. Describe the management of infections, including meningitis and sepsis.

F. LIC Simulation Cases

F.1 Acute pulmonary edema (congestive heart failure)

F.2 Urosepsis/shock

F.3 Gastrointestinal bleeding from peptic ulcer disease

F.4 Respiratory failure from pneumonia (with escalation to intubation)

F.5 Small bowel obstruction

F.6 Pediatric meningitis

Acute Pulmonary Edema

Section 1: Case Summary

Scenario Title:	
Keywords:	Acute pulmonary edema, congestive heart failure, shortness of breath
Brief Description of Case:	A patient is seen by the emergency team, diagnosed with a hip fracture after he slipped and fell, and admitted by the orthopedics service. His medications have been held and he has been made NPO and started on maintenance fluids in anticipation of an operation tomorrow. He was staying in the emergency department when he woke up with shortness of breath and hypoxia secondary pulmonary edema. The pulmonary edema is secondary to 1) holding his medications and 2) maintenance fluids.

Goals and Objectives	
Educational Goal:	Review the initial assessment and management of a patient with shortness of breath.
Objectives: (Medical and CRM)	Objectives from M3 Curriculum: 1. History-taking skills: Students should be able to obtain, document, and present an appropriate medical history . 2. Physical exam skills: Students should be able to perform a focused physical exam to help establish the diagnosis of CHF and estimate its severity 3. Differential diagnosis: Students should be able to generate a differential diagnosis 4. Laboratory interpretation: Students should be able interpret specific diagnostic tests and procedures that are commonly ordered to evaluate patients who present with heart failure (acute pulmonary edema). 5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan
EPAs Assessed:	N/A

Learners, Setting and Personnel				
Target Learners:	X Medical Students	☐ Senior Learners	☐ Staff	
	☐ Physicians	☐ Nurses	☐ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	X Sim Lab	☐ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: 1			
	Sim Actors: 1			
	Sim Techs: 1			

Scenario Development	
Date of Development:	2015
Scenario Developer(s):	Time Chaplin
Affiliations/Institutions(s):	Queen's University
Contact E-mail:	brent.thoma@usask.ca
Last Revision Date:	Jan 2025
Revised By:	Grace Huang

Version Number:	3.0

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Charles Watson			Age: 68	Gender: Male	Weight: 90kg
Presenting complaint: Initially a hip fracture. Shortness of breath					
Temp: 36.5	HR: 105	BP: 180/100	RR: 24	O_2Sat: 83%	FiO_2: RA
Cap glucose: 5.7			GCS: 15 (E V M)		
Triage note (from initial ED encounter): Slipped and fell. Right leg shortened / externally rotated with pain to hip. No LOC.					
Allergies: None					

Past Medical History:	Outpatient Medications (all held since arrival to hospital):
MI in 2011 (stent to LAD) CHF (EF 30% on an ECHO from 2012) Active smoker (no formal diagnosis of COPD)	Atorvastatin 20mg po od Perindopril 4mg po od Furosemide 20mg po od ASA 81mg po od Bisoprolol 5mg po od Inpatient Medications: Received Ringer's Lactate at 150mL/hour since admission last night Hydromorphone 0.5-1mg IV prn for pain Acetaminophen 975mg po tid

Section 2B: Extra Patient Information

A. Further History
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, sim actors, SP, etc.)? The patient presented yesterday and was admitted by the orthopedics team for right hip fracture. He is in an unmonitored area of the ED overnight (Hallway 27). He had all his medications held and was put on NPO orders in preparation for his surgery tomorrow. The night nurse had no concerns but when his vitals were repeated this morning, he was found to be tachypneic and hypoxic.

B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: Normal heart sounds and peripheral pulses.	Neuro: GSC15

Resp: Diffuse crackles on auscultation. Increased work of breathing. Breaks up sentences due to SOB.	Head & Neck: JVP is high and prominent.
Abdo: Soft, non-tender	MSK/skin: Slightly diaphoretic. Bilateral 2-3+ edema to his legs.
Other:	

Section 3: Technical Requirements/Room Vision

A. Patient
X Mannequin *(specify type and whether infant/child/**adult**)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid

B. Special Equipment Required
Monitors Thermometer Glucometer Oxygen delivery devices (NP, mask, nonrebreather).

C. Required Medications
Nitroglycerin (IV, patch, and spray) Salbutamol nebulizer / MDI Furosemide IV / PO

D. Moulage
The patient is slightly diaphoretic and lying flat on the bed.

E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed X Patient not yet on monitor

F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format. The patient should have crackles to bilateral mid lungs, an elevated RR, increased work of breathing, and edema to his legs bilaterally. He will respond normally but break up his sentences due to shortness of breath. The patient will be knowledgeable about his past medical history and medications that he has been taking and the fact that they have been held overnight. He does not have chest pain but will indicate that he finds it hard to breathe. They will feel slightly better if they are moved from a supine to seated position.

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Nurse	The emergency department day asks the trainee to see the patient at the beginning of the case. The nurse will provide some basic background information and indicate that they called because the patient seems to have become short of breath. They will not know the patient well as they just started their shift and indicate that no concerns were raised by the night nurse. **The nurse will tell the trainee that the resident is having issues parking their car so they asked the medical student to assess the patient first. They can call the resident at any time (e.g. to approve orders, etc).** If asked, the nurse will provide the vitals that they just collected: HR: 105, BP: 180/100, RR: 24, **O2SAT: 83% on RA**, T: 36.5oC. Prompt medical students for investigations, differential diagnosis, and management if needed.
Resident	Having car issues so will not be able to be physically present. Help answer any questions that the medical students may have. Prompt them to think about differential diagnoses and come up with a management plan.

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: sinus HR: 105 BP: 180/100 RR: 24 O2SAT: 83% on RA T: 36.5oC GCS: 15	*The patient has increased work of breathing and feels SOB.*	Expected Learner Actions ☐ Attach monitors ☐ Provide supplemental oxygen ☐ Adjust the bed to a seated position ☐ History and physical exam ☐ Initiate investigations (IV access, Lab, ECG, x-ray)	Modifiers *Changes to patient condition based on learner action* - If seated the patient feels better - If salbutamol is provided thinks that it might be helping Triggers *For progression to next state* - Provide supplemental oxygen AND -Orders lab/ECG/CXR	If the trainee does not provide supplemental oxygen or order lab/ECG/CXR by 3 minutes into the case they should be prompted to do so by the nurse confederate.
2. Oxygen Provided Rhythm: sinus HR: 105 BP: 160/100 RR: 24 O2SAT: 87% on NP, 89% on NRB, 95% on BiPap T: 36.5oC GCS: 15	*The patient feels significantly better with oxygen but is still breathing at an increased rate.*	Expected Learner Actions ☐ Review ECG and CXR (labs are pending) ☐ Treatment with nitro ☐ Call RT - treatment with BiPap ☐ Treatment with furosemide	Modifiers - If the learner does not provide the patient with a diagnosis and treatment plan the nurse will prompt the students. Triggers - Treatment with nitroglycerine and BiPap is initiated	The trainee should be provided with the ECG and CXR. If they do not state the most likely diagnosis by 5 minutes into the case they should be asked what they think is going on by the nurse confederate. If they do not call the resident or initiate treatment with nitroglycerine / BiPap by 6 minutes into the case they should be prompted to do so by the nurse confederate.

3. Diagnosis and treatment	*The patient feels significantly better.*	Expected Learner Actions ☐ Discussion with resident (if not already done) ☐ Consultation of internal medicine for further assessment and management of SOB	Modifiers - If the plan is not communicated to the patient, they will ask what is going on. Triggers - Case ends after discussion with internal medicine.	The resident or internal medicine should provide further prompts if appropriate treatment has not been initiated.

Appendix A: Laboratory Results

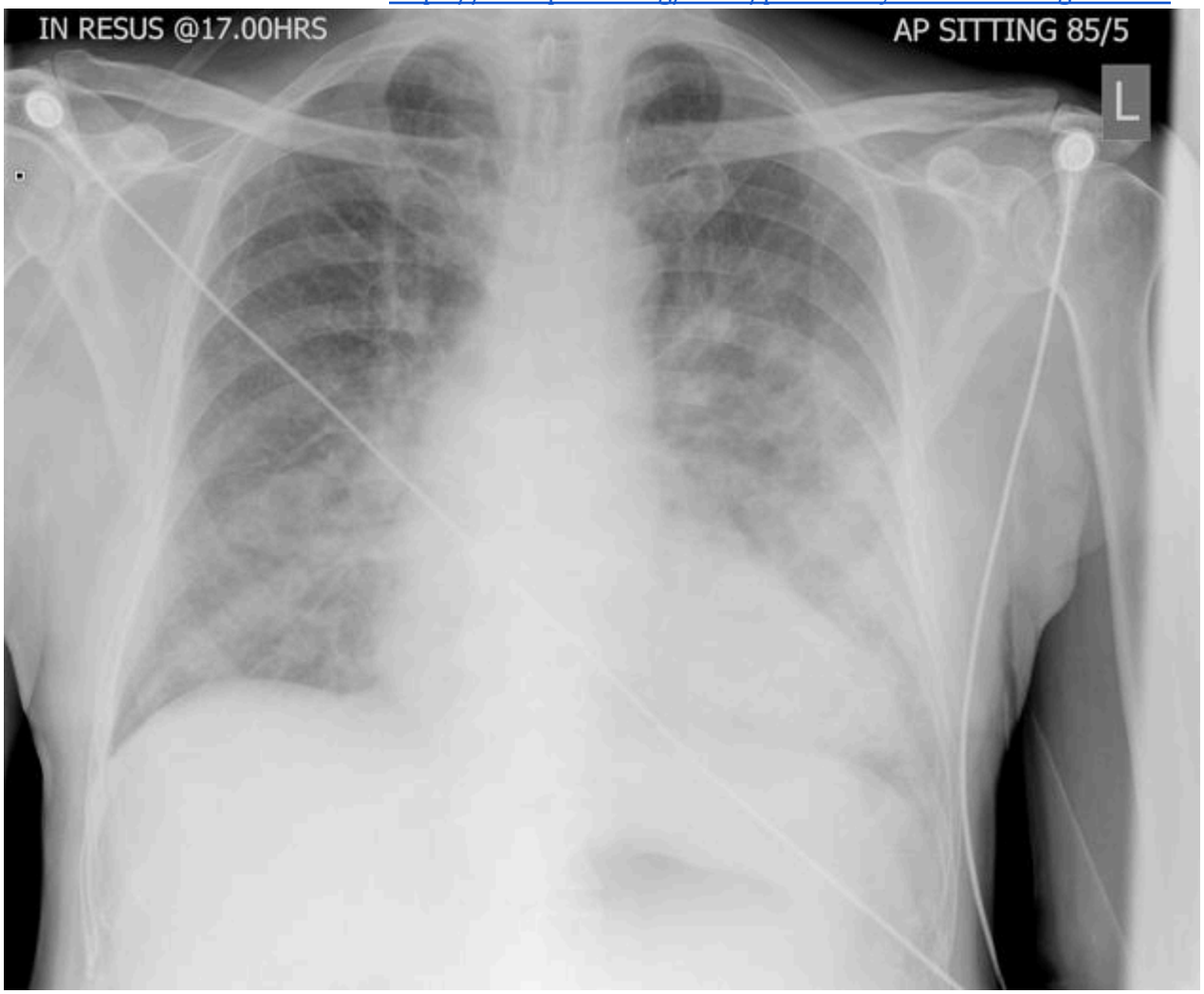
For this case, the lab results will not arrive before the scenario ends.

CBC WBC Hgb Plt Lytes Na K Cl HCO_3 AG Urea Cr Glucose Extended Lytes Ca Mg PO_4 Albumin TSH VBG pH pCO_2 pO_2 HCO_3 Lactate	Cardiac/Coags Trop D-dimer INR aPTT Biliary AST ALT GGT ALP Bili Lipase Tox EtOH ASA Tylenol Dig level Osmols Other B-HCG

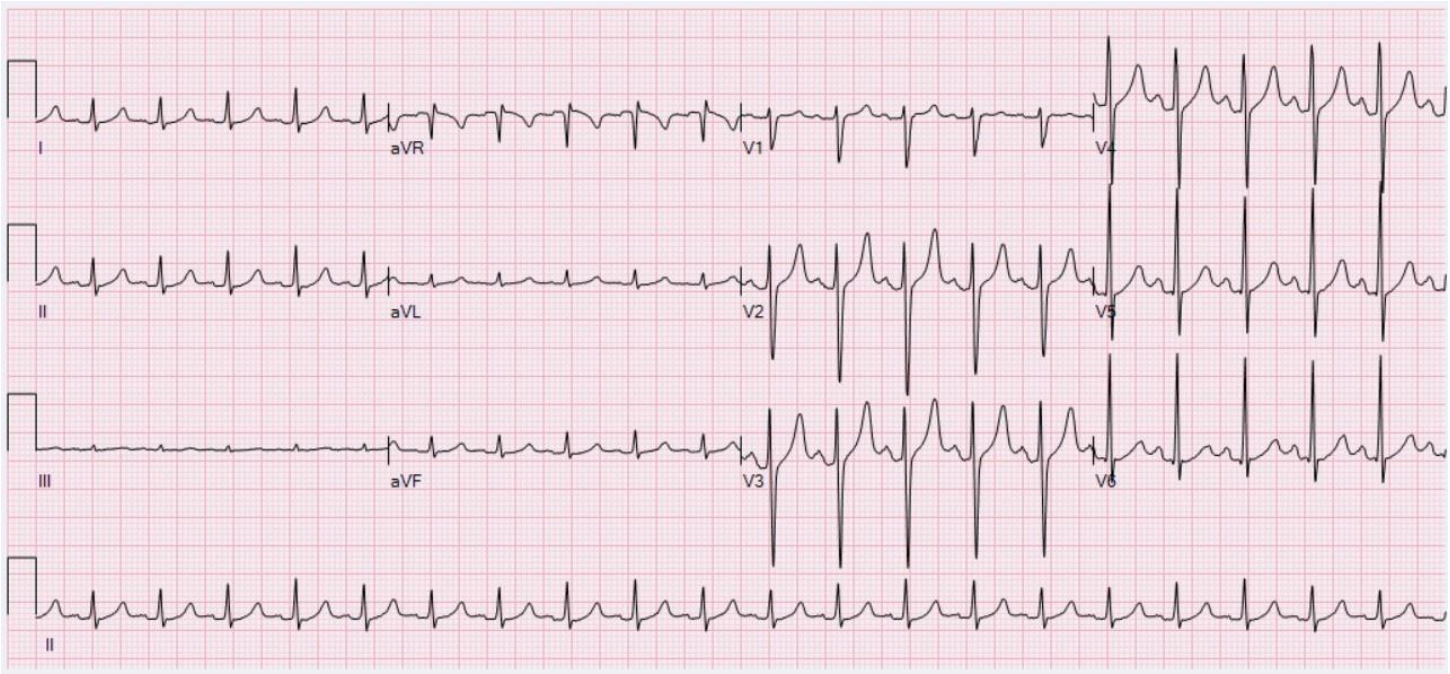
Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

