Transportable Simulation-Based Training Curriculum

Module 3

This work is supported by the Centers for Medicare and Medicaid Services Grant # 18-P-92332/1-01.

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official CMS position, policy or decision unless so designated by other documentation.
Module 3

3.1 Scenario Title: Antidote Dosing Error in a Pediatric Acetaminophen Overdose Patient

3.2 Date Created: January 6, 2005
   Date Revised: November 22, 2007

3.3 Categories: Pediatrics; Toxicology; Nursing; Teamwork

3.4 Target Audience: Pediatric Acute and Critical Care Residents / Nurses

3.5 Learning and Assessment Objectives

   A. Primary
      i. Recognition and management of acetaminophen toxicity
      ii. Resource utilization to identify new medication regimens and protocols
      iii. Crisis resource activation
      iv. Teamwork training
      v. Error disclosure and critical communications with patient family
      vi. Recognition and management of concurrent severe tricyclic antidepressant toxicity (optional)

   B. Critical actions checklist (see Appendix A)

3.6 Patient Safety Issues Addressed

   A. Authority gradient / Cultural change
      i. Surmounting of authority gradients as patient advocate
      ii. Cross-checking of medication orders

   B. Medical treatment skills in pediatric staff

   C. Teamwork (see Appendix B)

3.7 Graduate Medical Education Competence Domains Addressed

   A. Patient Care
      Interviewing
      Develop / carry out plans
      Performance of routine procedures
      Work within a team
Clinical skills addressed
i. Transition of care
   1. Patient report and acceptance
ii. Routine medical care
   1. Patient assessment
   2. Vascular access
   3. Medication administration
   4. Airway management
   5. Gastric decontamination
   6. Ventilatory support (optional)
   7. Circulatory support (optional)
   8. Seizure management (optional)

B. Medical Knowledge
   Investigatory + Analytic Thinking

C. Practice-Based Learning + Improvement
   i. Analyze own practice for needed improvement in pediatric toxicology management skills
      1. Simulation exercise to acquire and develop management skills for the acutely intoxicated pediatric patient
      2. Simulation exercise to experience and manage difficult communication issues surrounding patient safety and medical error disclosure
   ii. Use of information technology
      1. Web video + online references to assist with management of intoxicated patients
      2. Simulation environment with audiovisual recording to review clinical management and teamwork skills

D. Interpersonal + Communication Skills
   i. Listening skills (within team for information sharing and for conflict resolution)
   ii. Error disclosure
      1. Objective disclosure of error; institutional policy + procedure
      2. Activation of resources tasked with error investigation (supervisor / administrator; anonymous reporting)
      3. Critical incident debriefing

3.8 Environment and Equipment (see Appendix C)

3.9 Personnel (see Appendix C)
3.10 Scenario Narrative

A. An 18 month old child reportedly ingesting a toxic amount of acetaminophen is brought in to a rural hospital ED setting. The initial treating physician decides to intravenously administer N-acetylcysteine (NAC) as the child refuses to take oral NAC and vigorously resists a nasogastric tube, and IV NAC is ordered. The physician calculates and writes the dose incorrectly, such that a massive NAC overdose will result if not picked up and corrected. If the error is picked up by the SIM participants, the facilitating nurse will be resistant to correction because she knows the initial / ordering physician (who is no longer available) and trusts her experience. Additional evidence-based support (e.g. Web references, drug package inserts, pharmacist review) will be required to change the medication order. If the error is not picked up early on, the child will receive a first dose that is 4-fold the intended dose, after which the pharmacist will identify the error and report the error to the treating team. No adverse outcome will result from the slip / error. Error disclosure to the patient and family will need to be addressed at this point. Optional: Unidentified tricyclic antidepressant overdose can complicate the case with arrhythmias, seizures and hemodynamic instability and require resuscitation with intubation, sodium bicarbonate administration, and cardiopulmonary resuscitation.

i. **Patient name / Age / Sex:** Samuel Tiersen  
18 month old  
male

ii. **Mode of arrival:** ambulance

iii. **Accompanied by:** mother with patient

iv. **ED medical forms:** see <<Appendix D>>  
Prior medical records: n/a

v. **Chief complaint / History of present illness:**  
A child is brought in by ambulance with his mother, who states that her child had ingested a full bottle of acetaminophen suspension (160mg / 5mL). The child swallowed approximately 95mL about sixty minutes ago. The mother is sure of the dose because she has just given one 5mL dose from the newly-opened bottle a few days ago. No other ingestions are known to her. The paramedics have started a 22gauge IV in his right arm and infused about 200cc of normal saline.

