CAPTURING THE TEACHABLE MOMENT:

USING JUST-IN-TIME SIMULATION TO DEVELOP CLINICAL REASONING AND LEADERSHIP SKILLS IN PEDIATRIC TRAINEES ACROSS THE CONTINUUM

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DISCLOSURE

- The presenters have no disclosures.
OBJECTIVES

■ To explain how simulation can be used as a teaching tool to improve clinical reasoning skills and contingency planning.
■ To recognize the importance of developing a shared mental model for patients at risk for deterioration.
■ To identify the impact of just-in-time simulation on learner leadership abilities.
■ To design a just-in-time simulation scenario from a patient case.
■ To describe the role of debriefing and outline the key elements of effective debriefing.

IMPACT OF TRANSITIONS OF CARE
IN 2003...

PATIENT SAFETY IS THE GOAL
THE IMPLEMENTATION

- Provides a mnemonic with a structured model for both verbal handoff and a written handoff document
- “Implementation of the handoff program was associated with reductions in medical errors and in preventable adverse events with improvements in communication…”


CONTIGENCY PLANNING

- Do you know what’s going on?
- Can you plan for what might happen?

<table>
<thead>
<tr>
<th>Illness Severity</th>
<th>Stable, “watcher,” unstable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Summary</td>
<td>Summary statement</td>
</tr>
<tr>
<td></td>
<td>Events leading up to admission</td>
</tr>
<tr>
<td></td>
<td>Hospital course</td>
</tr>
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<td></td>
<td>Ongoing assessment</td>
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<td></td>
<td>Plan</td>
</tr>
<tr>
<td>Action List</td>
<td>To do list</td>
</tr>
<tr>
<td></td>
<td>Time line and ownership</td>
</tr>
<tr>
<td>Situation Awareness and Contingency Planning</td>
<td>Know what’s going on</td>
</tr>
<tr>
<td></td>
<td>Plan for what might happen</td>
</tr>
<tr>
<td>Synthesis by Receiver</td>
<td>Receiver summarizes what was heard</td>
</tr>
<tr>
<td></td>
<td>Ask questions</td>
</tr>
<tr>
<td></td>
<td>Restates key action/to do items</td>
</tr>
</tbody>
</table>
SHARED MENTAL MODEL

- What happens when the message is relayed wrong?
- What happens if the plan is not solidified?
- What happens when the team is unable to carry out the plan due to lack of knowledge?
- What barriers prevent the plan from being carried out?

Can you think of a time where...
...your learners did not properly identify a contingency plan for a patient who later decompensated?
...your learners did not share the same thought process about the reasons behind the patient’s management plan?
WHAT IS SIMULATION?

“Simulation is a technique ... to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner”

Gaba, 2004
THE CASE FOR SIMULATION

- Challenges in clinical teaching
- Changing technologies
- Need to assess competence
- Need to evaluate systems
- Opportunity for deliberate practice

Issenberg, SB et al, 2005

MEDICAL SIMULATION

- Captures teachable moments
- Practice high stakes, low frequency events
  - 44% of pediatric residents had never led a resuscitation
  - First five minutes matters for survival in a resuscitation
  - The perfect storm

MEDICAL SIMULATION

- Quality tool
- Systems and team issues can be analyzed
- Important for patient safety

BEYOND THE MOCK CODE

- Tool to teach clinical reasoning
  - Knowledge acquisition
  - Recognition of patient deterioration
  - Critical thinking
- Just in time and just in place models
  - CPR training
  - Mock codes on the inpatient unit

BEFORE THE CODE...

- How can simulation help prevent the code?

JUST IN TIME SIMULATION

- Goal is to develop situation awareness and contingency plans

- Not a full fledged “code”

- Happens in situ – right on the unit
KEY PLAYERS

Inpatient Team  Simulation Team  Nursing Staff

SIMULATION SESSION

Inpatient team and nursing convene for simulation  15 minutes of simulation  15 minutes of debriefing
PREPARATION ON DAY OF SIMULATION

Senior resident identifies “watcher”

Senior resident and simulation coordinator develop just-in-time simulation

CASE DEVELOPMENT

- Goals and objectives are key
  - Think about all of the participants

- Simulation is a “technique not a technology”

- Discussion with senior resident engages them to think of possibilities

Gaba 2004
BENEFITS

- Encourages team to think through case together
- Allows senior residents to practice giving interns autonomy versus intervening
- Reinforces the role of rapid responses
- Engages the entire team in discussion

VIDEO TRIGGER
LET’S PRACTICE

- Break into small groups
- Refer to the *Patient Handoff Document*, pick 1 of the 3 patients listed
- Fill in the worksheet entitled *Building a Just in Time Simulation*
- Use the *Example Case* to help you along

SHARE YOUR SIM
WHAT IS A DEBRIEF?