1. CXR with Edema. Found from: https://radiopaedia.org/cases/pulmonary-oedema#image-25532



2. Sinus tachycardia: https://en.wikipedia.org/wiki/Sinus_tachycardia



Appendix C: Facilitator Cheat Sheet & Debriefing Tips

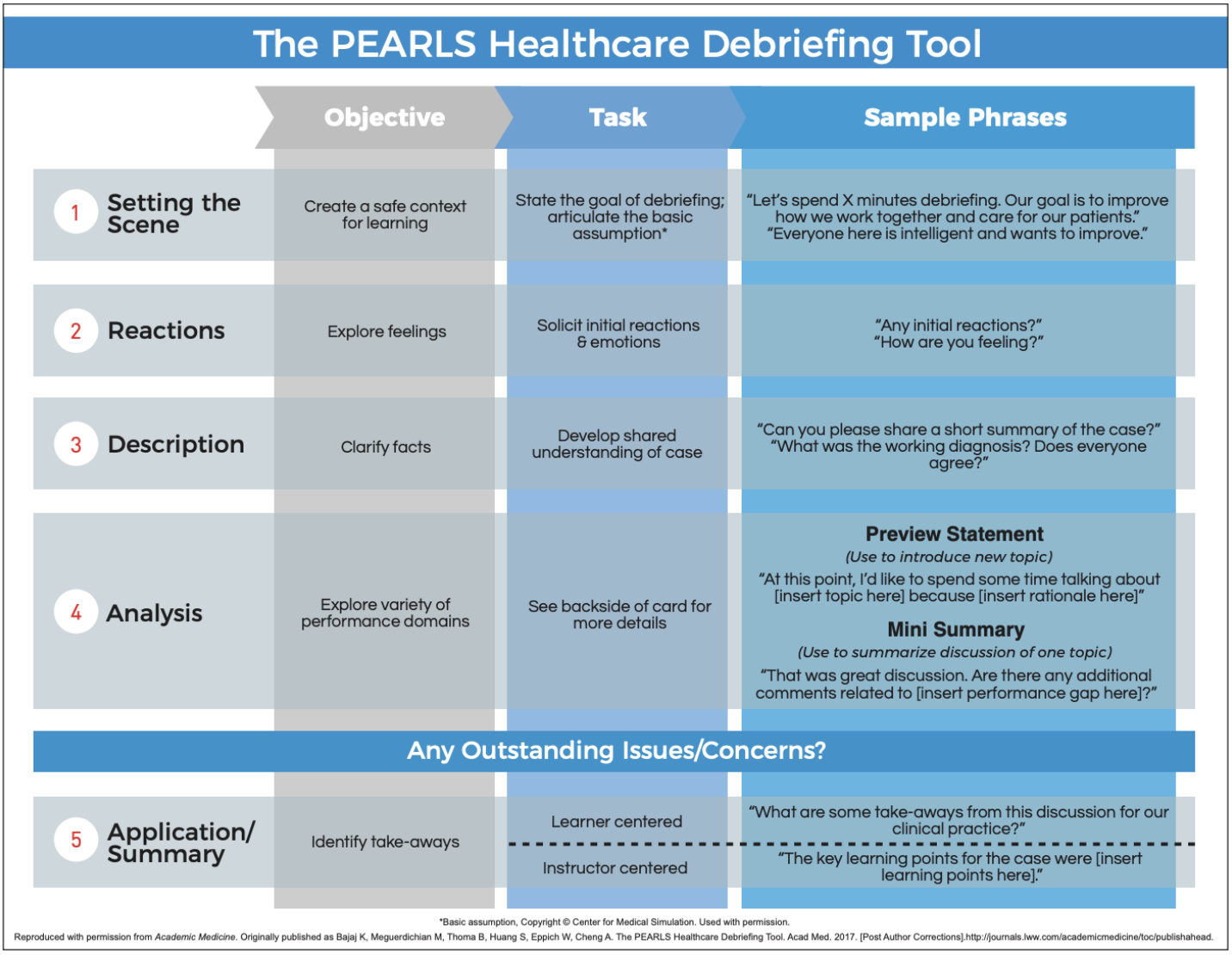
Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

1. Pre-Reading Material Provided to Trainees

- https://litfl.com/severe-heart-failure-management/
- Optional mindfulness reading: https://cmha.ca/brochure/mindfulness/

2. Guided Questions for Observers can be found here: Guided Questions for Observers

3. Debriefing Tips (PEARLS Healthcare Debriefing Tool)
https://debrief2learn.org/wp-content/uploads/2017/12/PEARLS-Pocket-Card-5.8x7.2-PDF-EN.pdf



The PEARLS Healthcare Debriefing Tool

	Objective	Task	Sample Phrases
1 Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2 Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3 Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4 Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"
Any Outstanding Issues/Concerns?			
5 Application/ Summary	Identify take-aways	Learner centered	"What are some take-aways from this discussion for our clinical practice?"
		Instructor centered	"The key learning points for the case were [insert learning points here]."

*Basic assumption, Copyright © Center for Medical Simulation. Used with permission.

4. Specific Debriefing Content Related to Objectives

Diagnosis:

- An appropriate differential will include cardiac ischemia (the ECG with LBBB may be mistaken for ischemia), pulmonary embolism (orthopedic injury and recent immobilization), and COPD exacerbation (history of smoking) in addition to pulmonary edema.

Management:

- While it is likely that immediate treatment with oxygen will be provided quickly, the trainee may not provide appropriately aggressive treatment for CHF. While furosemide is an appropriate treatment, it should be stressed that it takes some time to work. More acute treatments include nitroglycerine (spray would be reasonable initially with transition to a patch with improvement or an infusion if the patient does not respond) and BiPap.

Communication:

- Ideally, the trainees will communicate their orders specifically and directly to the nurse (e.g. "[Nurse name], please put nasal prongs on the patient and start the oxygen at 5L/min" as opposed to "Could we put on some oxygen").
- Watch for the use of order lists that are overwhelming (e.g. "Could we get the patient on oxygen, lab to draw a CBC, lytes-6, troponin, a CXR, and an ECG.").
- The use of orienting labels (e.g. "This patient is in respiratory distress" or "My working diagnosis is CHF"), explicit summaries (e.g. "Let's summarize: this is a 68 year old male with a history of CHF and smoking who came in with a hip fracture and became short of breath overnight. On history… Our exam found… Our plan/priorities are…"), and ideas from the team (e.g. "Am I missing anything?" or "Does anyone else have any suggestions?") should be encouraged.
- The call to the resident should include an introduction (name, service, location), concise description of the patient ideally using a standardized format (e.g. SBAR), and explicit request for advice/assistance.

References

1. https://emcrit.org/emcrit/scape/
2. https://litfl.com/severe-heart-failure-management/

Urosepsis

Section 1: Case Summary

Scenario Title:	
Keywords:	Urologic emergency, sepsis, septic shock
Brief Description of Case:	Denise is a 59-year-old female who presents with a 7-day history of urinary symptoms, fever, and started with left flank pain. She has a history of STEMI 5 years ago. She then becomes unstable requiring fluid resuscitation, vasopressors, and empiric antibiotic treatment. The team leader will manage a patient with severe sepsis secondary to an infected ureteric calculus then arrange emergent urologic consultation and admission to hospital.

Goals and Objectives	
Educational Goal:	Review the initial assessment and management of a patient with acute flank pain and fever.
Objectives: (Medical and CRM)	Objectives from M3 Curriculum: 1. Causes of shock. 2. Recognition of shock. 3. Definition of shock. 4. Dealing with shock. 5. Responding to shock. Additional objectives: 1. Early recognition of sepsis and identifying a likely source of infection 2. Timely implementation of broad-spectrum antibiotics and source control 3. Eliminate other differential diagnoses of shock 4. Management of a hemodynamically unstable patient with fluid resuscitation, vasopressors and appropriate monitoring 5. Appropriate hospital disposition of the patient
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	X Medical Students	☐ Senior Learners	☐ Staff	
	☐ Physicians	☐ Nurses	☐ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	X Sim Lab	☐ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: 1			
	Sim Actors: 1			
	Sim Techs: 1			

Scenario Development	
Date of Development:	Apr 12, 2020
Scenario Developer(s):	Johnny W Huang, Krista Dowhos, Lorraine Colpitts
Affiliations/Institutions(s):	Grand River/St. Mary's General Hospital, Department of Emergency Medicine, Kitchener-Waterloo Campus, McMaster University

Urosepsis

Last Revision Date:	Jan 2025
Revised By:	Grace Huang
Version Number:	7.0

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Denise Koffman			Age: 59	Gender: F	Weight: 90kg
Presenting complaint: fever and urinary symptoms					
Temp: 39.0	HR: 95	BP: 100/65	RR: 24	O_2Sat: 96%	FiO_2: RA
Cap glucose: 9.6			GCS: 15 (E V M)		
Triage note: 59-year-old female with 7-day history of dysuria, urinary frequency, and fever. This was preceded by intermittent left flank pain that has now become constant. She called EMS due to worsening left flank pain, nausea, and decreased PO intake.					
Allergies: none					
Past Medical History: STEMI (5 years ago) Hypertension Hyperlipidemia			Current Medications: Ramipril 4mg PO daily Atorvastatin 10mg PO daily Metoprolol 50mg PO BID Lasix 20mg PO daily Aspirin 81mg PO daily		

Section 2B: Extra Patient Information

A. Further History	
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, sim actors, SP, etc.)? - Patient emphasizes that intermittent flank pain preceded fever and dysuria - Patient had an inferior STEMI and stent 5 years ago. She has been followed by her community cardiologist and her most recent echocardiography showed LVEF >45% (4 years ago). - No urologic history, review of systems is otherwise unremarkable. - Patient lives at home with husband. Retired teacher. Remote smoking (<10 pack-year), social EtOH, and no recreational drug use	
B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: borderline tachycardia, normal heart sounds	Neuro: appears anxious and unwell, no focal neurologic deficits
Resp: GAEB, no wheezing or crackle	Head & Neck: unremarkable
Abdo: Soft, mild left tenderness without guarding	MSK/skin: Cap refill 4-5 sec. No skin changes/bruise
Other: Significant left CVA tenderness	

Section 3: Technical Requirements/Room Vision

A. Patient
X Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid

B. Special Equipment Required

C. Required Medications
Ringer's lactate or normal saline Broad spectrum antibiotics (e.g. Piperacillin-Tazobactam or ceftriaxone/ampicillin/gentamycin) Analgesics Anti-emetics

D. Moulage
Patient is lying supine

E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed X Patient not yet on monitor

F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format. Airway: patent, speaking in full sentences Breathing: RR 24 no active respiratory distress, O2 sat normal Circulation: borderline tachycardia, delayed capillary refill time Disability: GCS 15, appears anxious and unwell Exposure: Moaning when L flank palpated or CVA angle manipulated.

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Nurse	Calls the team to the bedside because the patient looks unwell. RN is skilled and helpful. Prompt medical students for investigations, differential diagnosis, and management if needed.
Resident	Having car issues so will not be able to be physically present. Help answer any questions that the medical students may have. Prompt them to think about differential diagnoses and come up with a management plan.

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: sinus rhythm HR: 95 BP: 100/65 RR: 20 O2SAT: 96% T: 39oC GCS: 15	*Appears unwell, delayed capillary refill*	Expected Learner Actions ☐ History and physical exam ☐ Bloodwork, including urine and blood cultures ☐ Insert urinary catheter	Modifiers *Changes to patient condition based on learner action* - Triggers *For progression to next state* - After history and physical exam completed and investigations ordered	Trainees should be prompted if they have not ordered investigations by 5 mins.
2. Becomes more hypotensive Rhythm: sinus tachy HR: 120 BP: 80/55 RR: 22 O2SAT: 95% T: 39oC GCS: 15		Expected Learner Actions ☐ 1-2L bolus of fluid, then reassess volume status ☐ Broad spectrum antibiotics ☐ Review lab work	Modifiers - Patient declines if no fluid bolus given (increase HR to 125, BP to 70/40) Triggers - After antibiotics and fluids have been initiated.	Option include: pip-tazo 3.375-4.5g IV OR ceftriaxone 1-2g IV OR ampicillin + gentamycin The trainee should be prompted if appropriate treatment has not been initiated.
3. More Stable, Diagnosis Rhythm: sinus rhythm HR: 85 BP: 110/75 RR: 18 O2SAT: 95% T: 37.8oC	normalized capillary refill, and GCS 15	Expected Learner Actions ☐ Reassess ABCs and volume status and recognize patient likely has septic shock ☐ Consider doing bedside ultrasound (Cardiac, IVC, Hydronephrosis) ☐ Consider more IV fluids	Modifiers Triggers - After reviewing with the resident and ordering imaging.	If trainees don't reassess the patient after fluids, the nurse will prompt trainees by asking, "how does the patient look now?" If trainees don't order any additional imaging, the nurse will prompt them: "Do you want me to

GCS: 15		☐ Order CT abdo/pelvis or ultrasound once patient is stabilized ☐ Review with resident (optional)		get you any DI reqs to order imaging?"
4. Consult Urology Rhythm: sinus rhythm HR: 85 BP: 110/75 RR: 18 O2SAT: 95% T: 37.8oC GCS: 15		<u>Expected Learner Actions</u> ☐ Interpret CT results ☐ Consult urology	<u>Modifiers</u> - If the plan is not communicated to the patient, they will ask what is going on. <u>Triggers</u> - END CASE after appropriate management of septic shock (abx, fluids) and disposition	Let trainees try to interpret the image first. After they have their interpretation radiology will call with the official report. CT abdo/pelvis: Large (11 mm) obstructing calculus in the left ureter with left hydro-ureteronephrosis.

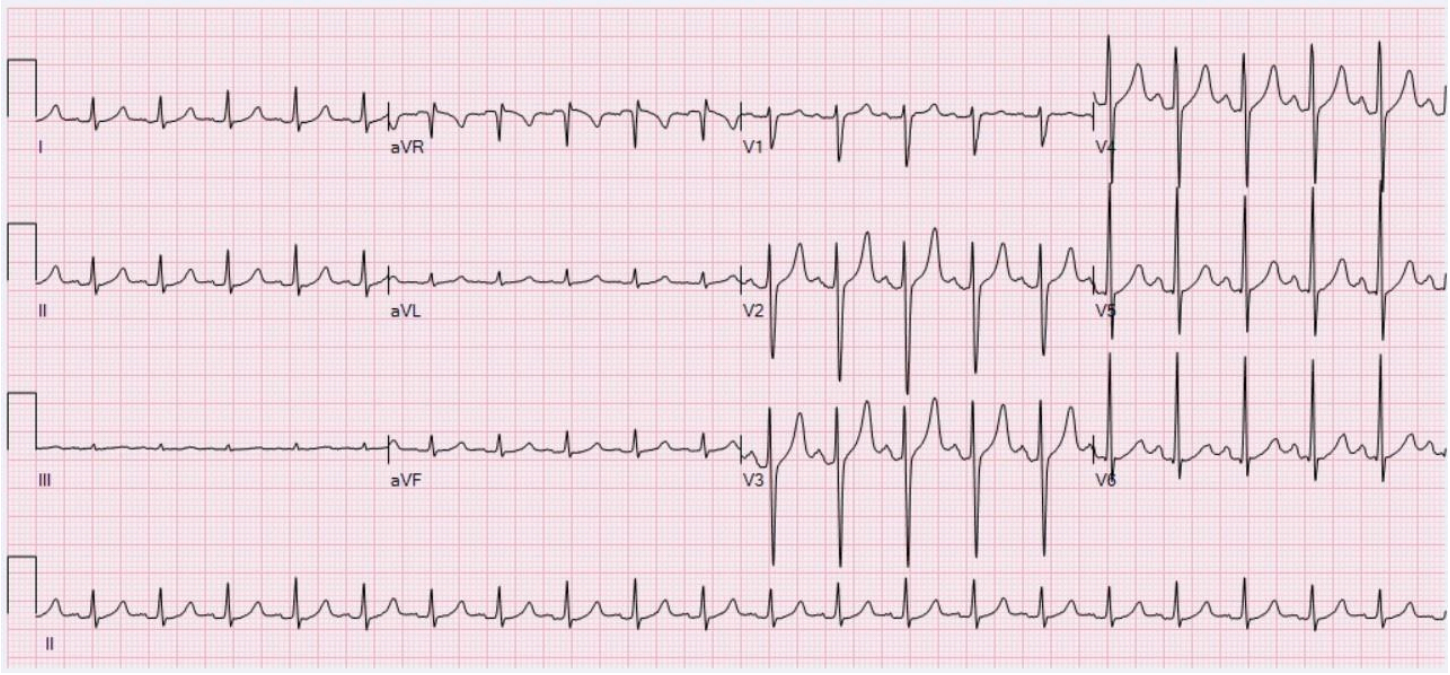
Appendix A: Laboratory Results

CBC WBC 20.3 Hgb 137 Plt 600 Lytes Na 135 K 5.1 Cl 98 HCO3 16 AG 21 Urea 15.1 Cr 217 Glucose 9 VBG pH 7.26 pCO2 32 pO2 55 HCO3 16 Lactate 3.8	Cardiac/Coags Trop <12 INR 1.1 Biliary AST 49 ALT 33 GGT 60 ALP 105 Bili 8 Lipase 82 Other B-HCG negative Urinalysis Color: Cloudy Spec gravity: 1.030 RBC: 3+ WBC 2+ Nitrites: Positive