vi. **Past medical history:** otitis media  
**Past surgical history:** none

vii. **Medications:** none  
**Medication allergies:** none known  
**Immunizations:** up to date

viii. **Social history:** healthy pre-schooler, lives with parents  
**Family history:** non-contributory
ix. **Physical examination:**
   1. Vital signs: weight: 13 kg
      heart rate: 110 / minute
      blood pressure: 98 / 62 mmHg
      respirations: 20 / minute
      oxygen saturation: 98% on room air
      temperature: 97.8 degrees F / 36.6 degrees C
   2. Head / Neck: normal, anterior fontanelle closed
   3. Chest: normal, equal breath sounds
   4. Heart: normal, no murmurs or heave
   5. Abdomen: normal, good bowel sounds
   6. Genitourinary: normal developmental stage
   7. Extremities: 22gauge right hand intravenous catheter
   8. Neurologic: normal

x. **Laboratory Values:**
   1. all: pending

i. **Imaging Studies:**
   1. chest x-ray: pending (normal lungs)
      see <<module 3 -image- >> files
C. Scenario Flow

expected interventions in **bold**

time 0  The attending ED physician, Dr. Finlay, briefly assesses the child and finds him to be cooperative and playful, with no acute distress. She is called away to an emergent patient and requests the ED staff and treating nurses to start “routine medical therapy.”

☐ **Patient report and acceptance from EMS / ED provider**
☐ **Patient assessment reveals vital signs and physical exam as above, without significant changes**
☐ **Application of monitoring equipment (cardiac monitor, pulse oximetry)**
☐ **Check vascular access**
Dr. Finlay returns after having called the regional poison control center and speaking with a toxicology specialist who recommends administration of N-acetylcysteine and activated charcoal based on the mother’s reliable history as well as the dose and timing of ingestion. She orders activated charcoal mixed in with chocolate milk, which the child drinks happily, and oral N-acetylcysteine, which the child vigorously refuses to take. Dr. Finlay then orders intravenous N-acetylcysteine in the following regimen (the written dose is for diluent, and at least an order of magnitude greater than recommended N-acetylcysteine dose):

First infusion: 3mL/kg (39mL) of Mucomyst 20% to make 200mL of dextrose 5% solution, administered over 40 minutes
Second infusion: 10mL/kg (130mL) of Mucomyst 20% to make 500mL of dextrose 5% solution, administered over 4 hours
Third infusion: 20mL/kg (260mL) of Mucomyst 20% to make 1000mL of dextrose 5% solution, administered over 16 hours

***Dr. Finlay is called away STAT to an emergent patient resuscitation and will be unavailable for the rest of the case. The SIM facilitator nurse will have the improperly prepared N-acetylcysteine infusion ready and start it immediately as ordered to drive scenario progression.***

Medical Error Detection + Correction Point #1

- N-acetylcysteine infusion should be discontinued
- Patient re-assessment reveals vital signs and physical exam as above, without significant changes
- Continued consultation with poison control center to determine further treatment
- Close monitoring for complications of N-acetylcysteine dosing error (hyponatremia, seizures)
- As the initial ordering physician (Dr. Finlay) is no longer available, the SIM facilitator nurse will be resistant to changing N-acetylcysteine dose because she knows and trusts Dr. Finlay. She will require evidence-based support (e.g. Web references, drug package inserts, pharmacist review) to change the medication order.
- Error disclosure and followup
  - objective disclosure of error to family
  - activation of resources tasked with error investigation (supervisor / administrator; anonymous reporting)
  - critical incident debriefing
- **Investigative probe: incorrect medication order is detected by treatment team and corrected**
10 minutes If the dosage error is not picked up, the first dose will have been started (IV infusion with 0.2micron millipore filter). The hospital pharmacist will call at this point to note the significantly high dose of weight-based N-acetylcysteine being requested by the treating team for an 18 month old child.

Medical Error Detection + Correction Point #2
- N-acetylcysteine infusion should be discontinued
- Patient re-assessment reveals vital signs and physical exam as above, without significant changes
- Continued consultation with poison control center to determine further treatment
- Close monitoring for complications of N-acetylcysteine dosing error (hyponatremia, seizures)
- Error disclosure and followup
  - objective disclosure of error to family
  - activation of resources tasked with error investigation (supervisor / administrator; anonymous reporting)
  - critical incident debriefing
The first Tylenol level from about 1 hour after ingestion is reported back at 55mg/L; liver function tests, coagulation studies, and all other labs (including aspirin / acetaminophen levels) are normal.