- Serves as the most important part of the exercise
- Provides the chance to be a “cognitive detective”
- Moves participants from experiencing event to making sense of it
- Allows participants to close performance gap through self reflection
REFLECTIVE PRACTICE

- Scrutinize one’s own practice to take steps to improve
- Reflection in action → thinking on your feet
- Reflection on action → thinking afterwards what could have been done differently, and how to change practice

HOW DO YOU FACILITATE THIS REFLECTION?

- Balance of active learning by participants, but not missing key teaching points
- Learning objectives should be revealed
- Exploration of frames or mental models
  - Serve as internal images of external reality
  - Influence clinical decision making based on frame held → lead to actions
THREE PHASES

- Reactions
- Understanding or analysis of what happened
- Summary

REACTIONS PHASE

- Allows participants to describe experience
- “Clear the air”
- How did it feel?

Rudolph et al, 2008
ANALYSIS PHASE

- Directive Questions
  - Instructor describes gaps, and offers solutions
- Self Assessment
  - Learners derive what went well, what should change
- Facilitated Discussion
  - Instructor facilitates self reflection on actions and frames

Cheng, Eppich 2014

ANALYSIS PHASE

- Directive questions
  - Time efficient
  - Useful for procedural or knowledge gap
  - Teacher centered
  - No exploration of rationale
ANALYSIS PHASE

- Self assessment (Plus Delta)
  - Draw two columns
    - What went well?
    - What would you do differently?
  - Can be time efficient
  - Is learner centered
  - Can get off track
  - May miss rationale
    - Facilitator may need to close performance gaps

ANALYSIS PHASE

- Facilitated discussion (Advocacy Inquiry)
  - Shifts focus from actions and moves it to frames
  - Requires some debriefing skill, and time
  - Exploration of what happened through observations
  - Allows performance gaps to be uncovered and closed by changing frames

Observation
- I noticed....

Advocacy
- Your perspective (concern or appreciation)

Inquiry
- Their perspective (tell me about that...)
SUMMARY PHASE

- What worked well
- What didn’t work
- Take-aways

Rudolph et al, 2008

KEYS TO EFFECTIVE DEBRIEFING

- Create a supportive environment
- Facilitate in an honest, nonthreatening way
- Allow sharing of emotions
- Allow trainees to share their thoughts
- Focus on improvement
PRACTICAL TIPS

- Involve everyone
- Monitor nonverbal messages
- Practice verbal skills → listen, rephrase, ask for elaboration
- Recognize the upset participant
  - Prevention is key

APPLICATIONS BEYOND THE CLINICAL REALM
Just in Time Non-Clinical Simulation

- Challenging family member
- Peer conflict
- Task prioritization

The Scenario

- 4 month old with bronchiolitis
  - Observed overnight on inpatient unit
  - Normoxemic; no distress or tachypnea overnight
  - Deemed stable for discharge
- Night team reports that mother requested antibiotics for home
  - Night nurses report mother was “belligerent, disrespectful, demanding”
  - Maternal aunt is a hospital employee and took off today to help with discharge
- Day senior requests a just-in-time simulation to prepare for family-centered rounds
IMPLEMENTATION LOGISTICS

Barriers

Time constraints
- Day shift work flow
- Night shift work flow

Buy in
- Physician
- Nursing

Coverage
- Patient care
- Didactics
TAKE-AWAYS FROM OUR TRAINEES

“I think we should do this for every unstable patient.”

“[It was] different...for a patient on your team...this was cool, I knew the patient.”

“It will definitely help us develop our contingency plans.”

QUESTIONS?
REFERENCES


Sam J, Pierce M, Al-Qahtani A, and Cheng, A. Implementation and evaluation of a simulation curriculum for paediatric residency programs including just-in time in situ mock codes. *Paediatr Child Health* 2012;17.2 e16-e


BUILDING A JUST IN TIME SIMULATION

Patient Case: ________________________________

Location: ________________________________

Participants: _____________________________________________________________

Roles Needed: ___________________________________________________________

Equipment: ____________________________________________________________

**Case Development**

I. Deterioration element or deliberate practice:

II. Patient parameters: *(what do the learners see when they encounter patient, what happens with an intervention?)*
III. Learning objectives:

1.

2.

3.

IV. Contingency Plans: ("if this, then___")

_____________________________________________________________________________________________________________

_____________________________________________________________________________________________________________

_____________________________________________________________________________________________________________

_____________________________________________________________________________________________________________
GUIDE TO EXECUTING A SUCCESSFUL JUST IN TIME SIMULATION

PART I: Simulation

1. Identify a patient in which to derive case scenario
   a. May be a “watcher”, a patient with higher likelihood of clinical decline.
   b. Can be a “stable” patient in which deliberate practice of contingency planning can be performed.

