Understanding situation awareness and its importance in patient safety

Abstract

Situation awareness describes an individual's perception, comprehension and subsequent projection of what is going on in the environment around them. The concept of situation awareness sits within the group of non-technical skills that include teamwork, communication and managing hierarchical lines of communication. The importance of non-technical skills has been recognised in safety-critical industries such as aviation, the military, nuclear, and oil and gas. However, health care has been slow to embrace the role of non-technical skills such as situation awareness in improving outcomes and minimising the risk of error. This article explores the concept of situation awareness and the cognitive processes involved in maintaining it. In addition, factors that lead to a loss of situation awareness and strategies to improve situation awareness are discussed.

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Aims and intended learning outcomes

This article aims to inform nurses about the importance of situation awareness and the need to maintain it to minimise the likelihood of errors. Situation awareness will be referred to as SA throughout the article for ease of reading. After reading this article and completing the time out activities you should be able to:
- Discuss the cognitive processes involved in maintaining SA.
- Identify the factors that can lead to a loss of SA.
- Describe strategies to mitigate the loss of SA.
- Identify opportunities to incorporate knowledge of SA and associated strategies into professional practice.

Introduction

SA describes an individuals's perception, comprehension and subsequent projection of what is going on in the environment around them (Endsley 1995). In other words, it describes people noticing what is going on around them, working out what the information they are noticing means, and using that information to plan required actions or decisions (Flin *et al* 2008).

Although this article describes the significance of SA in health care, it is important to recognise that SA is part of people's cognitive functioning in all contexts. For example, when driving on a busy road people are not only undertaking the technical and complicated task of driving, but also will be scanning the environment. They will be looking at the traffic in front of them and for brake lights or indicators so they can anticipate changing traffic speeds or the need for evasive action. They will be watching for other hazards, such as small children on the pavement who might run onto the road or people crossing the road recklessly, which may require corrective action

to prevent an accident. Thus SA – processing what is happening, what it means and what needs to be done as a result – is an important cognitive state that helps people make decisions and undertake tasks in relation to all aspects of their life (Gluyas and Morrison 2013).

Complete time out activity 1

The concept of SA sits within the group of non-technical skills that include teamwork, communication and managing the hierarchical lines of communication that tend to exist in health care. Hierarchical lines of communication lead to what is termed as an authority gradient and arise from a perceived professional hierarchy that results in junior staff feeling powerless to question or challenge senior staff (Gluyas and Morrison 2013). Non-technical skills are studied in the broader discipline of human factors, which examines the relationship between humans' thinking and cognitive processing and the environment (White 2012).

The importance of non-technical skills has been recognised in safety critical industries such as aviation, military, nuclear, and oil and gas. Investigations into major disasters in such industries identified that rather than deficient technical skills, it was non-technical skills, such as a loss of SA, that were implicated in many incidents (Endsley and Jones 2012). Examples of catastrophic incidents, where a loss of SA was a contributing factor, include the Chernobyl and Three Mile Island nuclear disasters in 1986 and 1979 respectively, the Piper Alpha oil rig accident in 1988 and the Tenerife aviation collision in 1977 (Flin *et al* 2008, Wachter 2012).

Health care has been slow to embrace the role of non-technical skills such as SA in improving outcomes and minimising the risk of error (Bromiley 2014). Healthcare literature was beginning to promote discussion about SA and error from the late 1990s (Gopher and Donchin 2011). However, in 2005, the high-profile case of Elaine Bromiley identified the crucial role of SA in clinical care errors. The case involved the death of a young wife and mother following failed intubation for routine surgery (White 2012). Elaine's husband was an airline pilot and, during the ensuing investigation, noted that the role of human factors and SA were not recognised immediately in healthcare investigations. In 2007, he established the Clinical Human Factors Group and in so doing helped to shift the focus on human factors and SA in health care from the realms of academia to the clinical area (Reid and Bromiley 2012, Bromiley 2014).

SA is imperative for improving patient outcomes in many aspects of clinical care (Stubbings *et al* 2012). Even a simple task such as the allocation of nurses' meal breaks requires a degree of SA to ensure that patient care is not compromised. For example, the following factors need to be considered:

▸ The nurses going off for a break in comparison to those remaining on the ward (the 'what?').
▸ Whether the skill mix and numbers of those remaining on the ward are appropriate (the 'so what?').
▸ Whether this decision would be prudent in the case of a medical emergency (the 'what now?').