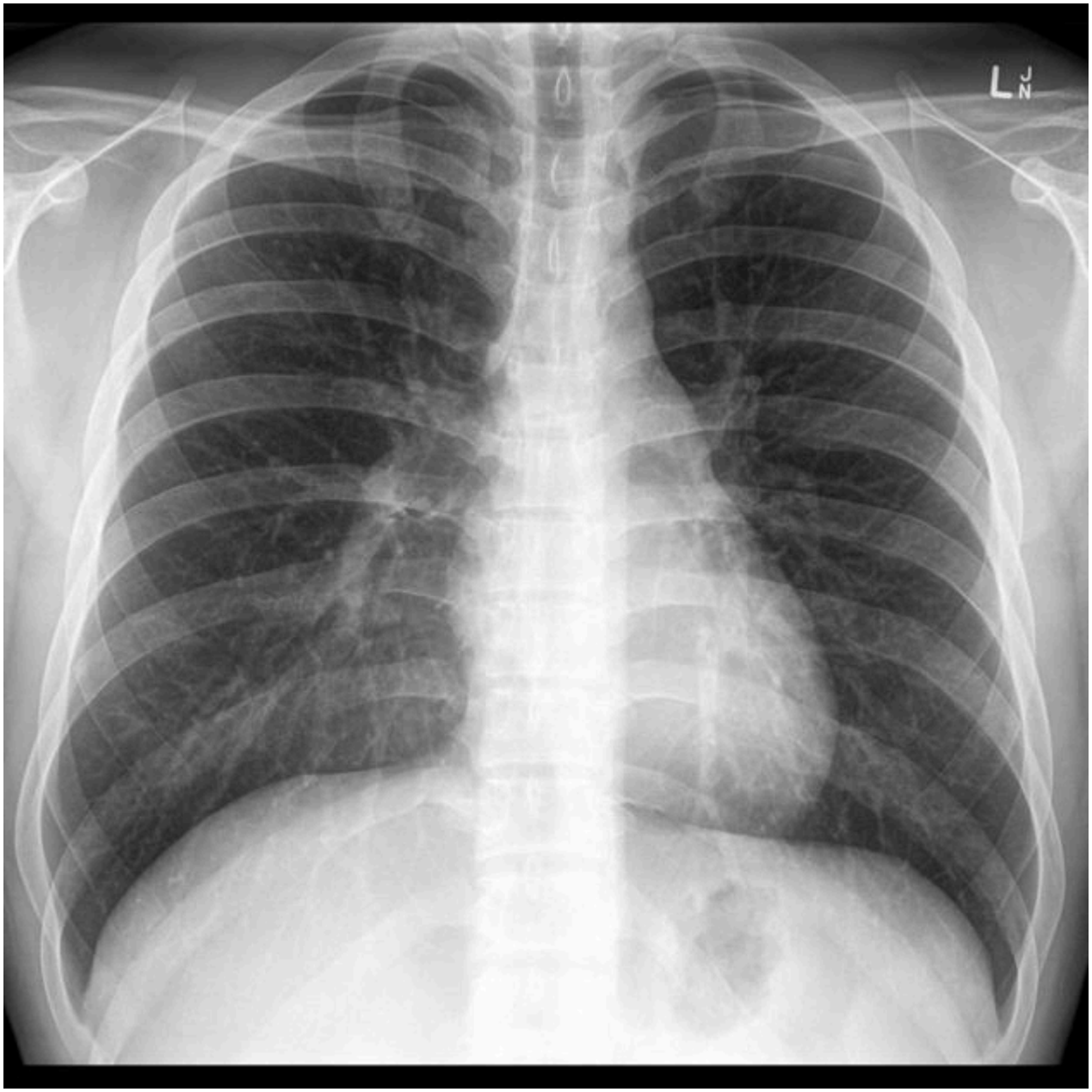
Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

1. Sinus tachycardia: https://en.wikipedia.org/wiki/Sinus_tachycardia



2. Chest X-Ray: normal. https://radiopaedia.org/cases/normal-frontal-chest-x-ray



3. CT abdo/pelvis: Large (11 mm) obstructing calculus in the left ureter with left hydro-ureteronephrosis.
https://radiopaedia.org/cases/ureteral-stone-with-hydronephrosis

Urosepsis

Image courtesy of Dr Roberto Schubert, Radiopaedia.org, rID: 16407

4. Ultrasound: Hydronephrosis

https://www.youtube.com/watch?v=UR6IYbXqBpk

Appendix C: Facilitator Cheat Sheet & Debriefing Tips

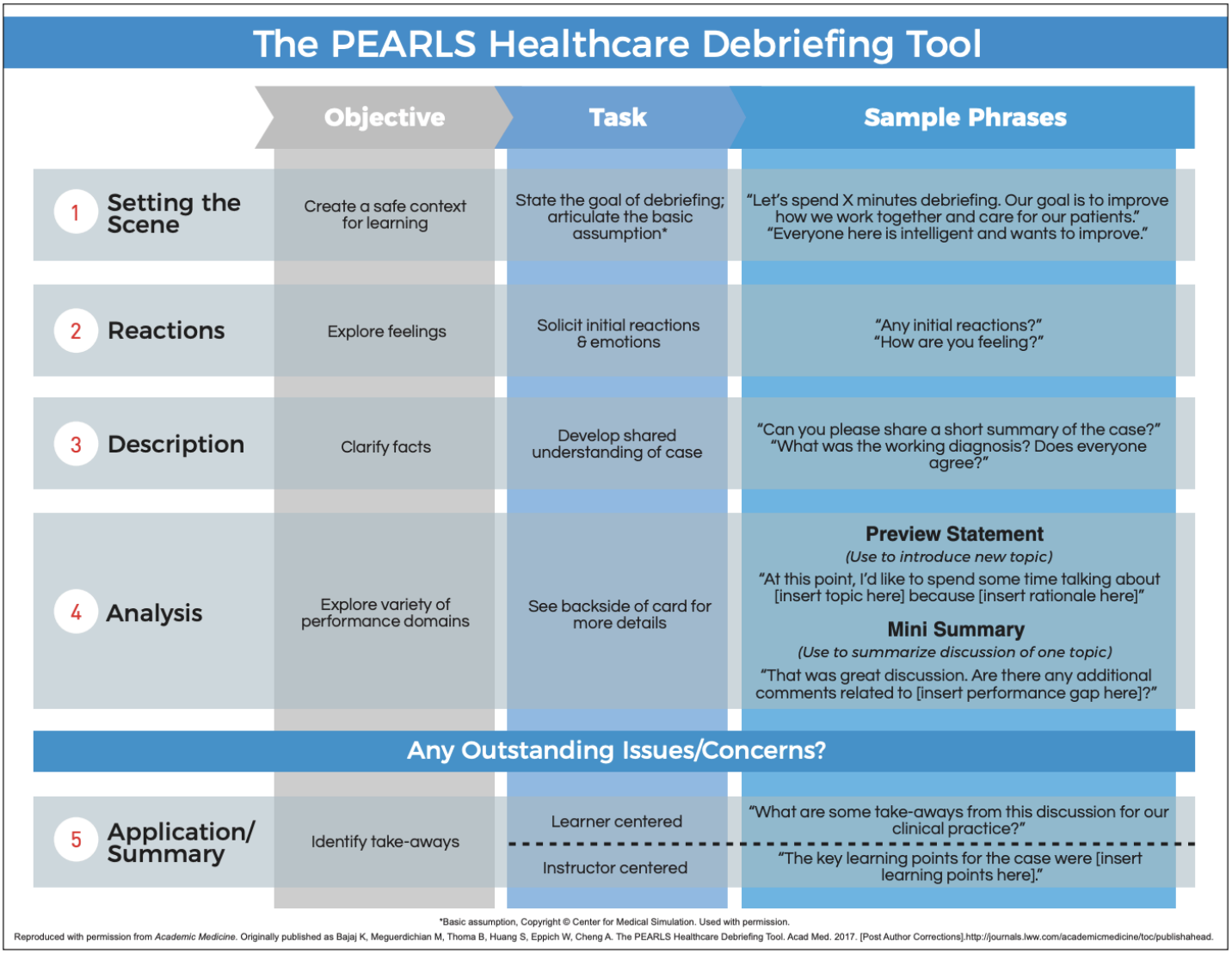
Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

1. Pre-Reading Material Provided to Trainees

- https://litfl.com/urosepsis/
- Optional mindfulness reading: https://cmha.ca/brochure/mindfulness/

2. Guided Questions for Observers can be found here: Guided Questions for Observers

3. Debriefing Tips (PEARLS Healthcare Debriefing Tool)
https://debrief2learn.org/wp-content/uploads/2017/12/PEARLS-Pocket-Card-5.8x7.2-PDF-EN.pdf



The PEARLS Healthcare Debriefing Tool

	Objective	Task	Sample Phrases
1 Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2 Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3 Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4 Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"
Any Outstanding Issues/Concerns?			
5 Application/ Summary	Identify take-aways	Learner centered / Instructor centered	"What are some take-aways from this discussion for our clinical practice?" / "The key learning points for the case were [insert learning points here]."

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4. Specific Debriefing Content Related to Objectives

Diagnosis:

- Definition of shock: Shock is a life-threatening state where there is globally insufficient delivery and/or utilisation of oxygen at the cellular level. It is characteristically (but not always) associated with low blood pressure and impaired tissue perfusion. The consequence of shock is cellular and tissue hypoxia and ultimately cellular death and organ dysfunction.
- Recognition of septic shock. Review the different types of shock - septic/distributive shock, hemorrhagic/hypovolemic shock, obstructive shock e.g. cardiac tamponade, cardiogenic shock, anaphylactic shock.

Management:

- Resuscitation
    - Address life threats
        - Manage ABCs appropriately
        - attach monitoring (HR, ECG, NIBP, RR, SpO2)
        - Large bore IV access (e.g. 2 X 16G peripheral IV lines) and obtain blood cultures if suspected sepsis
    - Fluid resuscitation
        - Most patients need no more than 2-3 L (30 ml/kg IBW) IV in total
        - Use crystalloid (0.9% NaCl)
- Early administration of appropriate antibiotics following blood cultures
- Early source control
- Assess further fluid resuscitation - Target mean arterial pressure (MAP) >65 mmHg initially in most patients

Communication:

- Ideally, the trainees will communicate their orders specifically and directly to the nurse (e.g. "[Nurse name], please insert an IV and start a 1 L bolus of NS" as opposed to "Could we start IV fluids").
- Watch for the use of order lists that are overwhelming (e.g. "Could we get the IV in, lab to draw a CBC, lytes-6, troponin, a CXR, and an ECG.").
- The use of orienting labels (e.g. "This patient in septic shock" or "My working diagnosis urosepsis"), explicit summaries (e.g. "Let's summarize: This is a 59-year-old female with 7-day history of dysuria, urinary frequency, fever, and left flank pain…… On history… Our exam found… Our plan/priorities are…"), and ideas from the team (e.g. "Am I missing anything?" or "Does anyone else have any suggestions?") should be encouraged.
- The call to the resident/urology should include an introduction (name, service, location), concise description of the patient ideally using a standardized format (e.g. SBAR), and explicit request for advice/assistance.

References

1. Tintinalli's Emergency Medicine. Chapters 50, 56, and 89
2. EM Cases. "Episode 122 Sepsis & Septic Shock – What Matters Live from EM Cases Course", with Dr. Sara Gray
3. https://litfl.com/urosepsis/

4. https://litfl.com/initial-management-of-sepsis/
5. https://litfl.com/shock/

Gastrointestinal Bleeding

Section 1: Case Summary

Scenario Title:	
Keywords:	Upper GI bleed, melena, peptic ulcer disease
Brief Description of Case:	A 74-year-old female presents with a two day history of melena. She has a known history of peptic ulcer disease. For the past week, she has been having increased pain in her knees, and she has been taking several tablets of ibuprofen daily to help control the pain. Today she felt more tired and dizzy. Her haemoglobin has dropped from a baseline of 110 to 72. She requires IV fluids, RBC transfusion, IV pantoprazole, and a consult to G.I. for scope.

Goals and Objectives	
Educational Goal:	Review the initial assessment and management of a patient with acute upper GI bleed.
Objectives: (Medical and CRM)	Objectives from M3 curriculum: 1. History-taking skills: Students should be able to obtain, document, and present an appropriate history that differentiates among etiologies of disease. 2. Physical exam skills: Students should be able to perform a physical examination to establish the diagnosis and severity of disease. 3. Differential diagnosis: Students should be able to generate a differential diagnosis recognizing specific history and physical examination findings that suggest a specific etiology for GI bleeding. 4. Laboratory interpretation: Order and interpret diagnostic and laboratory tests based on the differential diagnosis. 5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan for patients that includes: establishing adequate venous access, administering crystalloid fluid resuscitation, ordering blood and blood product transfusion (with consenting), determining when to obtain consultation from a gastroenterologist or a general surgeon.
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	X Medical Students	☐ Residents	☐ Staff	
	☐ Physicians	X Nurses	☐ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	X Sim Lab	☐ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors:			
	Sim Actors:			
	Sim Techs:			

Scenario Development	
Date of Development:	Jan 2025
Scenario Developer(s):	Grace Huang, iFMEM R2
Affiliations/Institutions(s):	Dalhousie University

Gastrointestinal Bleeding

Contact E-mail:	h.grace334@gmail.com
Last Revision Date:	Jan 2025
Revised By:	Grace Huang
Version Number:	1.0

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Jenny Green			Age: 74	Gender: F	Weight: 60 kg
Presenting complaint: Melena x 2 days					
Temp:	HR: 125	BP: 95/53	RR: 22	O_2Sat: 95%	FiO_2:
Cap glucose: 6.2			GCS: 15 (E V M)		
Triage note: Dark stools for 2 days. No nausea or vomiting. Today the patient is feeling more tired and dizzy.					
Allergies: None					
Past Medical History: Afib Prior PUD Osteoparthritis COPD Social history: 20 pack year smoking history (still smoking 0.5 packs/day) Social EtOH use			Current Medications: Apixaban Metoprolol Ventolin prn Pantoprazole		

Section 2B: Extra Patient Information

A. Further History
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, sim actors, SP, etc.)? ● No chest pain. She has chronic SOB due to COPD but she feels that it is worse than usual. ● She feels dizzy, especially when she tries to stand up, but has not fainted. ● No fevers or chills. ● For the past week, she has been having increased pain in her knees, and she has been taking several tablets of ibuprofen daily to help control the pain. ● Patient offers, "the last time I've felt like this was when I had a bleed from PUD over 10 years ago." Patient offers the information that her baseline Hgb is 110.

B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: normal S1 and S2	Neuro: GSC 15, no neurological defects.
Resp: chest clear, equal air entry bilaterally	Head & Neck: normal
Abdo: mild tenderness in epigastric region, no guarding or peritonitis. DRE: no blood seen currently	MSK/skin: pale skin
Other:	

Section 3: Technical Requirements/Room Vision

A. Patient
X Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid
B. Special Equipment Required
C. Required Medications
RBC Pantoprazole
D. Moulage
E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed XPatient not yet on monitor
F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format. The patient will complain about pain when the epigastric region is palpated.