   *In our video example, the team identified a 14 year old male who was just transferred to the inpatient floor from the PICU with a working diagnosis of atypical pneumonia. He has been afebrile on his current antibiotic regimen. He is s/p bilateral chest tube removal and extubation 2 days prior.

2. Set a time and location conducive to your learners
   * At our institution we start 30 minutes prior to inpatient rounds, as to not interrupt workflow; this time also allows bedside nurse to participate. We set up a treatment room closest to the actual patient’s bed location as this typically is the first patient the team rounds on if they are a “watcher.”

3. Decide roles for educators
   a. Potential roles include: simulator computer operator, facilitator, confederate (i.e. family member or bedside nurse if one not available)

5. Case development
   a. Determine what element of deterioration or deliberate practice you wish to simulate.
      i. If you have a simulation mannequin available, what do you want your parameters to be?
         * In our example, this involved new onset respiratory distress and fever.
   b. Design learning objectives keeping all participants in mind.
      - Recognize a patient in respiratory distress and intervene (i.e. place on O2, obtain CXR)
      - Identify a patient in shock and start early fluid resuscitation being mindful to re-evaluate.
      - Make a plan for escalation of care, i.e. call a rapid response.

PART II: Debrief

1. Introduce that the debrief is now taking place and remind the participants that this is a safe place

2. Three key components of the debrief:
   a. Identify initial reactions or feelings (“How did that feel?”)
   b. Emphasize teaching points in non-judgmental fashion (“I noticed that you were hesitant to call a rapid response; I’ve seen in practice that the call is often delayed, can you tell me what your thought process was?”)
   c. Take-away (“What is one lesson that you will take away from this experience?”)

3. Remember to balance the teaching objectives that you establish with what you observe during the simulation.
   a. Take notes that you can refer to.
   b. Sometimes you may encounter a teaching point that needs to be addressed over those that you have designed.

4. Establish what contingency plans, the team will derive from this experience
   a. Try to have learners solidify contingency plans as “if this, then...”
### Case Development

<table>
<thead>
<tr>
<th>SWU</th>
<th>Patient Summary Statement &amp; Problem Based Hospital Course</th>
<th>Action List</th>
<th>Situation Awareness/Contingency Plan</th>
<th>Synthesis</th>
</tr>
</thead>
</table>
| BED 1 | **Summary:** 14 year old M PMHx of moderate persistent asthma, now HD#5 s/p bilateral pigtail chest tube placement/removal and extubation on 3/8 for atypical PNA complicated by bilateral transudative pleural effusions.  
1. PNA  
   - Room air  
   - Clindamycin & Levofloxacin  
2. Asthma  
   - Albuterol q4hr PRN | [ ] AM labs: CRP, BMP  
[ ] Follow up resp cultures | [ ] Use boluses sparingly |
| **Location:** 4th floor treatment room  
**Participant(s):** Green Team (2nd year senior, two interns)  
**Roles Needed:** Sim operator, facilitator, confederate as nurse  
**Equipment:** Sim Junior, oxygen set up, fluids |

1. **Deterioration element or deliberate practice:**

   New onset respiratory distress associated with fever

2. **Patient parameters: (what do the learners see when they encounter patient, what happens with an intervention?)**

   Initial vitals: HR 130s RR30 BP 84/58 O2 sat 89% in room air  
   Physical Exam: decreased lung sounds on right with crackles on left  
   **Interventions:**  
   Administration of O2, improves pulse oximetry  
   Administration of NS bolus, improves HR and BP

3. **Learning objectives:**
   a. Recognize a patient in respiratory distress and intervene (place on O2, obtain CXR).  
   b. Identify a patient in shock and start early fluid resuscitation being mindful to re-evaluate.  
   c. Make a plan for escalation of care, i.e. call a rapid response.

4. **Contingency Plans: ("if this, then___")**
   a. If develops respiratory distress, then obtain CXR.  
   b. If concern for shock, then administer 20cc/kg bolus and re-assess respiratory status.  
   c. If febrile, then obtain blood culture.
Capturing the Teachable Moment: Using Just-In-Time Simulation to Develop Clinical Reasoning and Leadership Skills in Pediatric Trainees Across the Continuum

Timeline: (75 minutes)

