

Supplemental Digital Appendix 1

Interview Procedures, From a Study of Emergency Physician Decision-Making and Clinical Decision Rules, McMaster University, 2015–2016

Phase 1: Critical Incident Interviewing (Max. 30 min)

Background: For a critical incident report to be effective and useful, three important pieces of information must be included: **(a)** a description of a situation that led to the incident, **(b)** the actions or behaviours of the focal person in the incident and **(c)** the results or outcomes of the behavioural actions. When a clear description of the events leading up to an incident is provided by a study participant, and understanding is created of why certain actions were or were not taken (Kempainen, 2000).

1. Think back to a recent case where you were asked to evaluate a patient for the possibility of a deep vein thrombosis. Please share with me your diagnostic reasoning and considerations during that encounter.

2. Think back to a recent case where you were asked to evaluate a patient for the possibility of a pulmonary. Please share with me your diagnostic reasoning and considerations during that encounter.
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Phase 2: Video-Prompted Think Aloud & Mind Mapping (30 min)

During this phase, the participants will be shown two of six potential videos. They are given pen and paper and asked to depict their thinking process on paper (concept map). The researcher will ask the participant what they perceive to be the barriers to evidence based medicine practice in venous thrombosis.

Think-aloud protocols involve participants thinking aloud as they are performing a set of specified tasks. Users are asked to say whatever they are looking at, thinking, doing, and feeling as they go about their task. This enables investigators to see first-hand the process of task completion (rather than only its final product).

The following script will be presented to all participants prior to the Think Aloud section.

“We will now begin the think aloud phase. We will be showing you a video with a first year medical student and patient. As before, imagine you are in a shift and you overhear the following discussion at triage. At the end of the video, I would like you to think aloud and explain your clinical reasoning process to me. Imagine that I know nothing about the diagnosis of venous thrombosis. I will also supply you with pen and paper, and we would like you to draw out your decision making process so that I might better understand your thinking.

Some examples of things you might say:

‘The first thing I need to do is...’

‘I just thought of ____, so, I’m going to do ____’

‘I’m considering applying X rule... But the patient has Y factor so...’”

This interview will be audio recorded for further transcription.

Phase 3: Knowledge of Clinical Decision Rules & Use of Memory Aids (15 min)

The participants will be asked about their knowledge on various Clinical Decision Rules that are associated with the conditions mentioned in our study (chest pain, shortness of breath, leg pain).

Reference:

Kempainen, J. K. (2000). The critical incident technique and nursing care quality research. *Journal of advanced nursing*, 32(5), 1264-1271.

Supplemental Digital Appendix 2

Listing of Cases for Video Prompts, From a Study of Emergency Physician Decision-Making and Clinical Decision Rules, McMaster University, 2015–2016

This appendix outlines of the cases shown in the video prompt (Part 2) of the study:

Age	Sex	Patient history
55	Male	This man presents with a history of exertional calf pain without cardiac symptoms for two days. He has recently undergone his first cycle of chemotherapy for colon cancer. His past medical history includes a history of diabetes, chronic obstructive pulmonary disease and myocardial infarction.
65	Female	This elderly woman presents with a 4-day history of shortness of breath and pleuritic chest pain. She has a history of a prior provoked VTE. She is not currently anticoagulated. She has been feeling well other than this, and denies leg pain or cardiac symptoms.
65	Male	This man arrives with a 1-day history of chest and back pain. He has associated shortness of breath on exertion. He has unilateral leg swelling, pain and warmth to the touch. He underwent an operation four week ago and is not anticoagulated.
25	Female	This young woman presents with a 2-day history of diffuse, pleuritic chest pain. She is otherwise well. She denies hemoptysis. She is, however, on an oral contraceptive pill and has a maternal history of VTE.
35	Female	This woman presents with a 3-day history of progressively worsening unilateral leg pain. The leg is warm to the touch. She has no cardiac symptoms, but has a positive family history of VTE.
35	Male	This man presents with a 2-day history of exertional, pleuritic chest pain with shortness of breath. He denies hemoptysis or calf swelling. He has a history of VTE and is not currently anticoagulated.