To use another example: a nurse walks into a patient's room to answer a call bell and notices that the patient's drainage bag is full of blood. This is the 'what?' stage of SA. Interpreting the meaning of this observation may then lead the nurse to conclude that if the drainage bag is full of blood, the patient is possibly haemorrhaging. This is the 'so what?' stage of SA. Through this analysis, the nurse may decide that the patient is at risk of hypovolaemic shock and, therefore, requires urgent attention. The nurse subsequently seeks immediate medical review. This is the 'what now?' stage of SA.

Decision making is required in everyday clinical practice, not only in specialised environments or during crises. The aim of SA is to prevent critical situations from developing (Stubbings *et al* 2012). Therefore, it is imperative that the factors that improve SA are included in the training and education of healthcare professionals if patient safety is to be improved.

Training and education programmes to improve SA involve identifying and understanding the role of cognitive processing in SA. This understanding forms the basis for being able to examine different situations to identify the factors that will likely have a negative effect on achieving SA. Individuals can use this knowledge to improve SA in similar situations.

Cognitive processing in situation awareness

SA is not a static state but rather an ongoing process that is normally used in relation to dynamic situations that require tasks, decisions and actions to be undertaken or completed. It involves three levels or stages of

TIME OUT

1 Consider the following scenario from an SA perspective: you are preparing a meal and your three-year-old child comes into the kitchen and starts to climb onto a stool 'to help'. You notice that the pot handle is facing outwards from the top of the stove, there is a sharp knife on the cutting board and there is a hot cup of coffee on the kitchen worktop. Answer the following questions:

▸ What information will you be processing about the situation (perception)?
▸ What does this information mean (comprehension)?
▸ What actions are required (projection)?

cognitive performance (Figure 1) (Endsley and Jones 2012):

- Level 1: perception of elements in the environment.
- Level 2: comprehension of the current situation.
- Level 3: projection of future status.

Each of these levels will be discussed separately, however it is first important to recognise the effect of time on SA. The perception by the individual of the amount of time available until a decision needs to be taken will have an effect on SA. For example, perceived time pressures may lead to reactive decision making (Stubbings *et al* 2012). If the individual estimates that a decision is required quickly, cues may be missed in the perception stage and not considered in the comprehension stage, thus leading to a flawed projection stage. In addition, a rapidly changing situation requires rapid changes in perception, comprehension and projection, and can result in outdated or inaccurate SA (Carayon 2011).

Level 1: perception

The sensory systems of vision, hearing, smell, taste and touch provide individuals with the information to perceive what is happening in the environment around them. For example, nurses may use any or all of these five senses when undertaking a physical assessment of a patient. They may look for and feel skin turgor, listen to respiratory patterns or a cardiac rhythm, smell alcohol on a patient's breath or smoke on clothing, and hear the sounds of,

and see the visual display lights on, a patient monitor. These sensory inputs are processed selectively because, in any given situation, there is a significant amount of information, which is impossible for an individual to process. Selective processing of the incoming information relies on past experiences that are stored in the memory. These memories provide nurses with cues to help recognise what it is important to notice and what can be ignored. The memories can be stored in either working or long-term memory stores. However, it is the working memory (also known as short-term memory) that has a greater role in the perception stage of SA (Endsley 1995).
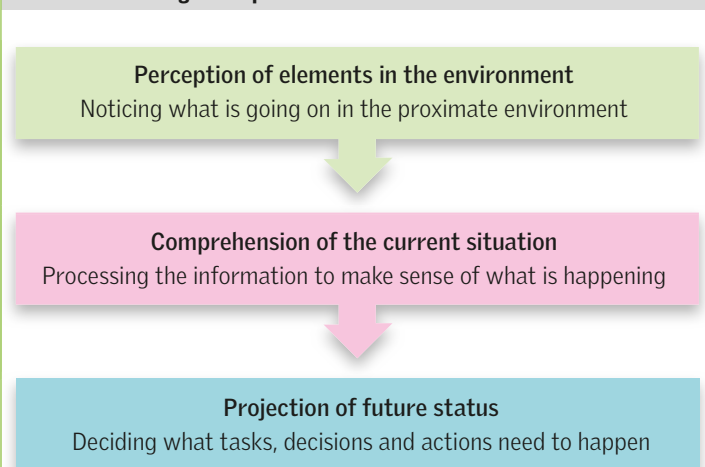
Working memory has a limited storage capacity – it can store approximately seven pieces of information (Flin *et al* 2008), and is susceptible to losing information unless the information is consciously and consistently repeated. For example, if a nurse is walking to the office to chart physiological recordings and is interrupted by someone asking a question, it is likely that the physiological measurements will be lost in the working memory and will be replaced with the information contained in the question. This is important in the context of SA since retaining important information to support accurate SA can be compromised by interruptions and distractions (Endsley and Jones 2012).

