



Designing Simulation Scenarios That Teach Deterioration Recognition to Newly Qualified Nurses

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Abstract

Newly qualified nurses are often the first to see a ward patient begin to deteriorate and the least equipped to recognise it. Simulation is widely used to prepare them, but many scenarios open with a patient who is already critically unwell, so that the learner practises the response to a crisis and not the earlier work of noticing that one is coming. This article proposes an eight-step procedure for writing scenarios whose explicit purpose is to teach recognition. The steps are: define objectives in terms of noticing, interpreting and escalating; choose a common clinical story; script the physiology as a slow trend across several sets of observations; embed soft cues and realistic distractions; fix the trigger point and the expected action against a track-and-trigger chart and a structured communication tool; decide fidelity and roles; plan the prebriefing; and plan a structured debriefing tied to a clinical judgement rubric, followed by piloting and revision. The procedure draws on Tanner's clinical judgement model, Endsley's account of situation awareness, cognitive load theory and published simulation design standards. It is a proposal and has not been evaluated here. The article sets out its limits and what would need to be shown to establish that scenarios built in this way improve recognition at the bedside.

Keywords: *Simulation-based education, Clinical deterioration, Newly qualified nurses, Clinical judgement, Scenario design, Early warning scores*

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1. Introduction

Serious deterioration in a hospital patient is usually preceded by hours of abnormal physiology. Rapid response teams and track-and-trigger charts exist to exploit that warning, and both depend on what happens first at the bedside: somebody has to take the observations, see that they are abnormal or changing, and call for help. Reviews of the nursing role in that process describe it as far from automatic. Nurses detect deterioration through a mixture of vital signs, knowing the patient and intuition, and they meet obstacles in getting their concern acted upon (Odell et al., 2009).

On many wards the nurse at the bedside is in the first year of practice. The transition from student to

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registered nurse has been characterised as a shock, in which responsibility arrives faster than confidence (Duchscher, 2009). Benner's account of skill acquisition places the new graduate at the level of the advanced beginner, who can follow rules and recognise recurring features of situations but has difficulty judging which features matter most (Benner, 1984). Recognising early deterioration is a task of exactly that kind.

Simulation offers a way to practise it without risk to patients, and programmes built around the deteriorating patient are well described in the literature (Buykx et al., 2011; Liaw et al., 2011). The design of the scenario decides what is practised. A scenario that begins with a patient who is hypotensive and barely responsive teaches the response to a crisis that nobody could miss. This article proposes a procedure for writing scenarios in which the thing to be learned is the noticing itself. The procedure is assembled from theory and published standards. It has not been applied or evaluated in the work reported here, and it is offered as a method for others to use and test.

2. Background

Three bodies of work shape the procedure: what is known about how recognition fails, models of clinical judgement and situation awareness, and guidance on simulation design.

2.1. How recognition fails

Failure at the bedside takes several forms. Observations may not be taken, or taken incompletely, with respiratory rate the sign most often left out. They may be recorded without being interpreted, each set judged alone and the trend unseen. The nurse may sense that something is wrong before the numbers change and lack the words to justify a call; a systematic review identified a set of indicators behind such worry, among them changes in breathing, circulation, mental state and agitation (Douw et al., 2015). Or the nurse may recognise the problem and hesitate to escalate, for fear of being wrong or of a dismissive reply. A scenario intended to teach recognition has to give the learner the chance to fail in each of these ways.

2.2. Clinical judgement and situation awareness

Tanner (2006) describes clinical judgement as four linked processes: noticing, interpreting, responding and reflecting. Noticing is shaped by what the nurse expects to see, which in turn depends on knowledge of the typical patient and of this particular one. Endsley's model of situation awareness, developed in aviation, makes a parallel distinction between perceiving the elements of a situation, comprehending their meaning and projecting what will happen next (Endsley, 1995). Both models imply that recognition is not a single act. A learner may perceive a raised respiratory rate and fail to comprehend it, or comprehend it and fail to foresee where the patient is heading. The Lasater Clinical Judgment Rubric turns Tanner's four phases into observable descriptors at four levels of development and gives designers a ready vocabulary for objectives and debriefing (Lasater, 2007).

2.3. Guidance on simulation design

The framework proposed by Jeffries (2005) directs attention to objectives, fidelity, problem solving, student support and debriefing as the design features of a simulation. The current standard of best practice on simulation design sets out criteria that include a needs assessment, measurable objectives, a scenario that provides the context for the experience, an appropriate type of fidelity, a prebriefing, a debriefing and pilot testing before full use (Watts et al., 2021). These documents say what a good scenario must contain. They do not say how to write one for a particular learning problem, and that is the gap the present procedure is meant to fill for the case of deterioration.

