Safety II: A Novel Approach to Reducing Harm

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Chapter Objectives

- Highlight the differences between Safety I and Safety II approaches
- Understand how Recognize, Respond, and Learn function as Safety II pillars
- Understand how individual factors, relationship and interactions, structural and environmental factors, and innovative approaches impact Safety II practice in a healthcare microenvironment

Opening Question/Problem

The most common approach to improving safety in all industries, and especially in healthcare, is learning from errors and harm. This "find and fix" approach is termed "Safety I." After an untoward event (or sometimes a near miss) occurs, a subsequent analysis is performed to identify where individuals and/or systems failed, with steps outlined to prevent event recurrence [1–3]. While the Safety I approach has led to dramatic safety improvements, Safety I has multiple shortcomings [4]. First, neither learning nor improvement happens until *after* an undesired event. Second, as individuals and systems improve to prevent recurrent errors, remaining errors/failures become "one-offs," each unusual and unique such that learning from prior events is uninformative. Third, focusing on what went wrong leads to more rules and regulations, trending toward rigid systems which cannot respond to the unexpected (assuming people follow the "rules"). Finally, since in every industry humans complete or supervise most activities, focusing on human error with the necessary enforcement of performance expectations can demoralize staff, thus potentially limiting a valuable resource – the human mind – from contributing to error reduction.

Another common approach to improving safety is the failure modes and effects analysis

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(FMEA). FMEA involves proactively identifying potential problems and then quantifying their likelihood of occurrence, the odds the problem will escape detection, and the severity of harm the event might cause [5]. A scoring system prompts system/protocol redesign to minimize the threat from potential events which are highest risk, highest likelihood, and most likely to escape detection [6]. However, FMEA has limited value in error prevention because it is usually narrow in scope, does not address all potential errors, and usually primarily focuses on problems predictable well in advance.

We believe the way forward is a new approach – Safety II [7]. Hollnagel, who initially developed the Safety II concept, describes a model for Safety II with four components: actions which he refers to as "potentials" [8]. These actions are Monitor, Anticipate, Respond, and Learn. (Key Points Box 12.1)

Key Points Box 12.1

Monitor: Being able to see what is happening in a situation. Requires valid information about the conditions and presentation of that information to those who can execute further Safety II steps. The level of detail and timescale of monitoring may depend on the situation and the role of the individual monitoring.

Anticipate: Being able to use information about the situation to develop expectations about what might happen next. May include assigning probabilities to different events.

Respond: Being able to take action to prepare for anticipated future events or change the course of events. Because protocol/policy determines actions under normal circumstances, responding in Safety II fashion typically involves deliberate "deviation" from protocol or real-time innovation.

Learn: Being able to learn from monitoring/anticipating/responding events. May involve both learning about how to handle the identical situation in the future, but more importantly learning about how to improve monitoring, anticipating, and responding.

These four components/actions are interdependent: they often occur in parallel, and improving capabilities in one step can improve the ability to successfully perform the others. We believe that, especially in bedside clinical care, monitoring and anticipating are so tightly linked, they constitute one action we term "recognizing," followed by responding (e.g., taking action, or deliberately deciding no action is necessary), and learning how to improve our ability to recognize and respond.

We believe adding Safety II to current harm prevention strategies will lead to improved outcomes for the following reasons: (1) responses to all possible scenarios cannot be put into protocol because of the complexity of healthcare systems; therefore, flexibility and resilience will always be needed to cope with unanticipated conditions; (2) mindfulness, situational awareness, and clinical judgment add the power of human intelligence to rote following of expected procedures; and (3) allowing people to find "work-arounds" or alternative ways to perform their normal tasks can sometimes improve efficiency and safety simultaneously.

The following scenario illustrates Safety II in a nonclinical situation:

Vignette 12.1

While driving through a neighborhood, you see a soccer ball roll into the street just ahead. Within a split second, you anticipate a child might soon dash into the street, so you take an unusual action by putting your foot on the brake and slowing down or maybe even stopping. Soon after you stop, a child dashes out into the street to retrieve the ball. You wipe your forehead in relief at

the near catastrophe avoided. Further, you make note children are playing in a particular driveway on this street and decide to drive more slowly when coming down this street in the future. You also note that sometimes you text and drive and are grateful you were not texting in this situation.