Long-term memory is the main memory store and holds the information from past experiences and events. Information is retrieved from the long-term memory store to assist in cognitive processing at several different levels of SA. At the perception level, information from the long-term memory is transferred to the short-term memory and is used to help recognise and prioritise which sensory information needs to be noted. Information retrieval from long-term memory to assist SA perception is increasingly likely if the information has been used recently, is familiar or is of particular interest to the individual (Flin *et al* 2008).

Failure in the perception stage of SA can occur because sensory information is not available or difficult to notice, individuals do not observe elements in the environment around them, or the information that is gathered from the environment is misinterpreted (Endsley 1995). Accurate perception of factors present in a given situation or the environment is vital to guide information processing in relation to the significance of these factors and subsequent decision making.

FIGURE 1

Three levels of cognitive performance involved in situation awareness

Perception of elements in the environment
Noticing what is going on in the proximate environment

Comprehension of the current situation
Processing the information to make sense of what is happening

Projection of future status
Deciding what tasks, decisions and actions need to happen

(Endsley and Jones 2012)

Level 2: comprehension

The comprehension stage of SA involves processing the information that is gathered in the perception level to work out what is happening and what is significant in the situation. For example, a nurse carrying out care for a patient in a multi-bedded room is engrossed in the task and is not perceiving the busy ward noises, such as people talking, trolleys being pushed past and patient call bells ringing. However, on hearing a loud crash and someone calling out for help, the nurse turns, sees a patient lying on the floor and comprehends that the loud noise and call for help is probably related to the patient who has fallen. The nurse will be using information stored in the long-term memory that provides understanding of what a loud noise, call for help and patient on floor probably mean.

The retrieval of stored information from long-term memory is called pattern matching. Pattern matching uses information gathered and stored in the long-term memory from previous experience to interpret the information that is gathered in the perception stage and to inform the comprehension stage. The stored information is known as mental models or schema, which are groups of cues that can mean certain things in certain circumstances. When pattern matching, not all the cues need to be present for the individual to extrapolate the information to the situation they are trying to understand (Endsley 2015).

People with less experience have fewer mental models on which to draw from their long-term memory to make sense of a situation (Endsley 2015). This is obvious when observing a nurse who has extensive experience and advanced skills undertake the complicated care of an acutely unwell patient. The nurse is able to detect minute or subtle changes in a patient's condition and use multiple pieces of information such as physiological signs and symptoms, data from technological equipment and observation of the patient's behaviour quickly. A novice nurse may require the information to be overt or may spend additional time focusing on the situation and processing the information in the working memory (Carayon 2011).

Failure in accurate comprehension of the situation can occur for several reasons, including (Flin *et al* 2008):

▸ The incorrect mental model being retrieved from the long-term memory.
▸ The correct mental model being used, but its elements being applied incorrectly.
▸ The absence of a mental model in the long-term memory that pattern matches for the perceived situation.
▸ A simple memory failure.

Failure to comprehend the situation accurately can lead to delayed care or the provision of inappropriate care and adverse patient outcomes (Flin *et al* 2008).

Level 3: projection

Projection involves using the understanding of what is going on in the situation to project what might happen in the future and thus what actions or decisions are required (Endsley 2000). For example, an experienced surgical nurse may be assessing a post-operative patient and note tachycardia, hypotension, a significant amount of fresh blood in the drainage bag and restlessness. Pattern matching to a mental model gained from the nurse's experience in caring for many post-operative patients provides the cues in the comprehension stage that the possible meaning of such signs is post-operative haemorrhage. In the projection stage, the possibilities include patient collapse from massive haemorrhage. Therefore, the nurse responds by seeking review, assessing the need to increase fluid input and further physiological assessment of the patient.

The projection stage provides the opportunity to anticipate and predict what might happen and gives time to prepare and decide the best course of action. Projection can also heighten perception since people scan and look for possible cues indicating that the understanding of the situation gained in the comprehension and projection stages is stable or changing (Endsley 2015).