3. The Proposed Procedure

The procedure has eight steps, listed with their outputs in Table 1. The first five produce the scenario script, the next two the teaching that surrounds it, and the last a tested version. Figure 1 shows the five phases through which a scenario written in this way moves and what the learner is expected to do in each.

Table 1: The eight steps of the proposed scenario design procedure and the output of each		
Step	What the designer does	Output
1. Set objectives	State what the learner should notice, interpret and do, in observable terms	Three to four objectives
2. Choose the story	Select a common ward presentation with a gradual onset	One-page patient summary
3. Script the trend	Write four or five sets of observations that drift before any single value alarms	Timed observation table
4. Add cues and noise	Embed soft signs and ordinary competing demands	Cue list and distractor list
5. Fix trigger and action	Mark where the chart requires escalation and what a good call contains	Expected-action checklist
6. Decide fidelity and roles	Match equipment and actors to the cues that must be perceived	Set-up sheet and role briefs
7. Plan briefing and debriefing	Write the prebrief and the debriefing questions against a rubric	Facilitator guide
8. Pilot and revise	Run with a few nurses, observe where they notice, adjust	Revised scenario

3.1. Step 1: Set objectives around noticing

Objectives for a recognition scenario should name the cognitive act and the cue. "Manages a septic patient" is too broad. "Identifies a rising respiratory rate across three sets of observations and states its possible significance" can be observed and discussed. Three or four objectives are enough, and at least one should concern escalation, since recognition that leads to no action protects no one. Tanner's phases supply a convenient frame: one objective each for noticing, interpreting and responding.

3.2. Step 2: Choose a common story

The clinical story should be one the new nurse will meet within months: a chest infection after abdominal surgery, bleeding after a procedure, an older patient with a urinary infection who becomes confused, opioid-related respiratory depression. Rare conditions invite learners to treat the exercise as a diagnostic puzzle. The designer writes a short summary of the patient, including the baseline observations and the details a nurse would learn at handover.

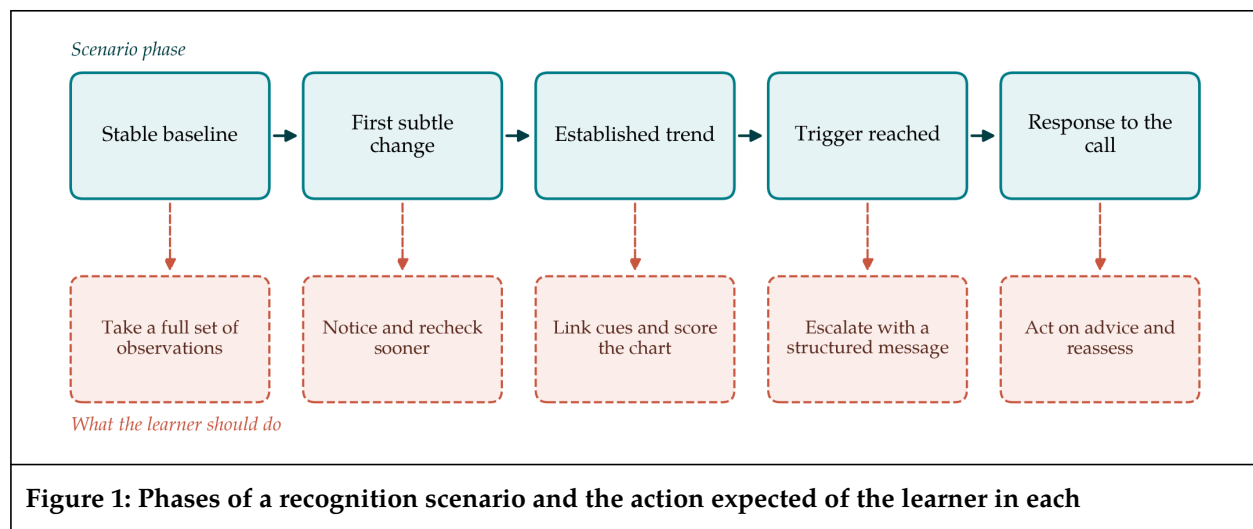
3.3. Step 3: Script the physiology as a trend

This step distinguishes the procedure from conventional scenario writing. The designer scripts four or five sets of observations, spaced as they would be on a ward, in which values move gradually. In the first set everything lies within the patient's normal range. In the second, one or two values shift without crossing a threshold. By the third the direction is clear to anyone who compares the sets. Only in the fourth does the aggregate score require an urgent response. Time is compressed so that the scenario fits a teaching session, and the compression is announced to learners. The scripted values should be checked by an experienced clinician for plausibility.