In this case, you were able to monitor because you were looking out the windshield and not texting (good situational awareness). Seeing the soccer ball led to anticipating – having a strong suspicion a child was about to run in front of you (probably informed by past learned experience). Responding entailed slowing down and/or stopping the car suddenly – perhaps in a manner typically considered dangerous and against "preferred" behavior. Finally, you learned how to better monitor (eliminate a texting habit) and anticipate (expect children playing on this street or even while driving in general). Illustrated here, no accident or error occurred, and in fact, an accident was likely avoided. Additionally, important learning occurred, reducing the accident risk in the future.

One other core feature in Safety II is resilience. Elements of resilience are foresight (predicting something untoward will happen), coping (preventing something untoward from becoming worse), and recovery (ability to return to normal functioning once something untoward occurs) [9]. While related to individual psychological resilience, system resilience involves the ability of the system or individual to perform under varying conditions, e.g., responding appropriately to both negative and positive conditions [10]. Resilience is central to how error is avoided and success obtained. Safety II considers the human component of systems as necessary to maximize flexibility and resilience [7, 11], whereas Safety I sees human variation as a liability requiring design out of the system.

Vignette 12.2

CJ arrived in the Emergency Department (ED) with persistent fevers, headaches, sore throat, and emesis. After sending appropriate studies, empiric antibiotics were started for presumptive meningitis. CJ was admitted to the pediatric intensive care unit (PICU) for further management due to altered mental status.

In the PICU, she developed septic shock. A new murmur led to diagnosis of native valve Methicillin-Susceptible S. aureus (MSSA) endocarditis. Following a complicated hospital course, she was eventually ready for discharge with plans for a continuous nafcillin home infusion. When the physician began to place the order in the electronic medical record (EMR) for nafcillin administered as a continuous infusion, the option was not available.

Due to her system knowledge, the clinical pharmacist recognized multiple risks in this unusual situation. She worked with informatics to immediately build an order in the EMR. Because this is an unusual dosing method for inpatients, she notified the verifying pharmacist that he would receive an order to verify an outpatient continuous nafcillin infusion. "Anticipating" that inpatient pharmacists might not have the knowledge or experience in preparing the infusion, she contacted the IV room pharmacist to discuss medication preparation details; for example, the medication must be drawn up using an exact normal saline volume and placed in a specific bag, and because nafcillin is stable at room temperature for only 24 hours, the bag needed refrigeration prior to administration. Finally, she sent a communication to all pharmacy staff to ensure their awareness of this variation in standard practice and that future orders might include continuous nafcillin infusions.

The clinical situation described – "needing to order, dispense, and deliver a medication in a novel way" – required recognizing the situation and anticipating its risks and responding. The outcome was good and no adverse medication-related event occurred. The final step was ensuring individuals and the institution learned from this unique situation and thus increased the odds of success in both similar and dissimilar future situations. After this case was over, debriefings were performed to identify how to avoid this problem or closely related problems in the future and to identify what allowed this pharmacist to recognize a developing problem and respond in the way she did.

Recognize (Monitor and Anticipate)

Improvement Strategy

The first step in using the Safety II approach in a healthcare setting is recognizing what might happen next. Recognition combines observing (monitoring) for signals and using that data to anticipate.

If individuals cannot monitor and interpret their surroundings, everything becomes a surprise. An individual's role determines the monitoring breadth, depth, and timescale. Microsystem managers may monitor their particular unit over hours, days, or weeks, while bedside providers monitor a patient moment-by-moment.

Successful monitoring depends on multiple factors. Is data available describing the situation or environment? Is that data available to the individual(s) responsible for the monitoring and in a timely manner? Does the individual responsible for monitoring have sufficient skill/experience to interpret the data presented? Finally, is the monitoring individual alert, non-distracted, and able to focus on the situation (mindful and situationally aware)?

We performed qualitative research to identify individual or system characteristics that may contribute to Safety II application in our PICU [12]. The study identified 19 themes, grouped into 4 domains, which appear to improve recognizing (monitoring and anticipating), responding, and learning (Fig. 12.1). Characteristics (themes) that improve an individual's ability to monitor more effectively include an aptitude to pay attention to detail (focus) and to assume a more global perspective (thinking beyond one's role and to be more sensitive to signals). The ability to monitor individual patients, as well as the overall state of the unit, is also affected by structural and environmental factors, including familiarity with and proximity to coworkers; patient number, acuity, and intensity; and shift resource availability. Thus, monitoring may improve by eliminating non-value-added tasks to decrease distraction, streamlining mundane tasks, and introducing moments during the day dedicated to performing monitoring and anticipating. Finally, providers must be alert to their mental state and the thoughts in their head (mindfulness) and the environment/situation around them (situational awareness) [13]. In healthcare, mindfulness and situational awareness are characterized by actively observing oneself, the patient, and the problem [14] and then being able to convert the flood of data around us into useful and actionable information.

