**Template of Events for Applied and Critical Healthcare Simulation User Manual**

 The purpose of this document is to describe each of the sections in the Template of Events for Applied and Critical Healthcare Simulation (TEACH Sim) and how to appropriately use it to develop healthcare simulation scenarios. TEACH Sim is structured to guide simulation scenario developers through the evidence-based scenario design process laid out by the Simulation Module for Assessment of Resident Targeted Event Responses (SMARTER) methodology.1 As such, designers are recommended to progress linearly through each of TEACH Sim’s numbered sections. Skipping ahead or completing sections out of order is discouraged as it is inconsistent with the SMARTER approach to simulation-based training design. The following is a brief description of each of TEACH Sim’s major sections.

**Scenario Overview**

The scenario overview section of TEACH Sim provides reference information related to the development process of the documented scenario. This information includes the scenario title, scenario author(s) name(s), original purpose of the scenario, date(s) of development, and the estimated run-time for the resulting scenario. Although this overview section may seem trivial, these minor details can actually be quite important. The first element, for example, is the scenario title, and it becomes a vital component when distinguishing scenarios from one another amongst a library or database of multiple scenarios. The second element, the purpose of the scenario, provides a brief snippet on why the scenario was developed and what it is intended to train. For individuals external to scenario development, the purpose can be particularly useful because it can assist others in determining whether the scenario is appropriate for their respective situation. The next element, dates of development, can be pivotal if the scenario undergoes several revisions during the creation process. The date provides a quick reference to ensure that the most current version of the scenario is being utilized. Finally, the duration of the scenario can be helpful in identifying how much time should be allotted for the various stages of scenario implementation (i.e., set-up, run, and debrief). This section is not a prescriptive part of the scenario development process and its purpose is completely to function as a reference table.

1. **Learner Role**

Identifying who the simulation is intended to train is the first step in the scenario design process. Therefore, instructional designers begin the development process with Section 1: Learner(s). As the name suggests, this section specifies the individual(s) who are being targeted to acquire the KSAs of the training. It should be noted that every scenario may be appropriate for targeting multiple individuals simultaneously (e.g., rapid response team), focusing solely on one learner, or applying the training to multiple learners sequentially. The benefit of training multiple learners simultaneously ensures that the team has an opportunity to practice together in a safe yet realistic manner. However, the disadvantage is that it is significantly more complicated to develop a scenario with multiple learners, and it is even more difficult to maintain standardization. Distinguishing learner(s) is noteworthy because different facets of the scenario will be specifically tailored to each learner. As such, it is important to identify the learner(s) early in the development process because subsequent components of the scenario will be contingent upon these designated individuals.

1. **Learning Objectives**

Scenario designers should have an explicit purpose in mind regarding on what competencies the learners specified in Section 1 must be trained. Section 2: Learning Objectives requires scenario designers to specify the learning objectives that the resulting scenario will be designed to address. Learning objectives should be written at a level of granularity that can be measured and trained. Scenario designers are also encouraged to limit the learning objectives addressed by any given simulation scenario to avoid creating overly complex scenarios. Complexity makes it difficult to measure learner behavior and provide them subsequent developmental feedback. We recommend constricting learning objectives to 5 or fewer per scenario.

1. **Clinical Context**

Once the learning objectives have been established, it is time to consider Section 3: Clinical Context. The scenario context is a brief description of the situation in which the learner(s) will be responding. Even though multiple contexts will likely be suitable, it is important to select a context that will align with the primary components of the scenario and situation(s) relevant to the learner. Although it may be tempting to begin scenario development with an interesting case study, building a scenario to fit a clinical context can undermine the value of the scenario as a learning tool. By beginning with a context in mind, instructional designers risk creating scenarios that are inappropriate for learner needs. Therefore, it is best to first identify learning objectives and match the clinical context to these aims.