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Nurse	RN is skilled and helpful. Prompt medical students for investigations, differential diagnosis, and management if needed.
Resident	Having car issues so will not be able to be physically present. Help answer any questions that the medical students may have. Prompt them to think about differential diagnoses and come up with a management plan.

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: irregularly irregular HR: 125 BP: 95/53 RR: 22 O_2SAT: 94 % T: 37.5 °C GCS: 15	*Patient is pale and is complaining about feeling weak and dizzy.*	Expected Learner Actions ☐ Focused history and physical for GI bleeding. ☐ Monitors ☐ 2 x LB IV ☐ Order labs ☐ IV bolus ☐ Recognize and name features of early shock (HR, BP)	Modifiers *Changes to patient condition based on learner action* - If learner orders blood and does not consent the patient, nursing staff to prompt "a consent form needs to be signed before giving blood" Triggers *For progression to next state* - Finished focus history and physical	
2. Remains stable after interventions Rhythm: irregularly irregular HR: 125 BP: 95/53 RR: 22 O2SAT: 94 % T: 37.5 oC GCS: 15		Expected Learner Actions ☐ Start IV pantoprazole ☐ Transfuse RBC	Modifiers - If no pantoprazole or RBC transfusion is given, patients BP decreases to 88/50 Triggers - Started management.	Lab work comes back: hg 72 (baseline 110)
3. GI consult		Expected Learner Actions ☐ GI consult ☐ Keep patient NPO ☐ Hold Apixaban	Modifiers - If learners do not mention anything about keeping the patient NPO, the patient will prompt "I haven't had breakfast or my	

			apixaban today, should I take it now?" <u>Triggers</u> - Case ends after discussing the case with GI over the phone and relaying orders to the nursing team.	

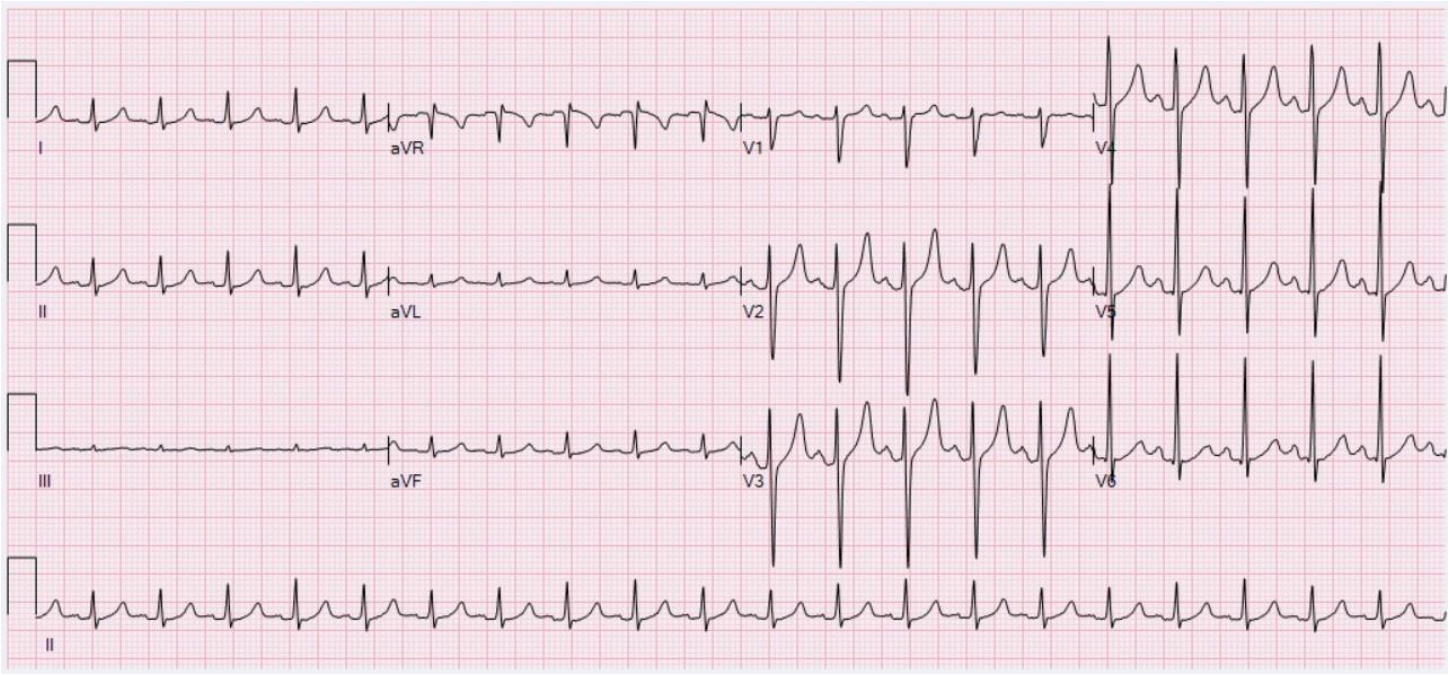
Appendix A: Laboratory Results

CBC WBC 5.5 Hgb 72 (L) (baseline 110) Plt 285 Lytes Na 143 K 3.5 Cl 98 Cr 68 Glucose 6.5	Cardiac/Coags INR 1.4 Biliary AST 28 ALT 15 Bili 7 Lipase 50

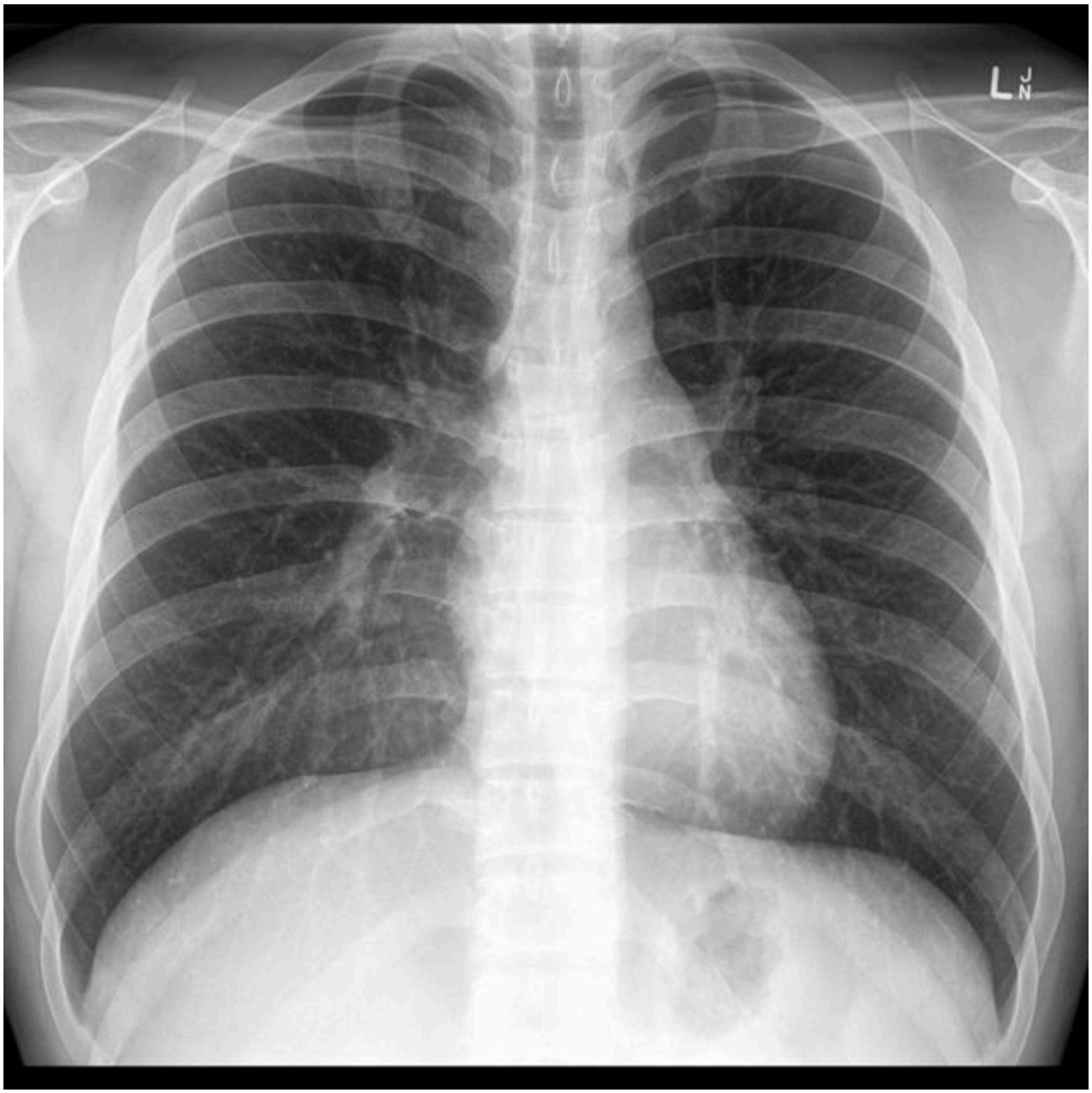
Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

1. Sinus tachycardia: https://en.wikipedia.org/wiki/Sinus_tachycardia



2. Chest X-Ray: normal. https://radiopaedia.org/cases/normal-frontal-chest-x-ray



Appendix C: Facilitator Cheat Sheet & Debriefing Tips

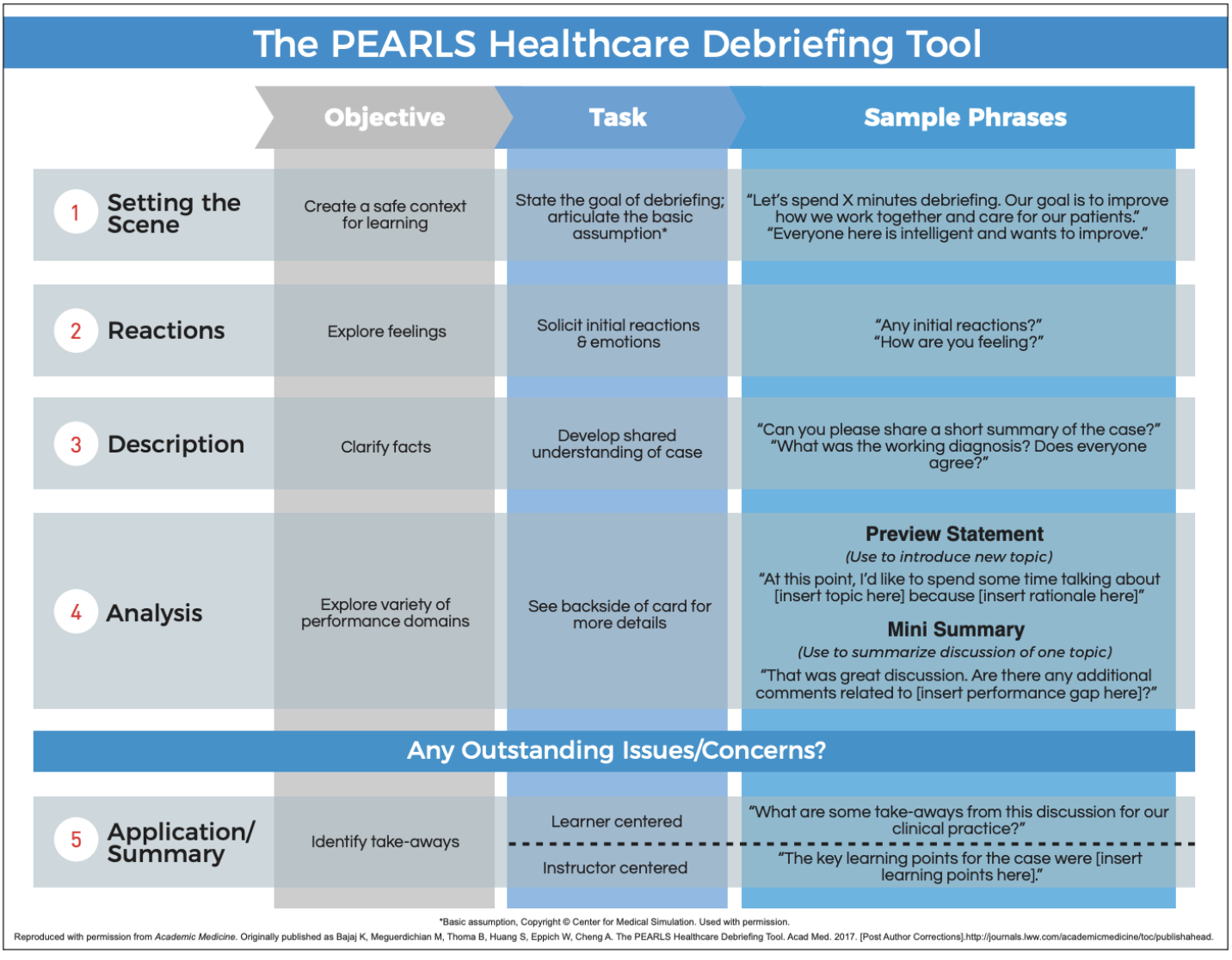
Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

1. Pre-Reading Material Provided to Trainees

- https://litfl.com/gastrointestinal-haemorrhage/
- Optional reading: https://professionaleducation.blood.ca/en/transfusion/best-practices/informed-consent-blood-transfusion
- Optional mindfulness reading: https://cmha.ca/brochure/mindfulness/

2. Guided Questions for Observers can be found here: Guided Questions for Observers

3. Debriefing Tips (PEARLS Healthcare Debriefing Tool)
https://debrief2learn.org/wp-content/uploads/2017/12/PEARLS-Pocket-Card-5.8x7.2-PDF-EN.pdf



The PEARLS Healthcare Debriefing Tool

	Objective	Task	Sample Phrases
1 Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2 Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3 Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4 Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"
Any Outstanding Issues/Concerns?			
5 Application/ Summary	Identify take-aways	Learner centered	"What are some take-aways from this discussion for our clinical practice?"
		Instructor centered	"The key learning points for the case were [insert learning points here]."

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4. Specific Debriefing Content Related to Objectives

Diagnosis:

- Differentiate upper vs. lower GI bleed
- Upper GI Bleeding: peptic ulcer disease (75% are gastric, rather than duodenal), varices (90% are oesophageal, rather than gastric), esophagitis, gastritis, duodenitis, mallory-Weiss tear, portal hypertensive gastropathy
- Lower GI Bleeding: diverticular disease, angiodysplasia, colonic tumour/polyps, meckel's diverticulum, inflammatory bowel disease, arteriovenous malformations, haemorrhoids

Management:

- Investigation: CBC (check Hb, platelets), coagulation profile, blood gas and lactate (if haemodynamically unstable), other investigations as appropriate if underlying liver disease or other bleeding disorders suspected, consider testing for H. pylori if appropriate
- Resuscitation: large bore IV access, transfuse RBC
- Upper GI endoscopy

Consenting for Blood Products

Inform patient of: the nature of treatment (what component is to be transfused? why?), material risks of transfusion – what would a reasonable patient need to know, expected benefits, possible alternatives and their risks, the likely consequences of not having the treatment, right to refuse transfusion

Communication:

- Ideally, the trainees will communicate their orders specifically and directly to the nurse (e.g. "[Nurse name], please insert an IV and start a 1 L bolus of NS" as opposed to "Could we start IV fluids").
- Watch for the use of order lists that are overwhelming (e.g. "Could we get the IV in, lab to draw a CBC, lytes, ECG, and CXR etc.").
- The use of orienting labels (e.g. "This patient in septic shock" or "My working diagnosis urosepsis"), explicit summaries (e.g. "Let's summarize…… On history… Our exam found… Our plan/priorities are…"), and ideas from the team (e.g. "Am I missing anything?" or "Does anyone else have any suggestions?") should be encouraged.
- The call to the resident/surgery should include an introduction (name, service, location), concise description of the patient ideally using a standardized format (e.g. SBAR), and explicit request for advice/assistance.