Tightly interwoven with monitoring are foresight and anticipating dangers. How do individuals anticipate the future, and how do they attach various probability levels to possible future outcomes? One possibility is that individuals with experience recall previous situations and apply heuristics such as recognizing "I've seen this before, and I remember what happened next." Another possibility is that individuals know what aspects of their current observations do not reflect a prior experience (because no two situations are identical), leading them to a "sixth sense" which causes them to go into higher alert or prompt further investigation and inquiry. Supporting these hypotheses, the PICU providers in our qualitative research [12] observed that colleagues proficient at anticipating have more experience and expertise. The providers

Driver	Individual Characteristics	Relationships and Interactions	Structural and Environmental Factors	Innovation Approaches
Monitoring	• Attention to Detail • Taking a Global Perspective		• Familiarity and Proximity • Number, Acuity, and Intensity of Patients • Shift Resource Availability	
Anticipating	• Taking a Global Perspective • Experience and Expertise	• Personal Relationships • Teamwork • Culture of Questioning • Communication • Training to Introduce Cultural Values		
Responding	• Taking Control • Staying Calm and Maintaining Focus • Experience and Expertise			• Relying on Teamwork if Something Novel is Considered • Teams Responding to Challenging Circumstances • Skepticism • Bringing Atypical Approaches from other Microenvironments
Learning	• Appreciating the Consequences of Mistakes	• Careful Examination and Feedback after Errors are Made		

Fig. 12.1 Interrelationship between the 4 Safety II components and 19 themes from qualitative research [12]

with substantial experience drew on their memories to remember similar situations and were more reliably able to predict the future.

For people with less experience, we can accelerate experience acquisition through simulation, especially if used to practice uncommon or unfamiliar situations. Using simulation may also effectively teach responding skills (discussed later). Strategies for improving a system's anticipatory ability may include ensuring availability of individuals with anticipation skills and having the microsystem deliberately take moments to pause and anticipate/predict the future (e.g., during handovers).

Anticipated Results of the Improvement

Taking steps to reduce distractions and improve mindfulness/situational awareness enables individuals and organizations to more effectively monitor patients, units, and the organization as a whole [15, 16]. Focusing on mindfulness, being present, and taking time to anticipate that things may not go as expected will impact an individual's ability to see the "accident waiting to happen." This is in contrast to working in autopilot mode and being forced to respond/recover more often than desired, i.e., being reactive instead of proactive. Ideally, improvements in monitoring will allow information to flow to individuals, keeping in mind that too little information will miss important signals while information overload will increase noise. The shortest possible time lag between data acquisition and its presentation to decision-makers gives those individuals more time to anticipate an event before it occurs and to initiate a response. Later, when learning occurs, the ability to identify leading indicators (data which accurately predicts the future) will improve.

How the Improvement Worked in Context of the Case

In our case, the pharmacist recognized potential problems which could put the patient at risk. More specifically, her recognition (combining monitoring and anticipating) occurred when she saw that the desired antibiotic therapy could not be ordered in the current EMR. This led to her anticipating multiple steps where future errors could occur, and getting the patient the proper therapy would require adaptive/novel responses by multiple microsystems within the hospital.

Struggles/Limitations/Opportunities

A key limitation to recognizing (monitoring and anticipating) is knowing both what to monitor and correctly interpreting the date being monitored (i.e., turning raw data into actionable information). Asking healthcare providers simply to "monitor more inputs" is unrealistic, and thus the Safety II learning step is to become better at monitoring the right things. Using the philosophy "a picture is worth a thousand words," a graphical information display (such as vital signs or PEWS scores) can potentially allow providers to more efficiently monitor patient status without adding significant workload burden. Visual monitoring systems require leveraging data from the electronic medical record and likely expertise from information technology (IT) and clinical informatics specialists.

Limitations which could preclude frontline healthcare providers from anticipating potential harm include but are not limited to workload, distractions (from patients, families, coworkers), and fatigue. Anticipating the future is a deliberate act requiring both time and mental energy. To foresee harm, individuals must be mindful and have situational awareness of their current surroundings. In our clinical example, the team utilized a "stop and resolve" mind-set to determine actions needed prior to using a continuous nafcillin infusion, thus increasing odds of things going right. If the clinical pharmacist in our case had not had the time to "stop and resolve" what was needed prior to moving forward with an unfamiliar therapy, the potential for error and harm would have been substantial. Safety II requires a conscious effort and deliberate actions to ensure a successful outcome.