1. **Knowledge, Skills, and Attitudes**

Section 4: Knowledge Skills and Attitudes (KSAs) involves developing a set of targeted KSAs, which is a critical step in bridging the gap between learning objectives and the creation of scenario performance measurement tools. KSAs are what learners must have in order to demonstrate effective performance in the clinical context of the scenario. In other words, they are what learners must know or be able to do to meet the learning objectives created in Section 2. Therefore, in order to meet the specified objectives of training, at least one KSA must be identified for each learning objective. In a similar vein, the scenario should not target any KSA that does not represent a manifestation of a learning objective. Should any learning objective or KSA be unmatched to a corresponding element, instructional designers must critically consider the implications and modify the scenario accordingly. Table 4 of *TEACH Sim*is, therefore, structured so that users link KSAs to predetermined learning objectives and ensure there is no deficiency or contamination across these elements. Because healthcare is complex, it is possible that a number of KSAs may indicate learner proficiency on a learning objective. To help limit the scope of the KSAs to be assessed and avoid measurement difficulties, instructional designers must ensure that KSAs are relevant to the selected clinical context. Savvy designers understand that although it may be possible to include a large number of KSAs in a scenario, carefully choosing to target and measure those that are most critical will enable observers to more accurately assess learner behavior and provide meaningful developmental feedback. As a rule of thumb, we recommend including no more than an average of two KSAs per learning objective.

1. **Scenario Development**

Section 5: Scenario Development assists in generating instructionally-sound scenarios by driving designers to create event-response pairs that are linked to KSAs and learning objectives identified in Sections 4 and 2, respectively. Section 5 consists of five elements: case stem, events, responses, KSAs, and learning objectives. The *case stem* allows any lead-in information to the scenario. *Events* are the building blocks that define the scenario storyline. Events consist of two components: contextual information and trigger information. *Contextual information* adds depth to plot progression and may be useful to the instructor and/or simulator operator in instances when learners deviate from anticipated responses. Contextual information may also describe distractor information designed to confuse learners or, for more challenging scenarios, make the correct response difficult to identify. Ultimately, contextual information requires no learner response. More importantly, events include *triggers*, which are incidents that elicit learner responses. *Responses* are learners’ behavioral reactions to each event.

As scenario designers draft each event-response pair, they must indicate what KSA(s) are being targeted by each pair and identify the corresponding learning objective(s). There is no recommended limit to the number of event-response pairs included in any given scenario, but each learning objective and KSA identified in Sections 2 and 4, respectively, should be targeted at least once during the scenario. Ideally, each KSA and learning objective will be targeted multiple times throughout the scenario with varying levels of difficult so as to provide learners with multiple opportunities to practice and demonstrate a more nuanced understanding of their proficiency. Multiple performance opportunities will also enable instructors to provide more detailed developmental feedback to learners.

Similarly, Section 5 should not include any learning objectives or KSAs not previously defined in Sections 2 and 4. It also should not exclude any learning objectives or KSAs defined in Sections 2 and 4. Should any learning objective or KSA fail to be matched with an event-response pair, we recommend modifying the scenario to include these missing elements. Neglecting to incorporate previously specified learning objectives or KSAs within the scenario indicates a deficiency that would benefit from modification. When complete, the scenario development table provides users with a global understanding of the scenario flow and the purpose of each event.

**Ancillary Information**

Ancillary Information is the most flexible piece of TEACH Sim. This section provides scenario designers with the opportunity to include information necessary for successful implementation of the simulation scenario. Designers will be able to determine what information is critical for their purposes, but TEACH Sim provides suggestions and prompts for information that may be generally relevant to healthcare simulation. Ancillary information includes the profile of the patient in question, specification of the simulation modalities for which the scenario is appropriate, a list of learner and confederate roles, scenario support staff (e.g., observers, simulator technician) required during implementation, and a list of equipment and props that will be needed to make the scenario successful. The patient profile details facts about the patient which are relevant to scenario events or which may serve as distractor information for learners participating in more difficult scenarios. Modalities are the types of simulation devices for which the scenario was created and to which it may be successfully applied. Individuals planning on implementing the scenario can easily reference this section of the template to identify what device they will need and determine whether the scenario is practical for their available resources. Similarly, articulating a list of props allows scenario users to quickly gather these items or ascertain whether they have the resources available. Careful consideration during development of the type and number of personnel needed in implementation standardizes the execution of the scenario across multiple performances. Personnel should be trained on their roles and responsibilities prior to scenario implementation. Identifying and training these individuals prior to implementation will ensure they are adequately prepared by the time the scenario is used for learners. Finally, template users may provide a reference list of any sources they used during scenario development. Like the Scenario Overview, the Ancillary Information section is not a step associated with the SMARTER design methodology so it, too, may be completed at any time throughout the development process.

**References**

1. Rosen MA, Salas E, Silvestri S, Wu T, Lazzara EH: A measurement tool for simulation-based training in emergency medicine: The simulation module for assessment of resident targeted event responses (SMARTER) approach. Simul Healthc2008; 3(3):170-9.