The description of the three levels or stages of SA may appear to be linear and a slow, laborious process. In practice, however, the process can be almost instantaneous and appear to be automatic, especially in skilled individuals (Endsley 2015). The process is also dynamic and can move to and from the different levels (Endsley 2015). In addition, while the individual is occupied by other tasks or if the situation is rapidly changing, the monitoring of the situation can result in a fluctuating SA status (Gartenberg *et al* 2014).

Factors influencing situation awareness

Effective SA is influenced by several factors, both internal and external to the individual. These factors can be related to the context of the situation, individual factors, task factors

and particular cognitive processing factors that lead to sub-optimal SA. The factors can be thought of as 'red flags' identifying possible negative effects on SA (Box 1).

Context factors include workload, busy shifts, rapidly changing environments and inappropriately designed or maintained equipment (Endsley 1995). These factors can increase stress on the individual's working memory capacity and result in ineffective scanning of the environment (Endsley and Jones 2012). For example, it is easy to imagine the challenges involved in maintaining SA if equipment used for monitoring a patient's vital signs does not have built-in safety features such as audible alarms. To enable accurate information gathering (perception), data displays need to be visible and easily read from all angles, and alarms must be audible and distinguishable from other equipment alarms. However, a determination of whether displayed vital signs are normal or abnormal may require

further interpretation (comprehension) and reliance on working memory to analyse the information. During a busy shift, or when clinicians are multi-tasking and attention is diverted elsewhere, critical changes in the patient's vital signs may be missed. Therefore, when the patient's vital signs diverge from acceptable parameters, safety features such as audible alarms and flashing lights can assist in maintaining SA (Drews and Doig 2014).

Distractions and interruptions are particularly intrusive on the maintenance of SA (Thomas *et al* 2015). Individuals rely on working memory to process information at all three levels of SA. However, the working memory has limited storage capacity and therefore has minimal ability to retain information. Thus, interruptions and distractions lead to rapid decay of information in the working memory. That information is replaced with the sensory information that has captured attention from the distraction or interruption (Thomas *et al* 2015). Of particular importance is the distraction of the mind, mind wandering or, as it is commonly called, day dreaming. This is when individuals are distracted by their inner thoughts, to the detriment of the task or actions being undertaken. Mind wandering occurs when an individual is undertaking tasks automatically, for example when the tasks are familiar and do not require conscious attention. However, automaticity that allows the mind to wander is also detrimental to noticing cues in the surrounding environment and therefore can lead to a loss of accurate SA (Endsley 2015).

Ineffective teamwork is another context factor that can result in inadequate SA. If individuals in a team are not working towards a common goal because each has a different perception, comprehension and projection of the situation, ineffective communication, co-operation and co-ordination in the team are likely to result (St Pierre *et al* 2010). The case discussed previously of the death of Elaine Bromiley provides an example of ineffective teamwork and sub-optimal team SA. In this case, the anaesthetists were cognitively fixated (attentional tunnelling) on establishing the patient's airway and did not notice the passage of time and the patient's decreasing oxygen saturation levels. The nurses were focused on trying to raise the issue of patient deterioration and the need to consider a tracheostomy, but were inhibited by the authority gradient. There was no clear leadership for effective communication, co-operation and co-ordination among team members. These factors combined and led to a situation

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BOX 1

Factors influencing situation awareness

Context
▸ Workload.
▸ Equipment.
▸ Distractions.
▸ Interruptions.
▸ Inadequate teamwork, for example sub-optimal communication, co-ordination and co-operation.
▸ Time constraints.

Individual
▸ Fatigue.
▸ Level of knowledge.
▸ Experience.
▸ Language barriers.
▸ Individual cognitive limitations and tendencies, for example mind wandering and attentional tunnelling.
▸ Individual life events, for example anxiety and illness.

Task
▸ Complexity, for example multiple steps.
▸ Novel or new task.
▸ Routine task leading to automaticity.

Cognitive limitations and tendencies
▸ Attentional tunnelling.
▸ Limitation of working memory capacity.
▸ Information overload.
▸ Cognitive sensitivity to certain types of noise, light and colour.
▸ Confirmation bias.
▸ Attribution bias.

(Reason 2004, Boakes 2009, Endsley 2012, Gluyas and Morrison 2013)

of inadequate SA of the severity of the clinical situation and ultimately the death of the patient (Walker 2008, Gluyas 2015).