<table>
<thead>
<tr>
<th>Time</th>
<th>Type of activity</th>
<th>Activity</th>
<th>Person Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 minutes</td>
<td></td>
<td>Introductions</td>
<td>All</td>
</tr>
<tr>
<td>5 minutes</td>
<td>Didactic</td>
<td>Transitions of Care:</td>
<td>Kheyandra</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Duty hour changes</td>
<td></td>
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<td></td>
<td></td>
<td>- Pros and cons</td>
<td></td>
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<td></td>
<td></td>
<td>- IPASS contingency planning, illness severity</td>
<td></td>
</tr>
<tr>
<td>5 minutes</td>
<td>Think-Pair-Share</td>
<td>Consider a time your learners failed to realize a contingency plan – what happened?</td>
<td>Blair</td>
</tr>
<tr>
<td>7 minutes</td>
<td>Didactic</td>
<td>- Simulation as a teaching tool: the case itself</td>
<td>Sharon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Intro to Just-in-Time Sim</td>
<td></td>
</tr>
<tr>
<td>2 minutes</td>
<td>Video trigger</td>
<td>Video display of one case</td>
<td>Kheyandra</td>
</tr>
<tr>
<td>20 minutes</td>
<td>Small group work</td>
<td>Design a Just-in-Time Sim:</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- All groups get same case and design a sim, OR</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Have 3-4 cases prepared for each to design their own sim</td>
<td></td>
</tr>
<tr>
<td>10 minutes</td>
<td>Large group work</td>
<td>Share your sim</td>
<td>All</td>
</tr>
<tr>
<td>5 minutes</td>
<td>Didactic</td>
<td>Simulation as a teaching tool: Debriefing</td>
<td>Sharon</td>
</tr>
<tr>
<td>7 minutes</td>
<td>Large group work</td>
<td>Watch video again and practice debrief</td>
<td>All</td>
</tr>
<tr>
<td>5 minutes</td>
<td>Didactic/Video</td>
<td>Applications beyond the clinical realm:</td>
<td>Blair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Leadership skills : delegation/ prioritizing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Challenging parent</td>
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<td></td>
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<td>- Phone skills</td>
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<tr>
<td></td>
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<td>- Breaking bad news</td>
<td></td>
</tr>
<tr>
<td>5 minutes</td>
<td>Didactic</td>
<td>Implementation logistics</td>
<td>Kheyandra</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- What if I don’t have a sim manikin?</td>
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<tr>
<td></td>
<td></td>
<td>- How do you fit this into the work day?</td>
<td></td>
</tr>
<tr>
<td>2 minutes</td>
<td></td>
<td>Conclusions/Q&amp;A</td>
<td>All</td>
</tr>
</tbody>
</table>
### Example Patient Handoff Document

#### I-PASS Handoff Tool, St. Christopher’s Hospital for Children

**Created by:** Lewis, K., Dickinson, B., Topiol, E., Wheaton, T., Calaman, S., 2016

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<table>
<thead>
<tr>
<th>BED 1</th>
<th>4 month old F</th>
<th>SWU</th>
<th><strong>Summary:</strong> 4 month old F with RSV bronchiolitis and dehydration, now HD#3 with increased respiratory distress and new onset fever.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NKDA</td>
<td>W</td>
<td>1. Bronchiolitis w/ hypoxemia:</td>
</tr>
<tr>
<td></td>
<td>Wt. 6kg</td>
<td></td>
<td>- Nasal suctioning PRN</td>
</tr>
<tr>
<td></td>
<td>Access: PIV</td>
<td></td>
<td>- Supplemental O2 at 2L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Fever:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Tylenol q4 hour PRN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Dehydration:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- D51/2NS at 24cc/hr</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] Monitor resp status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] Obtain U/A and culture</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPO for RR &gt; 60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BED 2</th>
<th>16 year old M</th>
<th>W</th>
<th><strong>Summary:</strong> 16 year old M, severe persistent asthma, now with status asthmaticus due to unknown trigger.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ALL: Peanut</td>
<td></td>
<td><strong>ED Course:</strong> received Duoneb x3, IM Epi, SQ terb, steroid load; placed on CN albuterol</td>
</tr>
<tr>
<td></td>
<td>Wt. 50kg</td>
<td></td>
<td>1. Status Asthmaticus:</td>
</tr>
<tr>
<td></td>
<td>Access: none</td>
<td></td>
<td>- Albuterol, continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Prednisone 30mg BID</td>
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<td></td>
<td>2. Nutrition:</td>
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<td></td>
<td></td>
<td></td>
<td>- Regular diet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] Wean albuterol</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lost IV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BED 3</th>
<th>2 week old M</th>
<th>S</th>
<th><strong>Summary:</strong> 2 week old male, born at 37 weeks gestation, admitted for neonatal fever, Tmax 101 in ED.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wt. 3kg</td>
<td></td>
<td>1. Neonatal fever:</td>
</tr>
<tr>
<td></td>
<td>All: NKDA</td>
<td></td>
<td>- Ampicillin, Gentamicin, Acyclovir</td>
</tr>
<tr>
<td></td>
<td>Access: PIV</td>
<td></td>
<td>2. Nutrition:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- PO ad lib with Sim Adv</td>
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<td></td>
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<td></td>
<td>- Strict I/Os</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] follow blood, urine, CSF cultures</td>
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</tbody>
</table>