Finally, a major limitation of recognition is that predicting the future will always be imperfect. Consequently, individuals and systems may be reluctant to perform in a proactive manner (anticipation) if they do not feel the anticipation prediction is accurate or likely. Consequently, if an action is taken to head off an anticipated untoward outcome, and the untoward event never occurs, one cannot be certain the proactive action avoided an untoward event. One opportunity to improve the efficacy of anticipatory behavior may be through predictive analytics, which utilizes "big data" and statistical analyses to develop predictive models about future outcomes and thus can assist human decision-making [17].

Respond

Improvement Strategy

The third Safety II component involves responding to a situation once monitoring and anticipation suggest an action is required. At this point, an individual, team, or system has made a deliberate decision that the current protocol or policy is not appropriate and following the usual or expected practice may lead to error or harm. Multiple questions then arise: How confident are the individual or team that following the expected plan will lead to error/harm? How do they know that any alternative path is safe (or at least safer than the expected path)? Among multiple possible actions, how does the individual or team choose the optimal path? Do nonidentical but similar past situations provide guidance? Will punitive action follow an innovative response? If the alternative actions still lead to error/harm, will a retrospective review conclude that the individual or team had intentions to take the safest action(s)?

Central to responding is creativity. Often called "thinking outside the box," in reference to

a psychological experiment from the 1960s, merely telling people they need to think outside the box does not improve their creative ability [18]. Recent research suggests that the presence or absence of particular neural networks predicts an individuals' ability to think creatively [19]. In our qualitative research, when asked how safety successfully occurs in the PICU, interviewed staff mentioned the ability to respond with innovation and creativity more often than other Safety II actions (Monitor, Anticipate, Learn) (Fig. 12.1). Personal characteristics or demeanors most often related to enhancing "responding" included staying calm, working in multidisciplinary teams, expecting rapid-fire questioning, and seeking ideas from outside the microsystem.

Anticipated Results of the Improvement

Creating an environment where intended variation in practice is acceptable within limits, with the intention to avoid devolving into randomness or chaos, allows individuals and teams to perform at their highest level and feel empowered to respond to changing circumstances. Ideally, if monitoring and anticipating are working well, instances where responding is needed will be infrequent, and the magnitude of responses will likely be less.

How the Improvement Worked in Context of the Case

In our case, because the clinical pharmacist anticipated multiple problems that could result from needing an unusual drug delivery method for continuous nafcillin, she was able to initiate a preemptive response. Aiding the effectiveness of her response was her understanding of the complete process, from ordering to drug delivery. She was able to "anticipate and implement" strategies to minimize the potential for error – thus enhancing the probability that things would go right. Specifically, her response included clarifying with infectious disease experts that a continuous nafcillin infusion was the intended treatment plan. She worked with various disciplines to build an order in the EMR. She educated individuals who would be involved in verifying and preparing the medication order. Lastly, she implemented error-proofing strategies, communicating specific instructions for medication storage and administration with the nursing staff.

Struggles/Limitations/Opportunities

A limitation to an individual's or team's ability to respond creatively is microsystem and organizational culture. Almost by definition, responses involve "going off script" or protocol. In an organization where prior variations in practice resulted in punitive action, individuals may be unwilling to alter their behavior. They may even take the attitude that "I'm just going to do what I've been told to do, and if something bad happens it is management's fault." Developing a culture wherein employees can thoughtfully vary practice in response to conditions may require leaders to spend time on the front lines demonstrating appreciative inquiry (i.e., focusing on what works and what people care about, through discovery, dreaming, designing, and deploying) [20, 21].

Other potential limitations stem from some still unanswered questions. For example, is the ability to innovate an inherent psychological skill or something that can be learned? If only certain individuals have the ability to respond creatively, should a team have a critical mass of these individuals at any given moment? Can creative individuals be identified prospectively? Finally, are there ways to assess the effectiveness of creative thinking among individuals (i.e., the person who consistently identifies the "right" path, compared to the person who just creates more problems)?

Learn

Improvement Strategy

The ability to recognize and respond are related. By learning from experiences, individuals may

be better informed about which cues to monitor, thus improving their potential to anticipate and respond. Healthcare is a complex sociotechnical system that is continuously changing, creating new situations that are often not predictable and which lead to planned and unplanned adaptations [22]. The ability to learn from responses that went well and improve performance is a key difference between Safety I and II. This shift in approach from responding to past untoward events to being proactive and learning from what and why things go right can support an organization's potential to handle a wider variety of conditions.