References

1. https://litfl.com/gastrointestinal-haemorrhage/
2. https://professionaleducation.blood.ca/en/transfusion/best-practices/informed-consent-blood-transfusion

Respiratory Failure from Pneumonia

Section 1: Case Summary

Scenario Title:	
Keywords:	Pneumonia, respiratory distress, respiratory failure, intubation..
Brief Description of Case:	56yo male presenting to the ED with his partner. Pt has respiratory symptoms and clinical presentation consistent with pneumonia. Participants are expected to recognize increasing respiratory distress and ultimately resp failure requiring advanced airway management and ET intubation.

Goals and Objectives	
Educational Goal:	Recognize and manage the pneumonia patient with respiratory failure. Identify the need for intubation.
Objectives: (Medical and CRM)	From M3 curriculum objectives: 1. History-taking skills: Students should be able to obtain, document, and present an appropriate medical history. 2. Physical exam skills: Students should be able to perform a physical exam to establish the diagnosis and severity of disease. 3. Differential diagnosis: Students should be able to generate a differential diagnosis recognizing specific history and physical exam findings that suggest a specific etiology of pneumonia and other possible diagnoses 4. Laboratory interpretation: Order and interpret diagnostic and laboratory tests based on the differential diagnosis. 5. Management skills: Students should be able to develop an appropriate evaluation and treatment plan for patients that includes: selecting an appropriate empiric antibiotic regimen.
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	X Medical Students	☐ Residents	☐ Staff	
	☐ Physicians	X Nurses	X RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	X Sim Lab	☐ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: 1			
	Sim Actors: 2			
	Sim Techs: 1			

Scenario Development	
Date of Development:	September 2022
Scenario Developer(s):	Tania Sullivan MD
Affiliations/Institutions(s):	NSH, Dalhousie University
Contact E-mail:	tania.sullivan@nshealth.ca
Last Revision Date:	Jan 2025
Revised By:	Grace Huang
Version Number:	3.0

Respiratory Failure from Pneumonia

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Paul Green			Age: 52	Gender: M	Weight: 100 kg
Presenting complaint: Fever/Cough/SOB					
Temp: 39.2	HR: 140	BP: 110/85	RR: 32	O_2Sat: 90%	FiO_2: RA
Cap glucose: 7.0			GCS: 15 (E V M)		
Triage note: Paul is a 52yo male presenting with a 3 day history of cough and now fever. Significant worsening of symptoms in past 24hrs. Min PO intake x 3 days. Profound weakness and SOB.					
Allergies: None.					
Past Medical History: Healthy Social: Non Smoker (quit x 20 years ago) Occas ETOH			Current Medications: No prescription medications		

Section 2B: Extra Patient Information

A. Further History	
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, sim actors, SP, etc.)? Pt is an Ex-smoker- quit x 20yrs.	
B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: S1S2 hyperdynamic	Neuro: Fatigued/ drowsy, but no lateralizing neuro findings
Resp: Decreased air entry bilaterally- worse on the right with assoc Rt sided course exp	Head & Neck: Increased work of breathing, shallow breaths, grunting at times.
Abdo: Some abdominal breathing noted	MSK/skin: Flushed
Other:	

Section 3: Technical Requirements/Room Vision

A. Patient
X Mannequin *(specify type and whether infant/child/**adult**)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid

B. Special Equipment Required
Intubation equipment: video laryngoscope, endotracheal tube, stylet, bougie, NP, bag valve mask, face mask, LMA

C. Required Medications
RSI Meds: Ketamine Rocuronium Succinylcholine **Infection Meds:** Ceftriaxone Azithromycin

D. Moulage
Patient seated in bed and having trouble breathing.

E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed
X Patient not yet on monitor

F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format.

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Nurse	Calls the team to the bedside because the patient looks unwell. RN is skilled and helpful. Prompt medical students for investigations, differential diagnosis, and management if needed.
RT	Very experienced RT, able to help guide learners with intubation steps.
Resident	In the beginning of the case, the resident is held up with parking issues. They are able to help answer any questions that the medical students may have. Prompt them to think about differential diagnoses and come up with a management plan. Will join the case when intubation is starting to supervise.

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: Sinus Tachycardia HR: 140 BP: 110/85 RR: 32 O2SAT: 90% T: 39.2oC GCS: 15	*Patient is flushed, on baseline poor color- looks fatigued and unwell.*	Expected Learner Actions ☐ Acknowledge abnormalities in first set of vitals. ☐ Primary survey and focused history taking. ☐ Request 1-2 IVs ☐ Start oxygen therapy ☐ Order septic labs/ VBG ☐ Treat fever ☐ IV fluid bolus ☐ Broad spectrum antibiotics.	Modifiers *Changes to patient condition based on learner action* - If no O2 therapy started, patient's sats will decompensate to 83% Triggers *For progression to next state* - Once primary survey and investigations completed	Chest Xray: Bi-basilar infiltrates worse on Rt.
2. Escalating O2 demands HR: 146 BP: 110/85 RR: 36 O2SAT: 91% on 4L n/c T: 39.2oC GCS: 15		Expected Learner Actions ☐ Review labs ☐ Consult RT ☐ Option to also call resident for advice	Modifiers - If trainees don't request RT support, nurse will ask "do you want me to help get additional support for this patient?" Triggers - RT arrives to support - Pt becomes more drowsy - Resident arrives on scene	Review blood work. Lactate elevated.
3. Intubation/ Stabilization HR: 140 BP: 100/70 RR: 32 O2SAT: 92%		Expected Learner Actions ☐ Perform airway procedural time out ☐ Deliberate pre-oxygenation with BVM/ nc setup vs BIPAP	Modifiers Triggers For progression to next state: - Successful intubation	Ensure adequate prep of self/ team/space for airway intervention. Deliberate pre-oxygenation with 100% Fio2.- flow rates to meet

T: 39.2oC GCS: 15				needs.
4. Resolution/ post intubation transfer. HR: 97 BP: 120/86 RR: vent settings O2SAT: 97%		Expected Learner Actions ☐ Plan post intubation sedation/care ☐ Consult ICU	Modifiers Triggers - Case ends with voicing of post intubation care and consulting ICU	

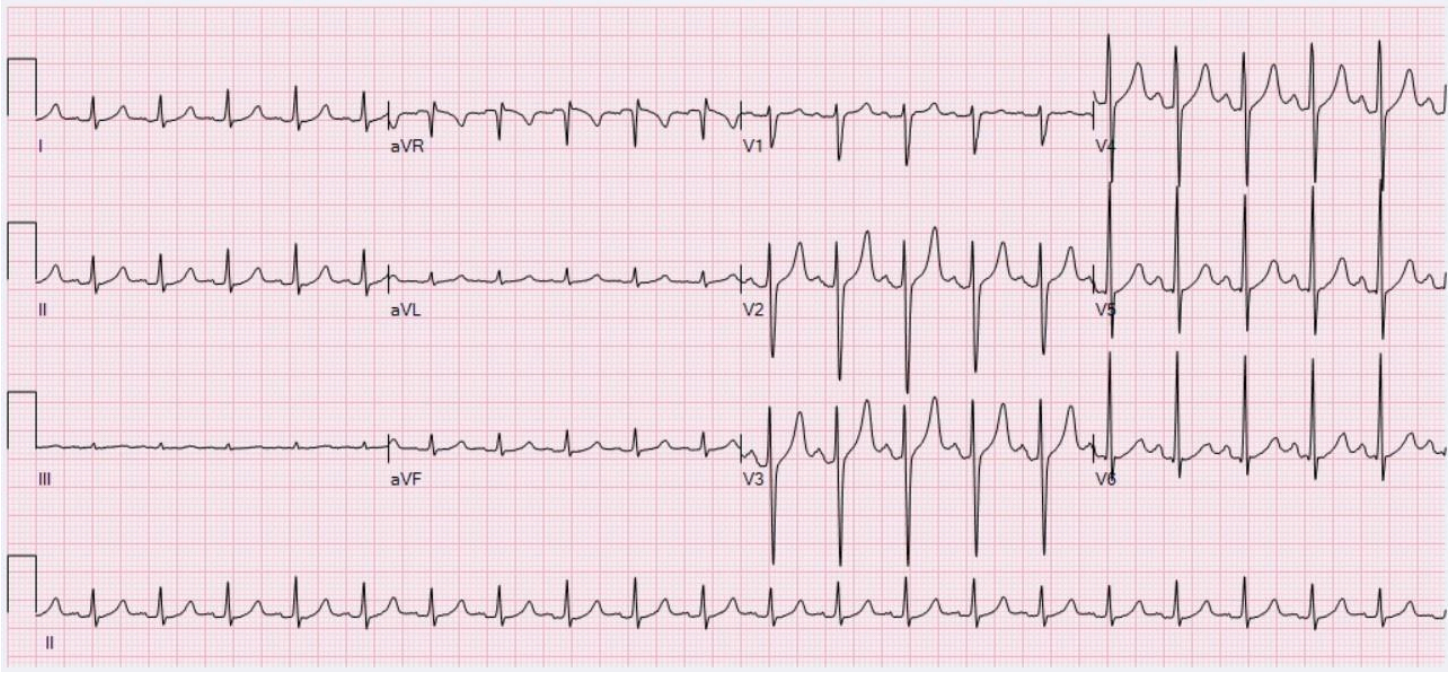
Appendix A: Laboratory Results

CBC WBC 18 (H) Hgb 125 Plt 250 Lytes Na 132 K 3.2 Cl 90 HCO_3 AG Urea Cr 110 Glucose 7.3 Extended Lytes Ca Mg PO_4 Albumin TSH VBG pH 7.36 pCO_2 28 pO_2 69 HCO_3 25 Lactate 2.5	Cardiac/Coags Trop <5 INR 1.2 Biliary AST 75 ALT 80 GGT 100 ALP 150

Appendix B: ECGs, X-rays, Ultrasounds and Pictures

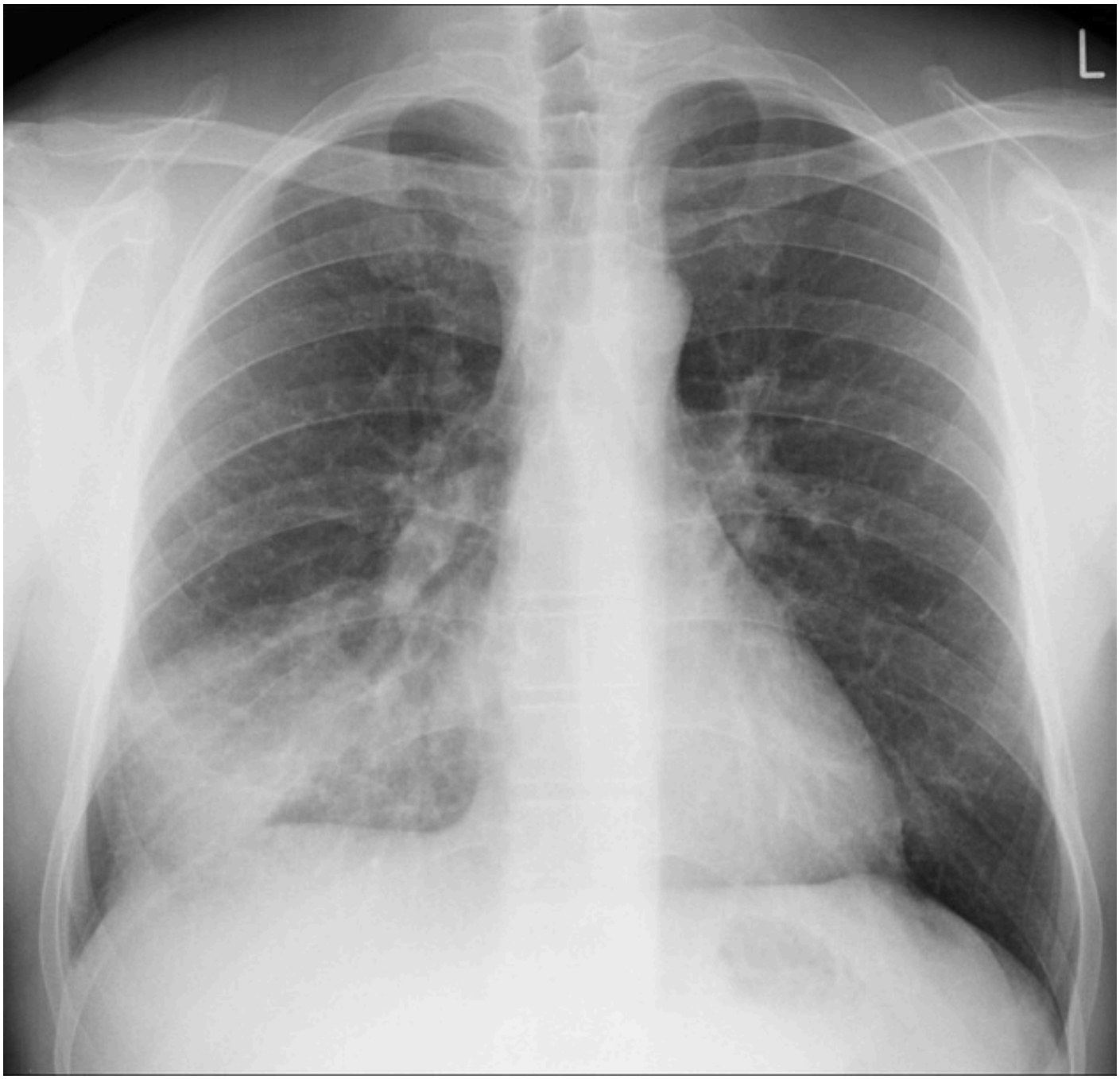
Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