- Discussion of acetaminophen toxicity
  - acute vs. chronic intoxication
  - pediatric vs. adult
  - diagnostic procedure
    - serum acetaminophen level / nomogram
    - liver function tests, coagulation studies
  - therapeutic interventions
    - gastric lavage
    - activated charcoal
    - oral N-acetylcysteine
    - intravenous N-acetylcysteine
    - supportive measures

- Formal transition of care + disposition of patient to ICU

OPTIONAL: At this point, an unidentified concurrent overdose of the mother’s tricyclic antidepressants pathophysiology may present with rapidly progressive seizure activity, ventricular arrhythmias, and hemodynamic instability.

- Patient assessment reveals a seizing, then post-ictal patient, progressive tachycardia with myocardial irritability / arrhythmias, hypotension and hypoxia

Physical examination:
- Chest: symmetric breath sounds
- Heart: tachycardia
- Neuro: unresponsive, pupils dilated to 6mm; non-focal
- Skin: dry

- Consider differential of seizure-inducing cardiotoxic ingestions
  - alcohols
  - anti-arrhythmics (class I; quinidine)
  - anti-cholinergics (diphenhydramine)
  - antidepressants (monoamine oxidase inhibitors, tricyclics)
  - cholinergics (organophosphates)
  - dopaminergics (phenothiazines)
  - hypoglycemics
  - opioids (dextromethorphan, meperidine, tramadol)
  - salicylates
  - stimulants (cocaine, amphetamines)
  - other (camphor, gingko, isoniazid, lithium, methylxanthines, propoxyphene, strychnine)
Consider differential of other etiologies of seizures
- infectious (meningoencephalitis)
- metabolic (hypo-calcemia / glycemia / natremia)
- neoplastic
- neurologic (primary, acquired)
- non-accidental injury
- vascular (CVA)

Diagnostic evaluation
- electrocardiogram (EKG)
- selected toxicologic assays (e.g. cocaine, lithium)
- head computed tomogram (CT)
- lumbar puncture (LP)

Toxicologic ACLS as indicated
- airway management (endotracheal intubation)
- ventilatory support (mechanical ventilation)
- circulatory support (IV access and fluids, lidocaine / dopamine infusions, defibrillation / cardioversion)
- gastric decontamination (activated charcoal administration after airway protection; ? gastric lavage)
- seizure management (benzodiazepines, barbiturates; avoidance of phenytoin)
- toxicologic expert consultation

Recognize and adequately manage TCA OD (airway, fluids, sodium bicarbonate; check arterial blood gases (ABGs)

Formal transition of care with report of patient presentation, resuscitative events, and treatment

B. Scenario Distracters – None

C. Trends Needed – none for acetaminophen ingestion; optional tricyclic antidepressant ingestion and toxicity component will require hemodynamic deterioration with ventricular arrhythmias and respiratory compromise (in SimBaby case).
3.11 **Instructor Notes**

A. Tips to keep scenario flowing in lab and via computer:
   - Presentation of patient with rapidly progressive deterioration should keep the case moving quickly and with learner stress.
   - Lulls in activity may be broken with entry of agitated father.

B. Tips to direct actors: as above.

C. Scenario programming: see &lt;&lt;Appendix F&gt;&gt;

3.12 **Debriefing Points**

A. Authority Gradient / Cultural Change
   i. Surmounting of authority gradients as patient advocate
   ii. Cross-checking of medication orders

B. Critical Event Response
   i. Acetaminophen overdose management
   ii. N-acetylcysteine dosing error management
   iii. Tricyclic antidepressant overdose management (optional)
   iv. Gastric decontamination (optional)

C. Practice-Based Learning + Improvement
   i. Analyze own practice for needed improvement in pediatric toxicology management skills
      1. Simulation exercise to acquire and develop management skills for the acutely intoxicated pediatric patient
      2. Simulation exercise to experience and manage difficult communication issues surrounding patient safety and medical error disclosure
   ii. Use of information technology
      1. Web video + online references to assist with management of intoxicated patients
      2. Simulation environment with audiovisual recording to review clinical management and teamwork skills

D. Interpersonal + Communication Skills
   i. Listening skills (within team for information sharing and for conflict resolution)
   ii. Error disclosure
      1. Objective disclosure of error; institutional policy + procedure
      2. Activation of resources tasked with error investigation
         (supervisor / administrator; anonymous reporting)
      3. Critical incident debriefing
3.13 Performance Measurement Instruments

A. Global Competency Rating Scale (see <<Appendix A>>)

B. Investigative probe: Incorrect medication order is detected by treatment team, with resultant error correction

C. BARS (see <<Appendix B>>)

3.14 Pilot Testing and Revisions

A. Numbers of participants- 3-5 learners (1-2 leaders)

B. Performance expectations, anticipated management mistakes
   - failure to detect N-acetylcysteine dosing error
   - failure to closely monitor for N-acetylcysteine dosing error complications
   - failure to continue consultation with poison control center to manage underlying acetaminophen overdose
   - failure to properly transfer and transition care
   - failure to recognize and manage tricyclic overdose (optional)