Anticipated Results of the Improvement

Individuals and organizations learn from not only what goes wrong but also what goes right. At a basic level, when things go right, one can step back to praise those who did well and learn how to respond to the same conditions in the future ("learning from excellence") [23, 24]. At a higher order of thinking (requiring *cognitive* processing), learning in Safety II will provide generalizable knowledge about how to better recognize (monitor and anticipate) and respond to all possible conditions encountered.

How the Improvement Worked in Context of the Case

In our case example, we had a clinical pharmacist who was able to recognize and respond, and no errors occurred. If she and the system took no further action beyond heading off harm in this dangerous situation, the learning opportunity to improve future system responses is lost. In our vignette, "doing things right" was followed by intentional steps to learn. Questions asked and answered included how do we ensure that in the future, continuous intravenous nafcillin is an expected ordering option, and what other medications cannot be ordered in our EMR? This proactive performance by the pharmacist led to organizational learning, resulting in a novel EMR protocol for ordering continuous antibiotic infusions, including but not limited to nafcillin. A more generalizable level of learning can happen when we identify how the pharmacist was able to function in this way and create improvements that make the ability to recognize and respond more likely in the future.

Struggles/Limitations/Opportunities

Resources allocated for the sole purpose of learning are often viewed as an expense rather than an investment. Because drawing a direct connection to patient-level outcomes is difficult, the educational budget is frequently the first cut. Fairbanks warns, "Management initiatives must be undertaken sensitively and carefully to avoid underappreciating the value of apparently nonproductive resources that are contributing to resilience potential and which might be otherwise misjudged as waste" [25].

In addition to learning from what goes right in actual clinical situations, the increased use of simulation can increase learning opportunities. Simulation-based education allows for reproduction of high-risk low-frequency events. Experiential learning occurs by immersing teams in high-fidelity scenario-based simulation with deliberate exposure to disturbances, prompting inexperienced practitioners to learn trade-offs and consequences while managing these disturbances. Allowing the team to replay the same scenario and apply newly learned behaviors or explore different solutions creates learning reinforcement. Most learning occurs during focused debriefing immediately following a simulation event. Appreciative inquiry during debriefing can explore methods and frames of mind that prompted innovative or positive productive behaviors. Directed immediate feedback and the opportunity to practice teamwork and communication can contribute to decreased cognitive load, improved adaptive capacity, and a wider range of conditions with sustained high performance. In these ways, simulation allows the opportunity for providers to learn the skills of monitoring, antici-

pating, and responding without putting patients at risk. (See Key Points Box 12.2).

Key Points Box 12.2 Summary

- Safety I is the process of learning and responding after an error has occurred. While important, it is ultimately limited in eliminating all patient harm.
- Safety II does not replace Safety I. Safety II is the process of learning from what goes right, which offers far more opportunities for spreading improvement.
- Applying Safety II utilizes four components (steps/potentials): Recognize (including Monitor and Anticipate), Respond, and Learn. Each of these is dependent on the others.
- Research has identified both individual and system traits which affect the ability to implement the four Safety II components [12].

Editors' Comments

We have seen dramatic improvement in patient safety and care quality over the past decade. However, too often safety improvements reach a plateau before we have reached the goal (presumably zero patient harm). For example, hand hygiene compliance might stall at 98%; serious safety events continue at a low but non-zero rate; a small number of blood stream infections continue to occur. Often our initial belief is that if we keep doing the same things we have been doing to improve, but just do more of it, we will finally get to where we want to be. However, a well-known saying (controversially) attributed to Albert Einstein is that "the definition of insanity is doing the same thing over and over again and expecting a different result." Are we insane in healthcare? Will continuing to employ the same strategies that enabled us to have drastic reductions in key safety and quality measures finally get us to perfection? Does our current approach – forcing more standardization – have a theoretical limit in complex systems that are continuously evolving?

Safety II may be part of the solution. The application of Safety II is in the early stages and the authors of this chapter, from Nationwide Children's Hospital (NCH) in Columbus, Ohio, lead this work in pediatric healthcare. The chapter presents a thorough and foundational understanding of why Safety II has emerged and how it creates a different approach to improving safety. Readers of this chapter should appreciate the differences between the current safety improvement strategies in many of our organizations and how Safety II implores us to think differently. The pillars of Safety II presented in the chapter and their descriptions are important for the reader to understand and be able to discuss. The authors eloquently demonstrate how the four components of Safety II (Monitor, Anticipate, Respond, Learn) can coexist with our Safety I strategies (retrospectively analyze and fix) as the two strategies are not mutually exclusive.