1. Sinus tachycardia: https://en.wikipedia.org/wiki/Sinus_tachycardia



2. Chest X ray - RML pneumonia. https://radiopaedia.org/cases/pneumonia-right-middle-lobe-1#image-1371188

Respiratory Failure from Pneumonia



Appendix C: Facilitator Cheat Sheet & Debriefing Tips

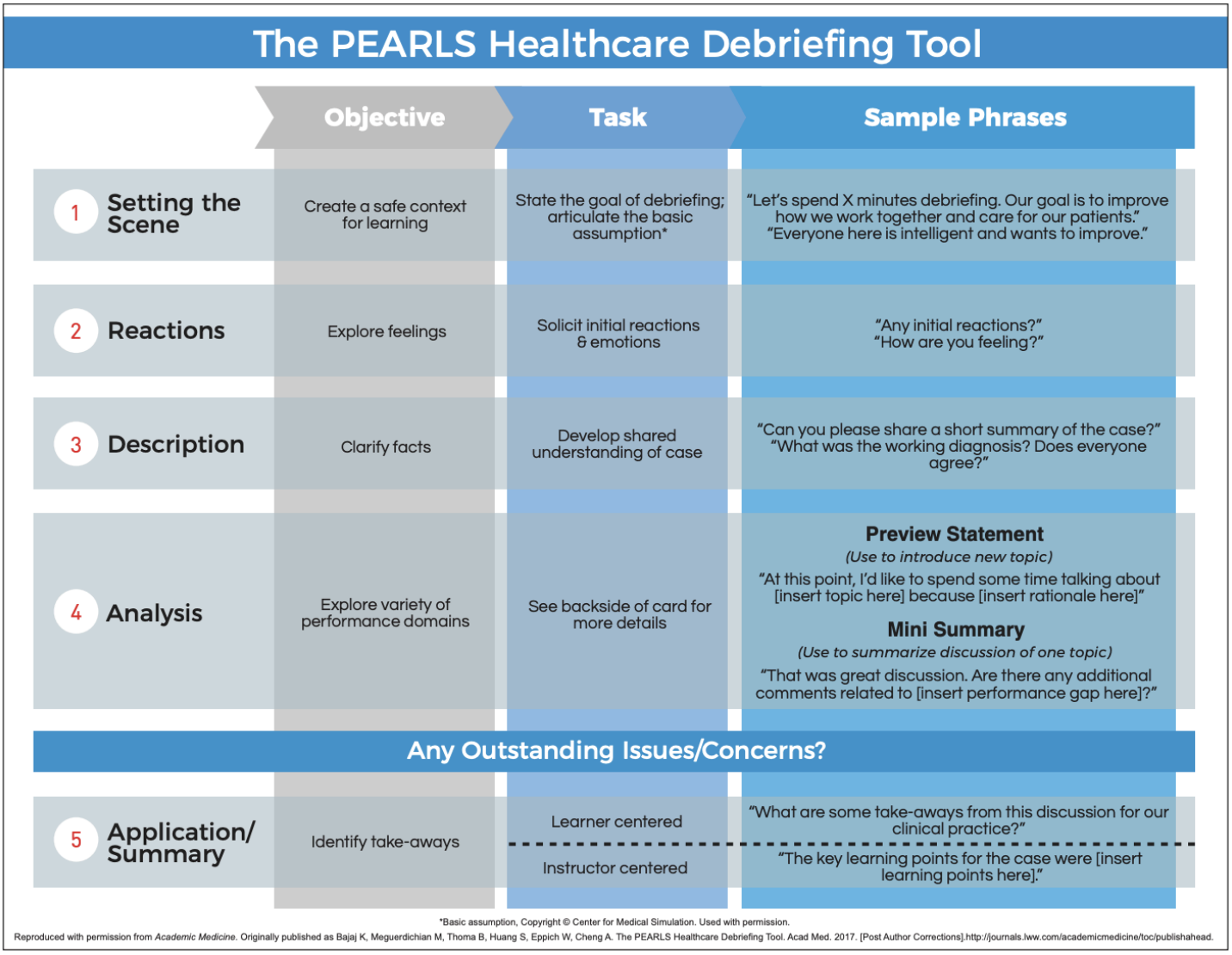
Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

1. Pre-Reading Material Provided to Trainees

- https://litfl.com/community-acquired-pneumonia/
- Optional mindfulness reading: https://cmha.ca/brochure/mindfulness/

2. Guided Questions for Observers can be found here: Guided Questions for Observers

3. Debriefing Tips (PEARLS Healthcare Debriefing Tool)
https://debrief2learn.org/wp-content/uploads/2017/12/PEARLS-Pocket-Card-5.8x7.2-PDF-EN.pdf



The PEARLS Healthcare Debriefing Tool

	Objective	Task	Sample Phrases
1 Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2 Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3 Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4 Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"
Any Outstanding Issues/Concerns?			
5 Application/ Summary	Identify take-aways	Learner centered	"What are some take-aways from this discussion for our clinical practice?"
		Instructor centered	"The key learning points for the case were [insert learning points here]."

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4. Specific Debriefing Content Related to Objectives

History and Physical:

- History-taking skills: Students should be able to obtain, document, and present an age-appropriate medical history that differentiates among etiologies of disease, including:
    - The presence and quantification of fever, chills, sweats, cough, sputum, hemoptysis, dyspnea, and chest pain
    - Historical features consistent with potential immunocompromise
    - Potential tuberculosis exposure
    - Identify patients at risk for aspiration
- Physical exam skills: Students should be able to perform a physical exam to establish the diagnosis and severity of disease, including:
    - Accurately determining respiratory rate and level of respiratory distress
    - Identifying bronchial breath sounds, crackles and wheeze
    - Identifying signs of pulmonary consolidation
    - Identifying signs of pleural effusion
    - Identifying signs of the complications of pneumonia

Differential diagnosis:

- Students should be able to generate a differential diagnosis recognizing specific history and physical exam findings that suggest a specific etiology of pneumonia and other possible diagnoses, including: Common cold, acute bronchitis, influenza, acute exacerbation of COPD, asthma exacerbation, CHF, and pulmonary embolism.

Management:

- Laboratory interpretation: Order and interpret diagnostic and laboratory tests based on the differential diagnosis. These may include: CBC, blood cultures, VBG, chest radiograph
- Students should able to develop an appropriate evaluation and treatment plan for patients that includes:
    - Selecting an appropriate empiric antibiotic regimen for community-acquired, nosocomial, immunocompromised-host, and aspiration pneumonia
    - Recognizing the complications of pneumonia

Communication:

- Ideally, the trainees will communicate their orders specifically and directly to the nurse (e.g. “[Nurse name], please insert an IV and start a 1 L bolus of NS” as opposed to “Could we start IV fluids”).
- Watch for the use of order lists that are overwhelming (e.g. “Could we get the IV in, lab to draw a CBC, lytes-6, troponin, a CXR, and an ECG.”).
- The use of orienting labels (e.g. “This patient in septic shock” or “My working diagnosis urosepsis”), explicit summaries (e.g. “Let’s summarize: This is a 59-year-old female with 7-day history of dysuria, urinary frequency, fever, and left flank pain…… On history… Our exam found… Our plan/priorities are…”), and ideas from the team (e.g. “Am I missing anything?” or “Does anyone else have any suggestions?”) should be encouraged.
- The call to the resident/ICU should include an introduction (name, service, location), concise description of the patient ideally using a standardized format (e.g. SBAR), and explicit request for advice/assistance.

RSI (advanced for medical students but can be an exposure - have a brief discussion)

- Equipment and planning: O2 MARBLES.

    - Oxygen; Masks (NP, NRB, BVM); monitoring; Airway adjuncts (e.g. OPA, NPA, LMA); Ask for help and difficult airway trolley; RSI drugs; Resus drugs; BVM; Bougie; Laryngoscopes; LMA; ETTs; ETCO2; Suction; State Plan
- Airway plan:
    - Formulate the airway management plan(s) and communicate this to the team, so they are all 'on the same page'.
    - Plan A, B, and C approach
    - Define the trigger points for moving from Plan A to B (and subsequent plans) if required.
- Medications
    - Common induction agents: ketamine, propofol, etomidate
    - Common paralytic agents: succinylcholine, rocuronium

References

1. https://litfl.com/community-acquired-pneumonia/
2. https://litfl.com/rapid-sequence-intubation-rsi/
3. https://www.bjaed.org/article/S2058-5349(17)30067-7/fulltext

Small Bowel Obstruction

Section 1: Case Summary

Scenario Title:	
Keywords:	Small bowel obstruction
Brief Description of Case:	A 65 year old male presents with a one day history of abdominal pain which is progressively getting worse, vomiting, and not tolerating PO intake. History, physical, and investigations are consistent with SBO. The SBO is managed conservatively and the patient is admitted to general surgery for observation.

Goals and Objectives	
Educational Goal:	Review the initial assessment and management of a patient with acute flank pain and fever.
Objectives: (Medical and CRM)	Objectives from M3 Curriculum: 1. Understand the presentation, investigations, and management of SBO 2. Understand the common etiologies of SBO and risk factors 3. Knowledge of surgical indications in SBO including at presentation and delayed 4. Knowledge of complications of SBO
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	X Medical Students	☐ Senior Learners	☐ Staff	
	☐ Physicians	☐ Nurses	☐ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	☐ Sim Lab	☐ In Situ	☐ Other:	
Recommended Number of Facilitators:	Instructors: 1			
	Sim Actors: 1			
	Sim Techs: 1			

Scenario Development	
Date of Development:	Jan 2025
Scenario Developer(s):	Grace Huang, iFMEM R2
Affiliations/Institutions(s):	Dalhousie University
Contact E-mail:	h.grace334@gmail.com
Last Revision Date:	Jan 2025
Revised By:	Grace Huang
Version Number:	1.0

Small Bowel Obstruction

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Jimmy Green			Age: 65	Gender: M	Weight: 70 kg
Presenting complaint:					
Temp: 37	HR: 121	BP: 95/62	RR: 22	O_2Sat: 98%	FiO_2: RA
Cap glucose: 4.7			GCS: 15 (E V M)		
Triage note: One day history of 8/10 abdominal pain which is progressively getting worse. 4 episodes of vomiting in the last 6 hours. Not tolerating PO intake. No fevers or chills.					
Allergies: None					
Past Medical History: Sigmoidectomy for diverticulitis in 2012 Afib HTN Depression PTSD			Current Medications: Lisinopril ASA Rivaroxaban Escitalopram Prazosin		

Section 2B: Extra Patient Information

A. Further History	
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, sim actors, SP, etc.)? No diarrhea, no blood in stools. LBM 2 days ago. No flatus for the last 24 hours. Emesis - no blood Feels bloated and his stomach has gradually been getting more distended.	
B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: Normal S1 and S2	Neuro: GSC 15. No neurological defects.
Resp: chest clear, equal air entry bilaterally	Head & Neck: Dry mucous membranes.
Abdo: distended, hyperactive bowel sounds. Diffusely tender without rebound or guarding. No percussion tenderness.	MSK/skin: warm and dry, no rashes
Other:	

Section 3: Technical Requirements/Room Vision

A. Patient
X Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid

B. Special Equipment Required
NG tube

C. Required Medications
Normal saline bolus Morphine, hydromorphone IV Gravol, zofran IV

D. Moulage
Patient in supine position in bed, complaining of pain.

E. Monitors at Case Onset
☐ Patient on monitor with vitals displayed
X Patient not yet on monitor

F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format. Patient complains of pain if the abdomen is palpated.

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Nurse	RN is skilled and helpful. Prompt medical students for investigations, differential diagnosis, and management if needed.
Resident	Having car issues so will not be able to be physically present. Help answer any questions that the medical students may have. Prompt them to think about differential diagnoses and come up with a management plan.

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: irregularly irregular HR: 121 BP: 95/62 RR: 22 O_2SAT: 98% T: 37°C GCS: 15	*Awake, alert, uncomfortable appearing, non-toxic*	<u>Expected Learner Actions</u> ☐ History and physical exam ☐ IV fluid bolus ☐ Order initial labs	<u>Modifiers</u> *Changes to patient condition based on learner action* - If no fluid bolus given, blood pressure changes to 85/58 <u>Triggers</u> *For progression to next state* - Once labs are ordered	
2. Resolved hypotension, patient stable Rhythm: irregularly irregular HR: 103 BP: 109/68 RR: 22 O_2SAT: 98% T: 37°C GCS: 15		<u>Expected Learner Actions</u> ☐ Pain management ☐ Antiemetic ☐ Review lab work ☐ Order CT once patient is more comfortable and stable	<u>Modifiers</u> - If no pain management given, patient will start complaining about pain in stomach <u>Triggers</u> - Medications given and CT ordered	
3. Diagnosis, Consult Gen Surg	*Appears more comfortable*	<u>Expected Learner Actions</u> ☐ Consult gen surg - will advise to admit under surgery team for observation ☐ NPO ☐ NG tube ☐ Explain plan to patient	<u>Modifiers</u> - If no plan is described to the patient, he will ask "what's happening now, can I go home?" <u>Triggers</u> - Case ends after consult and team explains plan to patient	CT abdo with report: multiple dilated loops of small bowel without clear transition point identified.

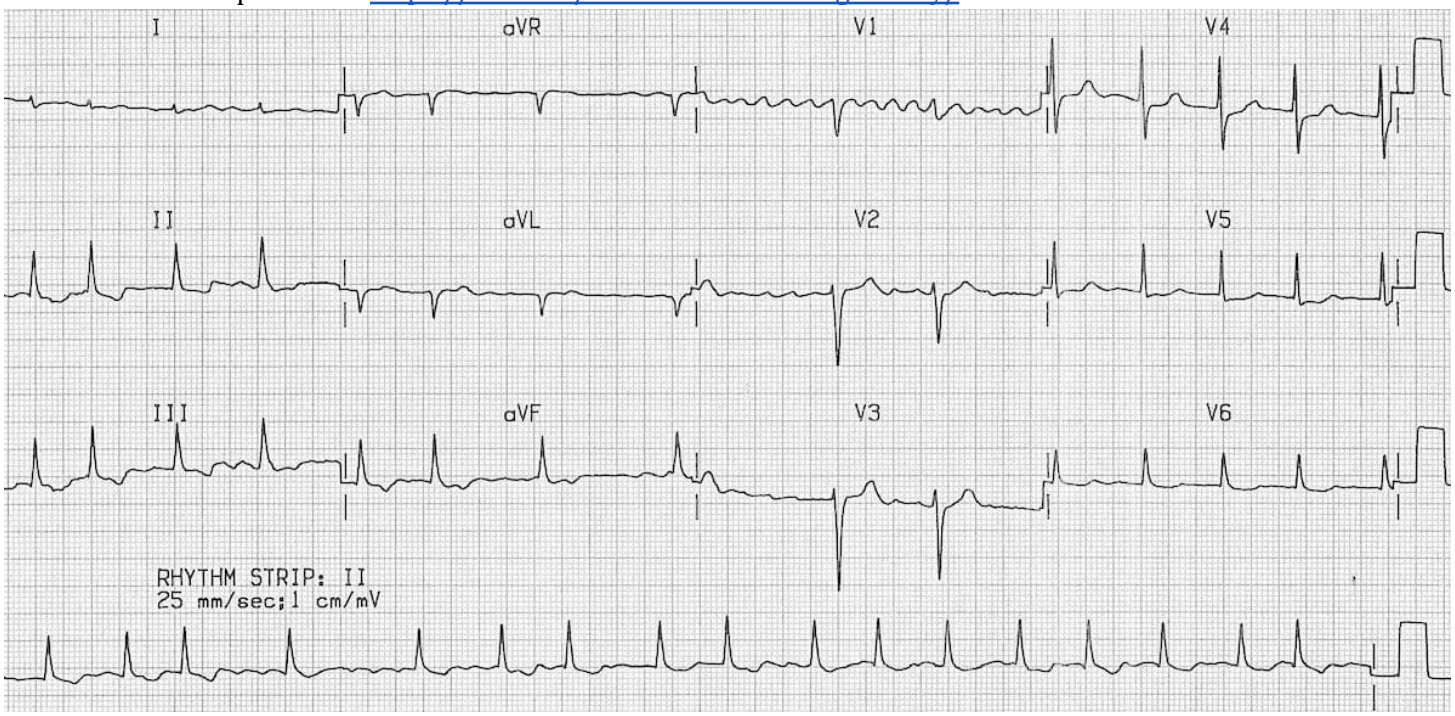
Appendix A: Laboratory Results

CBC WBC 12.9 (H) Hgb 120 (L) Plt 317 Lytes Na 139 K 3.5 (L) Cl 88 (L) Cr 97 Glucose 5.1 Lactate 2.4	Cardiac/Coags INR 1.1 Biliary AST 23 ALT 10 Bili 7 Lipase 115 Urinalysis Colour - yellow Clarity - clear Ketones - none Nitrites - none Leuks - none Blood - none