Individual factors such as anxiety, illness, fatigue and negative life events can also affect working memory capacity. Studies have shown that fatigue is responsible for a multitude of errors in health care, for example omissions and needlestick injuries (Rogers 2008, 2011, Hewitt 2010, Mahlmeister 2010). Referring to the previous example of the drainage bag full of blood, a nurse who is fatigued at the end of a busy 12-hour shift may have a diminished working memory and find it difficult to process additional information. The nurse's environmental scanning may be impaired as a result of the amount of pre-existing information being processed and consequently the blood in the drainage bag may not be noticed. Conversely, a graduate nurse may see the blood in the drainage bag but not comprehend its significance through lack of experience and knowledge and therefore may be unable to respond appropriately.

The experience and skill of the individual has a direct effect on the mental models that are available for pattern matching in the comprehension stage, and the ability to predict what might happen in the future in the projection stage. Given the synergy of these factors within a complex, dynamic environment such as health care, it is easy to understand how challenging yet vital it is to preserve SA.

Task factors that can affect SA may be related to the complexity of the task. If a situation requires the individual to undertake a new or novel task, depending on the difficulty associated with the task and/or the experience of the individual, the cognitive load requirements may result in the individual focusing on the task to the exclusion of other tasks that need to be completed. Conversely, a task that is routine and can be undertaken with a level of automaticity may result in slips or lapses, where steps in the task are done in the incorrect order or left out completely (Gluyas and Morrison 2013).

From a cognitive perspective, accurate SA relies on the individual being able cognitively to juggle many different pieces of information at the same time, which can result in (Simons 2010, Endsley 2012):

▸ Problems with cognitive processing, including attentional tunnelling where the individual focuses on one particular aspect of the situation and ignores other aspects of the situation.
▸ Limitations of working memory capacity in terms of storage.

▸ Information overload in terms of cognitive processing ability.
▸ Sensitivity to certain types of noise, light and colour, which can lead to erroneous perception, comprehension and projection of the cues in the environment.

Complete time out activity ②

Humans have cognitive biases, which help individuals manage the load of sensory information to be processed. However, in a negative sense, cognitive biases can lead to incorrect SA. Examples of such biases include confirmation bias where an individual ignores information that might challenge the SA mental model and only focuses on information that confirms the mental model. Fundamental attribution bias is where the individual relies on a mental model that is seen as typical of all similar circumstances; however, this can lead to incorrect comprehension, projection and SA (Mannion and Thompson 2014).

Complete time out activity ③

Strategies to mitigate loss of situation awareness

The first step in improving SA is to raise the individual's awareness of the effect of personal factors on SA. A tool that has been adopted by the NHS is the Foresight training programme (Norris 2012). This is based on the 'three bucket' model (Reason 2004), which encourages individuals to step back and examine the three aspects of self, context and task, which potentially could have a negative effect on SA and increase the likelihood of errors. Using this model helps individuals to identify red flags within themselves, the context and the task that might have a detrimental effect on their SA.

Using this model, the first aspect the individual considers is events that may be happening in their life, such as fatigue, stress and illness. The second consideration is the context in which the individual is working, where factors such as workload, light, noise, teamwork and the possibility of interruptions and distractions are contemplated. The third aspect is the task being undertaken, for example in terms of difficulty, complexity and criticality, as well as the resources (equipment and human) available. Moreover, the skill, knowledge, understanding and support required to complete the task are important aspects in evaluating the stresses that will affect cognitive processing. It must be remembered that stress

decreases scanning of the environment and the cognitive capacity to hold information in the working memory (Endsley 2012).

As people evaluate each of the aspects of self, context and task, they mentally add them to one of the three buckets representing each aspect. The fuller the buckets or the more red flags identified, the higher the likelihood that there will be inadequate SA and errors as a result of compromised cognitive load (Reason 2004, Boakes 2009, Gluyas and Morrison 2013). This strategy is particularly valuable since it can be used by anyone in any situation and requires no external tools. Raising conscious awareness of the effect of stressors and cognitive overload on the potential loss of SA and increased risk of errors, prompts individuals to use strategies to maintain SA (Gluyas and Morrison 2013).