Supplemental Digital Appendix 3

Listing of Clinical Decision Rules Commonly Used in Chest Pain, Breathlessness, and Leg Pain Cases

Clinical Decision Rule	Relevant to cases featuring...	What does it do?	Relevant Citations
Wells' Pulmonary Embolism Score	Chest pain Breathlessness	The original version of this decision tool helped to risk stratify patients' risk of having pulmonary embolism, based on clinical criteria. The sum score divides patients into different risk categories, or pretest probabilities (High, Medium, Low risk of pulmonary embolism). This CDR was changed later into a dichotomous score (pulmonary embolism likely and unlikely).	Wells PS, Anderson DR, Rodger M, et al. Excluding Pulmonary Embolism at the Bedside without Diagnostic Imaging: Management of Patients with Suspected Pulmonary Embolism Presenting to the Emergency Department by Using a Simple Clinical Model and D-Dimer. <i>Ann Intern Med.</i> 2001;5(3):98-107.
Pulmonary Embolism Rule-out Criteria (PERC)	Chest pain Breathlessness	This decision tool presents a list of eight clinical criteria. If all criteria are negative, pulmonary embolism can be excluded as a cause for the patients' symptoms.	Kline JA, Courtney DM, Kabrhel C, et al. Prospective multicenter evaluation of the pulmonary embolism rule-out criteria. <i>J Thromb Haemost.</i> 2008;6(5):772-780. doi:10.1111/j.1538-7836.2008.02944.
Age-Adjusted D-Dimer Cutoff	Chest pain Breathlessness	This decision rule calculates the threshold to define a positive or negative D-dimer blood test for pulmonary embolism. The threshold changes dependent on age.	Righini M, Van Es J, Den Exter PL, et al. Age-Adjusted D-Dimer Cutoff Levels to Rule Out Pulmonary Embolism. <i>JAMA.</i> 2014;311(11):1117. doi:10.1001/jama.2014.2135.
Revised Geneva Criteria	Chest pain Breathlessness	A clinical decision tool to calculate the probability of a patient having pulmonary embolism (similar to the Wells score).	Le Gal G, Righini M, Roy P-M, et al. Prediction of pulmonary embolism in the emergency department: the revised Geneva score. <i>Ann Intern Med.</i> 2006;144(3):165-171. http://www.ncbi.nlm.nih.gov/pubmed/16461960 .
HEART score	Chest pain	The HEART score uses clinical criteria to calculate the probability that a patient has an acute coronary syndrome (such as myocardial infarction).	Backus BE, Six AJ, Kelder JC, et al. Chest Pain in the Emergency Room: A Multicenter Validation of the HEART Score. <i>Crit Pathw Cardiol.</i> 2010;9(3):164-169. doi:10.1097/HPC.0b013e3181ec36d8.
Wells' Deep Vein Thrombosis Score	Leg pain, swelling	The main clinical decision tool to calculate the probability of a patient having deep vein thrombosis.	Wells PS, Anderson DR, Rodger M, et al. Evaluation of D-Dimer in the Diagnosis of Suspected Deep-Vein Thrombosis. <i>N Engl J Med.</i> 2003;349(13):1227-1235. doi:10.1056/NEJMoa023153.

Rules which have emerged since our data collection was completed:

YEARS study	Chest pain Breathlessness	A simplified version of the Wells score which incorporates D-dimer blood testing with a variable threshold.	van der Hulle T, Cheung WY, Kooij S, et al. Simplified diagnostic management of suspected pulmonary embolism (the YEARS study): a prospective, multicentre, cohort study. <i>Lancet.</i> 2017;390(10091):289-297. doi:10.1016/S0140-6736(17)30885-1.
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