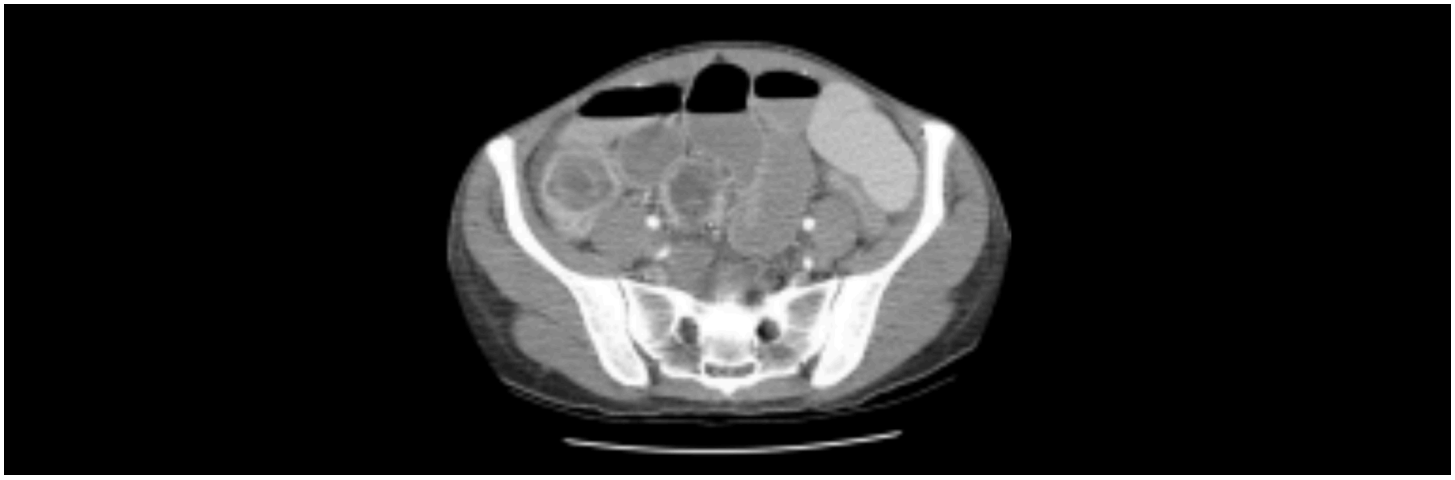
Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

1. ECG - Afib. Example 1 from https://litfl.com/atrial-fibrillation-ecg-library/



2. CT abdo: multiple dilated loops of small bowel without clear transition point identified.



Appendix C: Facilitator Cheat Sheet & Debriefing Tips

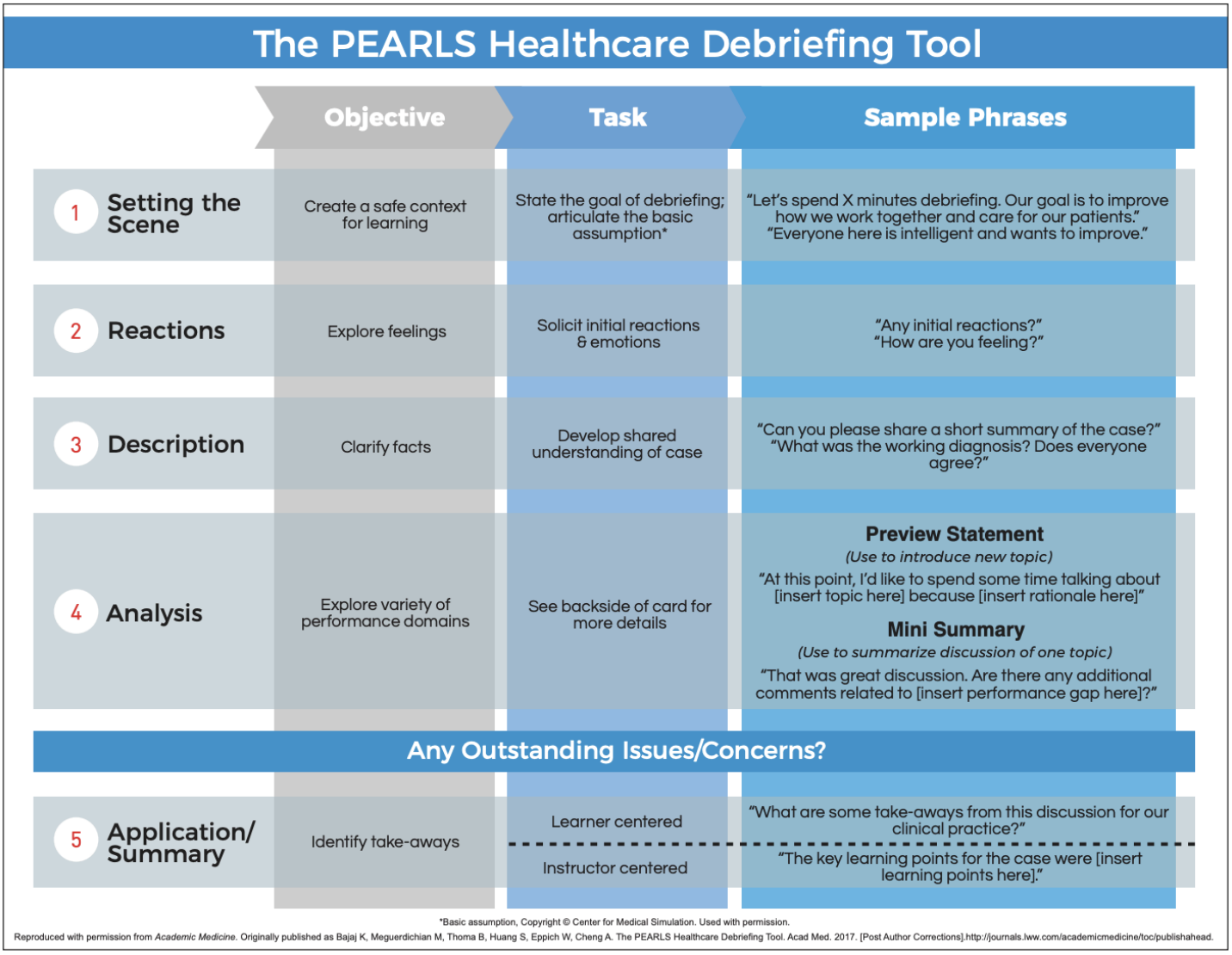
Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

1. Pre-Reading Material Provided to Trainees

- https://litfl.com/urosepsis/
- Optional mindfulness reading: https://cmha.ca/brochure/mindfulness/

2. Guided Questions for Observers can be found here: Guided Questions for Observers

3. Debriefing Tips (PEARLS Healthcare Debriefing Tool)
https://debrief2learn.org/wp-content/uploads/2017/12/PEARLS-Pocket-Card-5.8x7.2-PDF-EN.pdf



The PEARLS Healthcare Debriefing Tool

	Objective	Task	Sample Phrases
1 Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2 Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3 Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4 Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"
Any Outstanding Issues/Concerns?			
5 Application/ Summary	Identify take-aways	Learner centered	"What are some take-aways from this discussion for our clinical practice?"
		Instructor centered	"The key learning points for the case were [insert learning points here]."

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4. Specific Debriefing Content Related to Objectives

Diagnosis:

- Differential diagnosis includes bowel obstruction, ischemic bowel, acute biliary obstruction, pancreatitis, perforated gastric ulcer, AAA

Management:

- Fluid therapy: isotonic crystalloid such as Lactated Ringer solution or normal saline may be appropriate for initial intravenous fluid therapy if the patient is dehydrated
- Diet: NPO
- Gastric decompression: For patients with SBO that is associated with significant gastric distension, nausea, and/or vomiting, we perform nasogastric tube decompression
- Antibiotics: For most patients with uncomplicated SBO, we suggest not administering prophylactic antibiotics.
- Surgical indications in SBO:
    - Bowel compromise — All patients suspected of having bowel compromise (ischemia, necrosis, or perforation) based upon clinical and radiologic examination
    - Clinical signs - fever, leukocytosis, tachycardia that does not respond to fluid resuscitation, continuous or worsening abdominal pain, sometimes out of proportion to examination, metabolic and lactic acidosis, tachypnea, peritonitis

Communication:

- Ideally, the trainees will communicate their orders specifically and directly to the nurse (e.g. "[Nurse name], please insert an IV and start a 1 L bolus of NS" as opposed to "Could we start IV fluids").
- Watch for the use of order lists that are overwhelming (e.g. "Could we get the IV in, lab to draw a CBC, lytes, troponin, a CXR, and an ECG.").
- The use of orienting labels (e.g. "This patient in septic shock" or "My working diagnosis urosepsis"), explicit summaries (e.g. "Let's summarize: This is a 59-year-old female with 7-day history of dysuria, urinary frequency, fever, and left flank pain…… On history… Our exam found… Our plan/priorities are…"), and ideas from the team (e.g. "Am I missing anything?" or "Does anyone else have any suggestions?") should be encouraged.
- The call to the resident/urology should include an introduction (name, service, location), concise description of the patient ideally using a standardized format (e.g. SBAR), and explicit request for advice/assistance.

References

1. https://www.uptodate.com/contents/management-of-small-bowel-obstruction-in-adults#H2531219644

Pediatric Meningitis

Section 1: Case Summary

Scenario Title:	
Keywords:	Altered LOC, Sepsis, Meningitis, neurology, altered mental status.
Brief Description of Case:	A 5yo child presents with a parent and a 48hr history of progressive unwell- fever, lethargy, headache and vomiting.

Goals and Objectives	
Educational Goal:	Early recognition and goal directed management of the critically ill child presenting with altered mental status and signs of sepsis.
Objectives: (Medical and CRM)	Objectives from Med 3 Curriculum: 1. Recognize that a child with decreased level of consciousness is an emergency. 2. Given a child presenting with decreased level of consciousness, conduct a history and physical exam to develop a differential diagnosis considering common and important causes including: metabolic (e.g. hypoglycemia), intoxication/poisoning, infection (sepsis/meningitis/encephalitis), head injury. 3. Describe the management of infections, including meningitis and sepsis.
Interprofessional objectives:	1: Patient and Family Centered Care: Therapeutic care/ support / inclusion of the parent of a critically ill child.
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	X Medical Students	☐ Senior Learners		☐ Staff
	☐ Physicians	X Nurses	☐ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	X Sim Lab	☐ In Situ		☐ Other:
Recommended Number of Facilitators:	Instructors: 1			
	Sim Actors: 2			
	Sim Techs: 1			

Scenario Development	
Date of Development:	February 2023
Scenario Developer(s):	Tania Sullivan MD,CCFP(EM)
Affiliations/Institutions(s):	Dalhousie University, NSH
Contact E-mail:	Tania.sullivan@nshealth.ca
Last Revision Date:	Jan 2025
Revised By:	Grace Huang
Version Number:	2.0

Pediatric Meningitis

Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Andy			Age: 5	Gender: M	Weight: 20 kg
Presenting complaint: "the flu"					
Temp: 39.4	HR: 150	BP: 100/50	RR: 24	O_2Sat: 96%	FiO_2: RA
Cap glucose: 4.0 NEVER FORGET THE GLUCOSE			GCS: 14 (E V M)		
Triage note: 5yo presenting with parent- 24hr hx of fever, HA and now vomiting. Today parent concerned that 'acting delirious' and worried 'dehydrated'. Multiple school contacts with 'the flu'. Denies cough, loose stool x 1 no diarrhea. Child is ill appearing and moans with vitals sitting in parents lap. Eyes closed but opens to voice.					
Allergies: ?Amoxil (Rash)					
Past Medical History: Recurrent ear infections as toddler- Myringotomy tubes placed age 2.			Current Medications: Nil Immun: UTD		

Section 2B: Extra Patient Information

A. Further History
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, sim actors, SP, etc.)? Parent Provides : 24hr history of progressive unwell- fever, lethargy, headache and vomiting. Several students in class out with 'the flu' and so believed this was the problem.

B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: Hyperdynamic S1S2	Neuro: Pt rouses to voice, recognizes parents but confused with time and place. No lateralizing findings.
Resp: Good AE Bilaterally	Head & Neck: TM normal, PERL, Moans with neck exam and 'nuchal rigidity' noted
Abdo: Soft but generally moaning with exam	MSK/skin: no rashes found
Other:	

Section 3: Technical Requirements/Room Vision

A. Patient
☐ Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid

B. Special Equipment Required

Broselow Tape/ Pedi Stat app
Peds IV setup
Pediatric sepsis order sets

LP task Trainer + LP kit

C. Required Medications

Normal Saline
D5 NS
D10

Ceftriaxone
Vancomycin

D. Moulage

Patient in bed with parent at bedside.

E. Monitors at Case Onset

☐ Patient on monitor with vitals displayed
X Patient not yet on monitor

F. Patient Reactions and Exam

Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format.

A: Airway patent no stridor
B: Good AE bilat
C: Decreased cap refil: 4 sec
D: Drowsy, confused to place (where am i)
E: no rashes

Section 4: Sim Actor and Standardized Patients

Sim Actor and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Parent	Obvious concern/ scared- but the parent will be understanding and will not become frantic. Parent to describe that had kept the patient home from school because he was feeling unwell- headache and sore eyes. Noted fever and occasionally headache by last night and figured it was 'the flu' This AM was sleeping more than usual, vomiting and c/o headache. Parent woke the child at lunch time and seemed 'confused- like they were delirious. High fever noted at home. " I was worried he/she was dehydrated".
Nurse	Calls the team to the bedside because the patient looks unwell. RN is skilled and helpful. Prompt medical students for investigations, differential diagnosis, and management if needed.
Resident	Having car issues so will not be able to be physically present. Help answer any questions that the medical students may have. Prompt them to think about differential diagnoses and come up with a management plan.

Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: NSR HR: 150 BP: 100/50 RR: 24 O2SAT: 98% T:39.4 oC GCS: 14	*Child is moaning when examined – will open eyes to voice but whining when answering questions-*	Expected Learner Actions ☐ Timely recognition of 'sick' with immediate entry to department ☐ Monitors ☐ IV/IO ☐ Fever management ☐ Sepsis labs ☐ Name shock indicators and give initial 10-20/kg bolus NS. ☐ Name differential	Modifiers *Changes to patient condition based on learner action* Triggers *For progression to next state* Complete primary survey/ name concern and start interventions.	
2. Decline in LOC Rhythm: NSR HR: 150 BP: 90/50 RR: 24 O2SAT: 98% T:39.4 oC GCS: 13	*Child noted to be more repetitive with questions to mom, confused as to where they are. Mom voices concern of same.*	Expected Learner Actions ☐ Recognize deterioration in mental status/LOC ☐ Recheck Blood Glucose 2.5 ☐Intervene for low glucose. ☐ Broad spectrum abox-ceftriaxone and vancomycin ☐ Review labs	Modifiers - if not repeating glucose, lab will call to alert critical value- glucose 2.5. Triggers - Once the patient is treated for low sugars and with abx for suspected meningitis.	Check the sugar (and treat as necessary). If low, give dextrose 0.25-0.5 grams/kg. Usually this is recommended as 2-4 mL/kg of D10W, but if you have a good IV in a large vein 1-2mL/kg of D25W is also reasonable. Vanco: 15/kg IV Ceftriaxone 100/kg IV Consider dex
3. Consult peds Rhythm: NSR HR: 135 BP: 108/60 RR: 24	*Child has some clinical improvement after interventions.*	Expected Learner Actions ☐ Consult peds ☐ Explanation to parents	Modifiers - If the plan is not communicated to the patient, they will ask what is going on.	