Having identified previously that working memory has limited capacity to retain information, it is important that individuals adopt strategies to minimise interruptions and distractions where possible. To some degree, interruptions can be controlled. Individuals, when undertaking critical or error-prone tasks such as the administration of medication, can verbalise to those around them the need for uninterrupted or protected time. However, there will always be times when the individual is interrupted. Flin *et al* (2008) suggested that when people resume the task or duties they were undertaking before the interruption, they should take the time to establish consciously where they were in the task sequence. This will reduce the likelihood of slips and lapses.

Checklists and checking protocols are useful for overcoming distractions and interruptions (Thomassen *et al* 2011). These strategies provide a formal means of breaking tasks down into steps or a sequence of steps. People can then cue cognitively where they are in the sequence of steps required to complete a task correctly (Colligan and Bass 2012). However, checklists and checking protocols require mindful checking. If checking is done automatically

TABLE 1

Strategies to improve situation awareness

Situation awareness strategy	Description	Application
Self, context, task stressor evaluation, also known as the 'three bucket' model or Foresight training.	The individual assesses possible stressors within the categories of self, context and task that might negatively affect cognitive functioning.	Individual.
Re-evaluating task sequence after interruptions or distractions.	The individual evaluates consciously where they were in the task sequence or action before resuming the task or action.	Individual.
Checklists and checking protocols.	Individuals check formally each stage against a list of sequenced steps in a task or procedure.	Individual and team.
Updating current mental model.	The individual reviews consciously and questions the current mental model to ensure that what should be happening is and, if not, why not?	Individual.
Self-monitoring for mind wandering.	The individual monitors for cues or situations where mind wandering is likely to occur.	Individual.
'Sterile cockpit rule'.	Alerting others with visible warnings that certain high error or critical procedures are non-interruptible.	Team and organisational.
Checking in with other team members.	The individual verbalises their current mental model of the situation and their intended actions to other team members.	Individual.
Huddles.	The team gathers for a quick review of actions, outcomes and decisions, and plans future actions accordingly.	Team.
Simulation.	Individuals and the team practise developing and maintaining situation awareness in realistic simulated clinical environments.	Individual, team, organisational.

(Reason 2004, Flin *et al* 2008, Boakes 2009, Gluyas and Morrison 2013)

there is a likelihood that errors will still occur (Gluyas and Morrison 2013).

Another strategy to manage interruptions and distractions and to stay abreast of a rapidly changing or evolving situation involves the individual reviewing the mental model they have of the situation to ensure it is current. Flin *et al* (2008) referred to this as 'updating'. They suggested that the technique provides a review of the status of the current mental model held by questioning if what should be happening is happening and if not, why not? An extension of this updating strategy is focusing on the distraction of mind wandering. This involves the individual adopting a degree of self-monitoring for cues or situations where mind wandering is likely to occur.

The 'sterile cockpit rule', which was introduced by the United States Federal Aviation Administration (Flin *et al* 2008), can be adapted to health care to manage distractions and interruptions. This involves declaring certain critical or error-prone procedures or tasks as interruption free. An example is the increasingly common practice in healthcare organisations of having 'no interruption zones' or other visible warnings to alert others during medication administration that there are to be no interruptions (Anthony *et al* 2010).

Communication is vital to maintain SA. This involves the individual verbalising their mental model of the situation and intended actions to team members. This 'checking in' serves as corroboration that the mental model the individual has about the situation, and the required actions, is appropriate. It harnesses other team members' skills, knowledge and experience, providing a richer pool of mental models on which to base evaluation of SA. Checking in can also serve to challenge cognitive limitations and biases since other team members can question the individual's mental model, actions or decisions (Gillespie *et al* 2013). There is, however, a downside to checking in since groups can be subject to a phenomenon called 'groupthink', where team members do not challenge others' assumptions and decisions for a variety of reasons, such as authority gradients, peer pressure that prevents dissent and the perception that challenges to current opinion undermine team loyalty (Mannion and Thompson 2014). Therefore, individuals still need to maintain a questioning mindset about their mental models, even if others are validating them. They need continually to ask themselves if what should be happening is happening and if not, why not?

The concept of checking in has evolved into a formal process termed 'huddles' in effective teams (Goldenhar *et al* 2013). These involve the whole team gathering for a quick review of the team's position in terms of achieving care goals. This ensures that the team members share the same SA of the ongoing situation and can ascertain whether decisions and actions need to be changed or stay the same. Checking in also ensures that all team members are working towards the same goal, not duplicating effort or, conversely, missing out important steps on the assumption that someone else is undertaking them.