3.4. Step 4: Embed soft cues and realistic noise

Numbers are not the only evidence. The patient, played by an actor or voiced through a manikin, should show the softer signs that experienced nurses rely on: a change in colour, new restlessness, shorter sentences, a relative who says that something is different (Douw et al., 2015). The scenario should also contain the ordinary demands of a shift, such as a call bell elsewhere or a medicine that is due. Cognitive load theory cautions against overdoing this. Working memory is limited, and material that does not serve the learning goal competes with material that does (Sweller, 1988). For nurses in their first months one or

two distractions are sufficient.



3.5. Step 5: Fix the trigger and the expected action

The designer marks on the scripted chart the point at which the local track-and-trigger system calls for escalation. Where the National Early Warning Score 2 is in use, an aggregate score of 5 or more is the threshold for an urgent response and 7 or more for an emergency response (Royal College of Physicians, 2017). The expected action is then written down: whom the learner should call and what the call should contain. A structured tool such as SBAR (situation, background, assessment, recommendation) gives the content (Leonard et al., 2004). The person who takes the call follows a script and may be instructed to respond with mild reluctance, so that the learner practises persisting.

3.6. Step 6: Decide fidelity and roles

Fidelity should follow from the cues. Dieckmann et al. (2007) distinguish the physical, the conceptual and the experiential realism of a simulation and argue that the last two matter more for learning than equipment does. For recognition, conceptual realism is essential: the observations must change as they would in a real patient. A simulated patient played by a person conveys restlessness or confusion better than most manikins, while a manikin allows chest sounds and a monitor. A real observation chart of the kind used on the learners' own wards should always be provided, since reading the trend from it is the skill being taught.

3.7. Step 7: Plan the prebriefing and the debriefing

The prebriefing sets expectations, explains what the simulator can and cannot show, and establishes that mistakes are material for learning and not for assessment, which Rudolph et al. (2014) call the safe container. The debriefing is where noticing is examined. Debriefing with good judgement pairs the facilitator's honest observation with real curiosity about the learner's reasoning (Rudolph et al., 2006), and the PEARLS framework offers a script that blends learner self-assessment, focused discussion and direct feedback (Eppich and Cheng, 2015). For this kind of scenario the facilitator's guide should include questions aimed at each of Tanner's phases: what the learner saw at each set of observations, what it was taken to mean, and what prompted or delayed the call.

3.8. Step 8: Pilot and revise

A scenario should be run with a few nurses from the target group before general use. The designer watches for the point at which they notice the change. If everyone notices at the second set of observations the trend is too steep, and if no one notices before the trigger it is too flat or the soft cues are too faint. The script is adjusted until the scenario discriminates, and the facilitator guide is revised in the light of the questions that proved productive.

4. Fitting the Procedure to a Preceptorship Programme

The procedure is intended for educators who support new graduates in their first year. Three adjustments make it practical. Scenarios can be written as a graded series in which the same steps are applied to stories of increasing subtlety, moving from a single-system problem with clear cues to a patient with several conditions whose baseline is already abnormal. Sessions can be held on the ward, with a colleague as the simulated patient and the ward's own chart, which lowers cost and raises conceptual realism. And the observation table from step 3 can be reused as a short paper or screen exercise for nurses who cannot be released for a full session.

5. Limitations and What Remains to Be Shown

This article describes a design procedure and does not report its use. No scenarios written with it have been evaluated here, and its claims rest on the theories and standards cited. Three questions would have to be answered before it could be recommended with confidence. The first is whether scenarios built on a slow trend lead learners to notice earlier in later simulations than scenarios that begin with an obvious crisis. The second, and the harder, is whether any gain carries over to the ward, where the evidence for simulation in general is stronger for knowledge and performance in the laboratory than for patient outcomes. The third is how long the effect lasts and how often practice must be repeated.

The procedure also has limits by design. It addresses the individual nurse and leaves untouched the staffing levels, workload and escalation culture that determine whether a correct recognition leads to timely help. Compressed time may teach an unrealistic sense of how quickly trends emerge. Simulated patients cannot reproduce every sign. Educators should treat such scenarios as one part of preparing new nurses, alongside supervised practice and a ward culture that welcomes a call made in good faith.

6. Conclusion

Recognition of deterioration can be taught only by scenarios that give the learner something to recognise. The eight-step procedure proposed here asks the designer to write objectives around noticing, to script physiology as a trend, to add the soft cues and competing demands of real practice, to fix the trigger and the expected call in advance, and to debrief against a model of clinical judgement. It is grounded in established theory and standards and remains untested. Its evaluation, first in the simulation room and then at the bedside, is the necessary next step.

Conflict of interest

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