O2SAT: 98% T: 38 oC GCS: 13			<u>Triggers</u> - Case ends after consult to peds and addressing parental concerns	

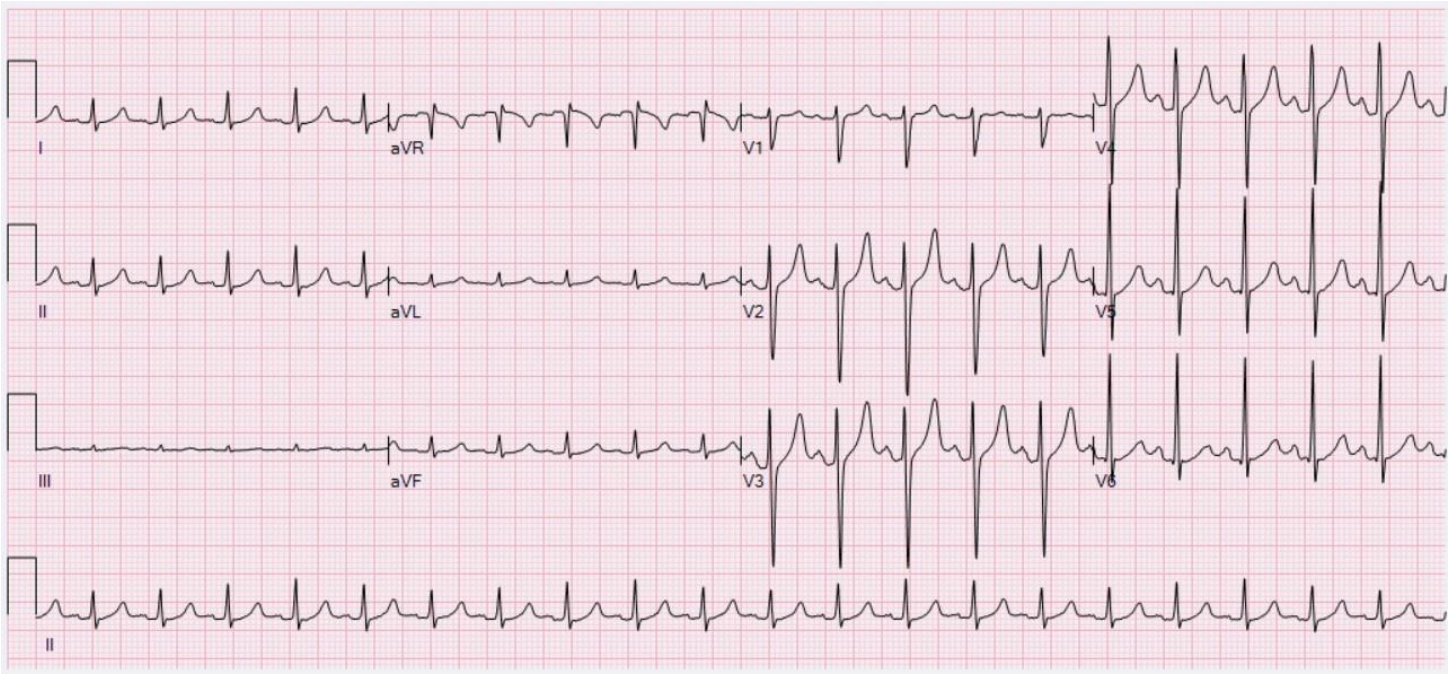
Appendix A: Laboratory Results

CBC WBC :25 (H) Hgb 100 Plt: 90 Lytes Na:129 K: 4.9 Cl: 91 HCO3 18 Urea: 7 Cr: 78 Glucose: 2.5 CRP: 160 (H)	Cardiac/Coags INR 1.5 Biliary AST 40 ALT 20 GGT 38 ALP 85

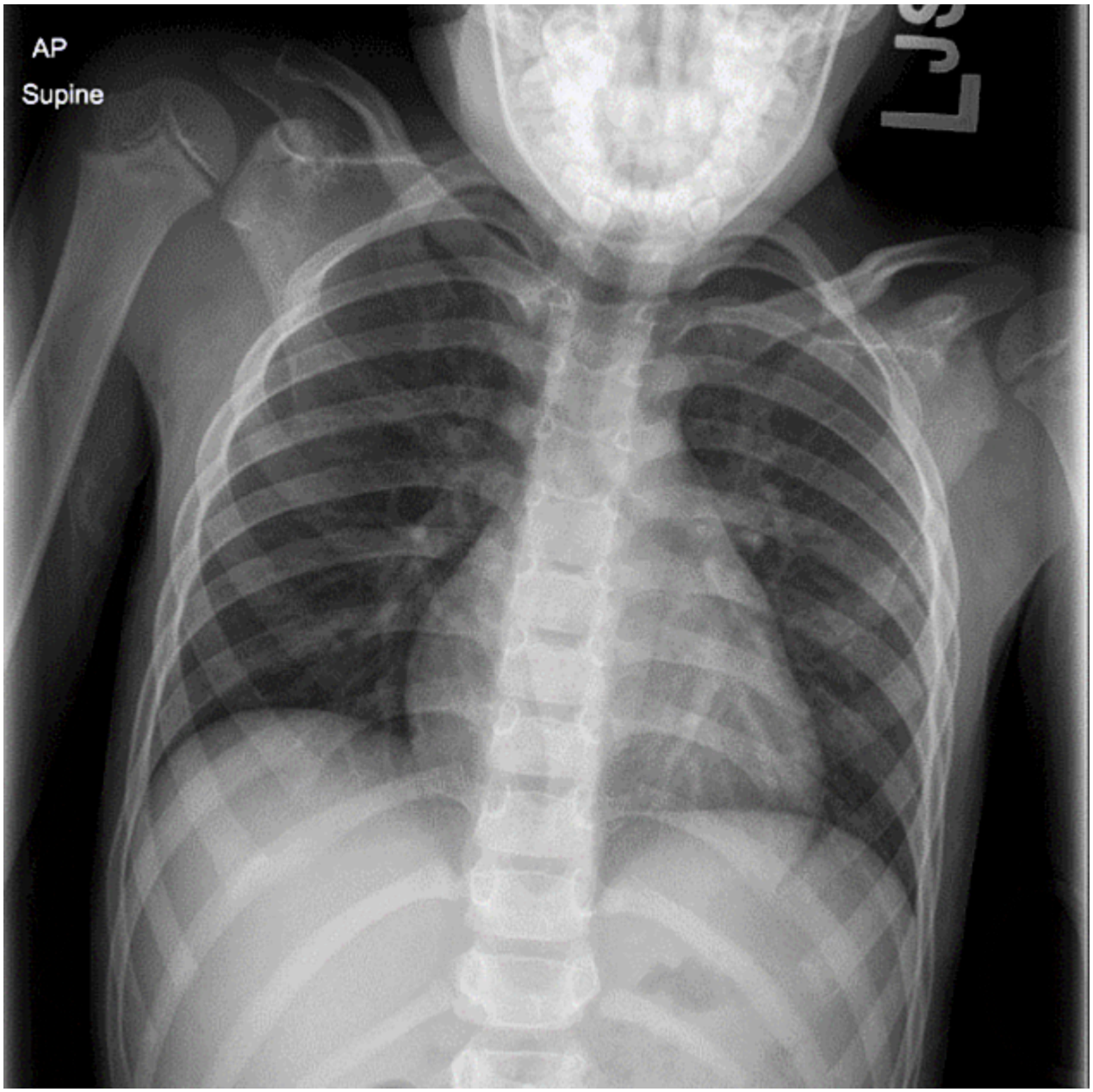
Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Paste in any auxiliary files required for running the session. Don't forget to include their source so you can find them later!

1. Sinus tachycardia: https://en.wikipedia.org/wiki/Sinus_tachycardia



2. Chest X-Ray: normal. https://radiopaedia.org/cases/normal-chest-radiograph-pediatric



Appendix C: Facilitator Cheat Sheet & Debriefing Tips

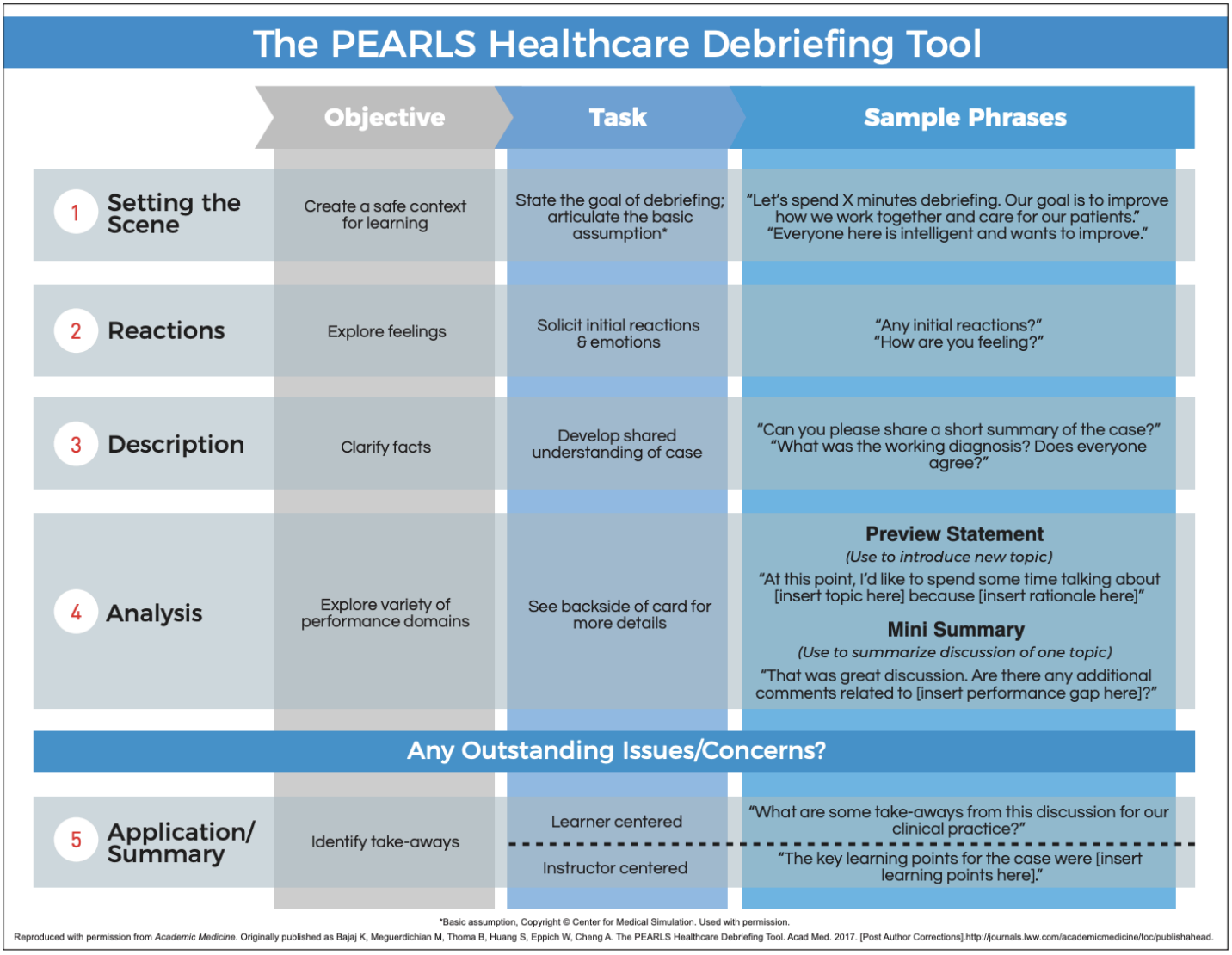
Include key errors to watch for and common challenges with the case. List issues expected to be part of the debriefing discussion. Supplemental information regarding any relevant pathophysiology, guidelines, or management information that may be reviewed during debriefing should be provided for facilitators to have as a reference.

1. Pre-Reading Material Provided to Trainees

- https://litfl.com/bacterial-meningitis/
- Optional mindfulness reading: https://cmha.ca/brochure/mindfulness/

2. Guided Questions for Observers can be found here: Guided Questions for Observers

3. Debriefing Tips (PEARLS Healthcare Debriefing Tool)
https://debrief2learn.org/wp-content/uploads/2017/12/PEARLS-Pocket-Card-5.8x7.2-PDF-EN.pdf



The PEARLS Healthcare Debriefing Tool

	Objective	Task	Sample Phrases
1 Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2 Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3 Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4 Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"
Any Outstanding Issues/Concerns?			
5 Application/ Summary	Identify take-aways	Learner centered	"What are some take-aways from this discussion for our clinical practice?"
		Instructor centered	"The key learning points for the case were [insert learning points here]."

*Basic assumption, Copyright © Center for Medical Simulation. Used with permission.

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4. Specific Debriefing Content Related to Objectives

Diagnosis:

- Recognize that a child with decreased level of consciousness is an emergency.
- DDx: metabolic (e.g. hypoglycemia), intoxication/poisoning, infection (sepsis/meningitis/encephalitis), head injury.
- Physical exam for meningitis should include: testing for nuchal rigidity, Kernig's, Brudzinski, and jolt accentuation of headache. But keep in mind that meningeal signs have poor accuracy. Derm exam to look for spreading petechial rash which is highly suggestive of bacterial meningitis

Management:

- Abx and consideration of LP: While CSF may become sterile in as little as one hour after IV antibiotic administration in some patients (depending on the organism), antibiotic administration should not be delayed for imaging or LP in the patient with a high pretest probability for bacterial meningitis. Ideally, antibiotics should be given and the LP performed at the same time as soon as the diagnosis of meningitis is entertained. It is reasonable to delay antibiotic administration until after the LP is completed in patients with a low clinical pretest probability for bacterial meningitis.

Treatment

Meningitis Treatment for full-term neonates, infants, children, adolescents*		
Age	**Antibiotic**	**Steroid**
0 – 7 days old	Ampicillin 225 mg/kg/day IV divided q8h **AND** Cefotaxime 100 – 150 mg/kg/day IV divided q8h	Not recommended
8 – 28 days old	Ampicillin 300 mg/kg/day IV divided q6h **AND** Cefotaxime 150 - 200 mg/kg/day IV divided q6h	
29 days or older	Ceftriaxone 100 mg/kg/**dose** (MAX 2000 mg/dose) IV x 1 then 12 hours later start 50 mg/kg/**dose** (MAX 2000 mg/dose) IV q12h **AND** Vancomycin 60 mg/kg/day (MAX 1000 mg/dose) IV q6h prior to levels **If immunocompromised, add** Ampicillin 300 mg/kg/day (MAX 3000 mg/dose) IV divided q6h	**≥2 months**, consider dexamethasone 0.15 mg/kg/**dose** (MAX 10 mg/dose) IV q6h x 4 days. Give 20 minutes prior to or at the same time as first dose of antibiotics. Steroids have been shown to ↓hearing loss & neurologic sequalae but do not change survival rates in high-income countries.[7]
Additional Treatment Considerations		
Consult Infectious Disease specialist if gram negative bacteria identified on Gram stain		
HSV Encephalitis suspected	Acyclovir** ≤ 3 months of age give 60 mg/kg/day IV divided q8h > 3 months to less than 12 years of age give 45 mg/kg/day (MAX 1000 mg/dose) IV divided q8h ≥ 12 years of age give 30 mg/kg/day (MAX 1000 mg/dose) IV divided q8h	
Lyme disease suspected	Ceftriaxone 75 mg/kg/day (MAX 2000 mg/dose) IV q24h **OR** Doxycycline 2.2 mg/kg/**dose** (MAX 100 mg/dose) PO BID	

*Please contact Pediatric Referral Centre for pre-term neonates born under 37 weeks gestational age.

**Ensure adequate hydration with at least maintenance IV fluids to minimize risk of nephrotoxicity.

- Dexamethasone: There is evidence for improved outcomes in patients with Strep pneumo and H Influenzae meningitis. If given, it should be given early – within the first 4 hours.

Communication:

- Ideally, the trainees will communicate their orders specifically and directly to the nurse (e.g. "[Nurse name], please insert an IV and start a 1 L bolus of NS" as opposed to "Could we start IV fluids").
- Watch for the use of order lists that are overwhelming (e.g. "Could we get the IV in, lab to draw a CBC, lytes, troponin, a CXR, and an ECG.").
- The use of orienting labels (e.g. "This patient in septic shock" or "My working diagnosis urosepsis"), explicit summaries (e.g. "Let's summarize…… On history… Our exam found… Our plan/priorities are…"), and

ideas from the team (e.g. “Am I missing anything?” or “Does anyone else have any suggestions?”) should be encouraged.
- The call to the resident/pediatrics should include an introduction (name, service, location), concise description of the patient ideally using a standardized format (e.g. SBAR), and explicit request for advice/assistance.
- Patient and Family Centered Care: Therapeutic care/ support / inclusion of the parent of a critically ill child.

References

1. https://emergencymedicinecases.com/pediatric-meningitis-recognition-workup-management/
2. https://litfl.com/bacterial-meningitis/