Situations that depict realistic events provide the opportunity for individuals to practise, allocating attention to different aspects of a scenario (Carayon 2011). Repeated exposure to distractions and interruptions in particular situations enable individuals to practise strategies to maintain SA, and has been shown to reduce the effect of interruptions and distractions (Thomas *et al* 2015). In addition, realistic clinical scenario simulations allow individuals and teams the opportunity to develop a repertoire of mental models that can be used to inform the perception, comprehension and projection stages of accurate SA (Buckley and Gordon 2011, Prakash *et al* 2014) (Table 1).
Complete time out activity ④

Conclusion

SA refers to the way in which people collect (perceive), interpret (comprehend) and use information to inform decision making (projection). In a healthcare environment, nurturing this skill can help to prevent errors and improve patient outcomes. Individual and contextual factors, such as skill, fatigue, distractions, equipment design, team factors and cognitive biases, can affect people's ability to achieve and maintain SA. Strategies to mitigate the loss of SA include checking in, performing a three bucket assessment and the use of checklists to simplify tasks. Additionally, clinical scenario simulations provide an opportunity to develop mental models and practise skills to mitigate the loss of SA.

If patient safety is to be improved, the knowledge and understanding of factors that impede and improve SA need to be included in the training and education of all healthcare professionals **N S**
Complete time out activity ⑤

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Situation awareness

TEST YOUR KNOWLEDGE BY COMPLETING SELF-ASSESSMENT QUESTIONNAIRE 840

1. Which of the following is a non-technical skill in health care?
a) Teamwork ❏
b) Communication ❏
c) Situation awareness ❏
d) All of the above ❏

2. Situation awareness:
a) Involves four levels of cognitive performance ❏
b) Is an ongoing process ❏
c) Is a technical skill ❏
d) Is not affected by the time available ❏

3. The third level of cognitive performance involves:
a) Comprehension of the current situation ❏
b) Projection of future status ❏
c) Management of hierarchical lines of communication ❏
d) Perception of elements in the environment ❏

4. Perception of elements in the environment:
a) Does not involve using all five sensory systems ❏
b) Involves comprehensive processing of all information ❏
c) Involves pattern matching ❏
d) Is assisted by information retrieval from long-term memory ❏

5. Accurate comprehension of a situation may result from:
a) Retrieval of the incorrect mental model from long-term memory ❏
b) A simple memory failure ❏
c) Application of the correct mental model ❏
d) Absence of a mental model in long-term memory ❏

6. Complexity is an example of which type of factor that influences situation awareness?
a) Context ❏
b) Individual ❏
c) Task ❏

d) Cognitive limitations and tendencies ❏

7. Which of the following is an example of a context factor that influences situation awareness?
a) Interruptions ❏
b) Experience ❏
c) Attribution bias ❏
d) Language barriers ❏

8. Fatigue:
a) Does not affect working memory ❏
b) Is responsible for errors in health care ❏
c) Is a context factor ❏
d) Is not important while performing routine tasks ❏

9. Which situation awareness strategy applies to teams only?
a) Simulation ❏
b) Checklists ❏
c) Self-monitoring ❏
d) Huddles ❏

10. The three bucket model for improving awareness involves:
a) Self, context and task ❏
b) Individual, team and organisation ❏
c) Interruptions, distractions and changing environment ❏
d) Perception, comprehension and projection ❏

This self-assessment questionnaire was compiled by Noreen Begley

The answers to this questionnaire will be published on May 4

The answers to SAQ 838 on managing complaints, which appeared in the April 6 issue, are:

1. d 2. c 3. c 4. d 5. a
6. b 7. a 8. c 9. d 10. b

How to use this assessment

This self-assessment questionnaire (SAQ) will help you to test your knowledge. Each week you will find ten multiple-choice questions that are broadly linked to the CPD article. Note: there is only one correct answer for each question.

▶ You could test your subject knowledge by attempting the questions before reading the article, and then go back over them to see if you would answer any differently.

▶ You might like to read the article to update yourself before attempting the questions.

When you have completed your self-assessment, add it to your professional portfolio. You can record the amount of time it has taken. Space has been provided for comments.

Report back

This activity has taken me _____ hours to complete.
Other comments:
_____
_____
_____
_____
_____

Now that I have read this article and completed this assessment, I think my knowledge is:
Excellent ❏
Good ❏
Satisfactory ❏
Unsatisfactory ❏
Poor ❏
As a result of this I intend to:
_____
_____
_____
_____