The best methods for actually implementing Safety II thinking and approaches in an organization remain underexplored. The intent of this chapter is to introduce this way of thinking and use NCH as an exemplar of how to ingrain a different mind-set than what we have currently (Safety I). As we strive to reach zero harm, we must embrace different techniques, with Safety II as a prime candidate for the way forward.

Chapter Review Questions

1. Which of the following are key differences between Safety I and Safety II?
   A. Safety I focuses on what went wrong. Safety II focuses on what went right.
   B. Both Safety I and Safety II see humans as a liability, to be "designed" out of systems.
   C. Safety I tends to focus on making systems more rigid, while Safety II focuses on making systems more flexible.
   D. All of the above.
   E. A and C.

   Answer: E is correct – Safety II sees human foresight and ingenuity as an asset toward improving safety. The key features of Safety II are that by allowing flexibility/adaptation/resilience to complex or unexpected circumstances, we can proactively prevent errors from ever occurring.
2. What are the four main potentials/components of Safety II?
   A. Monitor, Anticipate, Respond, Learn
   B. Monitor, Avert, React, Leave
   C. Investigate, Restrict, Enforce, Discipline
   D. Monitor, Reason, Action, Lesson

   Answer: A. Hollnagel proposes that Safety II involves four integrated actions as listed in (A). We suggest that two of these – Monitor and Anticipate – might be seen as "Recognize."
3. Which of the following statements is *false* regarding the shortcomings of Safety I?
   A. Learning does not occur until after a critical event has occurred.
   B. Over time, errors become unusual and unique making learning from events challenging.
   C. The result is often increased rules and regulations.
   D. Human error is not considered in the analysis of events.

   Answer: D. The first three answers are all problems with the Safety I approach. This does not mean that Safety I is useless, but that addition of Safety II to our toolkit will improve safety further. Safety I often assesses for human errors leading to harm.
4. What are the three main components of resilience?
   A. Toughness, Plasticity, Recoil
   B. Foresight, Coping, Recovery
   C. Anticipation, Flexibility, Recoil
   D. Mindfulness, Anticipation, Recovery

   Answer: B. "Resilience" is the ability of an individual or system to function under circumstances beyond the usual or outside conditions for which the system was designed. Therefore, coping and then recovering to normal function are required.
5. Which of the following statements is *true* regarding the weaknesses of a FMEA (failure modes and effects analysis)?
   A. Has limited value in error prevention as the scope is often too broad
   B. Primarily focuses on preventing predictable problems
   C. Is a core tool in Safety II methodology
   D. Often addresses all potential errors preemptively

   Answer: B. While FMEA is useful, the process is still limited because of the requirement to imagine well in advance things that might go wrong and then make strategic decisions about which possible failure modes to design out of a system. Safety II allows for coping with previously unimaginable circumstances effectively.
6. Which of the following safety approaches praises individuals who perform well with the attempt to learn how to respond to the same conditions in the future?
   A. Learning from experience
   B. Learning from praise
   C. Learning from positivity
   D. Learning from excellence

   Answer: D. Learning from Excellence describes reporting and analysis of actions individuals took to succeed in a situation. Then the analysis is used to improve safety in similar situations in the future.

7. Which of the following is true regarding the difference between Safety I and Safety II methodologies?
   A. The intention is for Safety II to replace Safety I as it is more effective at preventing safety events in the healthcare setting.
   B. Safety I efforts are focused on the primary prevention of events, while Safety II evaluates events after they have occurred.
   C. Safety I considers deviation in actions to be a liability, while Safety II considers intentional variation by humans as positive and necessary.
   D. Safety I involves deviation from the protocol, while Safety II stresses the importance of following institution policies and procedures.

   Answer: C. Safety II does not replace Safety I. However, Safety II recognizes that flexibility in actions can help a system to "bend and not break."
8. Predictive analytics, which leverages previously acquired data to develop predictions about the future, is an example of which of the four main Safety II components?
   A. Anticipate
   B. Learn
   C. Resilience
   D. Respond

   Answer: A. The anticipating step of Safety II requires the ability to predict the future. While humans may do this based on experience, heuristics, or "gut instinct," technological advances in predictive analytics may augment our ability to know when an event is about to occur.

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