3.15 Authors and their Affiliations

A. RIHMSC CMS Transportable Simulation-Based Training Curriculum Project team
   Marc Shapiro, MD; RIHMSC, Rhode Island Hospital, Providence RI
   Leo Kobayashi, MD; RIHMSC, Rhode Island Hospital, Providence RI
   Kavita Babu, MD; Univ. Mass. Medical Center, Worcester MA
   Frank Overly, MD; RIHMSC, Rhode Island Hospital, Providence RI
3.16 Additional Debriefing Materials

Print Materials
-Acetaminophen overdose (pediatric)-


-N-acetylcysteine overdose-

-Medical error disclosure-
Cantor MD. Telling patients the truth: a systems approach to disclosing adverse events. *Qual Saf Health Care* 2002; 11; 7-8.


Liang BA. A system of medical error disclosure. *Qual Saf Health Care* 2002; 11; 64-8.

Online Materials

## Rating Scale

<table>
<thead>
<tr>
<th></th>
<th>Very Poor</th>
<th>Poor</th>
<th>Marginal</th>
<th>Acceptable</th>
<th>Good</th>
<th>Very Good</th>
<th>Superior</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

### Competency Dimension and Descriptors

<table>
<thead>
<tr>
<th>No.</th>
<th>Competency Dimension and Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>APPROPRIATE ACTION PERFORMANCE</strong></td>
</tr>
<tr>
<td></td>
<td>- Patient report and acceptance from EMS / ED provider</td>
</tr>
<tr>
<td></td>
<td>- Patient assessment</td>
</tr>
<tr>
<td></td>
<td>- Application of monitoring equipment (cardiac monitor, pulse oximetry)</td>
</tr>
<tr>
<td></td>
<td>- Check vascular access</td>
</tr>
<tr>
<td></td>
<td><strong>Medical Error Detection + Correction Point #1</strong></td>
</tr>
<tr>
<td></td>
<td>- N-acetylcysteine infusion should be discontinued</td>
</tr>
<tr>
<td></td>
<td>- SIM facilitator nurse will be resistant to changing N-acetylcysteine dose and will require evidence-based support (e.g. Web references, drug package inserts, pharmacist review) to change the medication order</td>
</tr>
<tr>
<td></td>
<td>- Continued consultation with poison control center to determine further treatment</td>
</tr>
<tr>
<td></td>
<td>- Close monitoring for complications of N-acetylcysteine dosing error (hyponatremia, seizure)</td>
</tr>
<tr>
<td></td>
<td>- Error disclosure and followup</td>
</tr>
<tr>
<td></td>
<td>- objective disclosure of error to family</td>
</tr>
<tr>
<td></td>
<td>- activation of resources tasked with error investigation (supervisor / administrator; anonymous reporting)</td>
</tr>
<tr>
<td></td>
<td>- critical incident debriefing</td>
</tr>
<tr>
<td>Medical Error Detection + Correction Point #2</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>□ N-acetylcysteine infusion should be discontinued</td>
<td></td>
</tr>
<tr>
<td>□ Continued consultation with poison control center to determine further treatment</td>
<td></td>
</tr>
<tr>
<td>□ Close monitoring for complications of N-acetylcysteine dosing error (hyponatremia, seizure)</td>
<td></td>
</tr>
</tbody>
</table>
| □ Error disclosure and followup  
  - objective disclosure of error to family  
  - activation of resources tasked with error investigation (supervisor / administrator; anonymous reporting)  
  - critical incident debriefing |
| □ Discussion of acetaminophen toxicity |
| □ Formal transition of care + disposition of patient to ICU |

<table>
<thead>
<tr>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Consider differential of seizure-inducing cardiotoxic ingestions (see scenario script)</td>
</tr>
<tr>
<td>□ Consider differential of other etiologies of seizures (see scenario script)</td>
</tr>
</tbody>
</table>
| □ Diagnostic evaluation  
  - electrocardiogram (EKG)  
  - selected toxicologic assays (e.g. cocaine, lithium)  
  [ head computed tomogram (CT) ]  
  [ lumbar puncture (LP) ] |
1. Toxicologic ACLS as indicated
   - airway management (endotracheal intubation)
   - ventilatory support (mechanical ventilation)
   - circulatory support (IV access + fluids, lidocaine / dopamine infusions, defibrillation / cardioversion)
   - gastric decontamination (activated charcoal administration after airway protection; ? gastric lavage)
   - seizure management (benzodiazepines, barbiturates; avoidance of phenytoin)
   - toxicologic expert consultation

2. Recognize TCA OD and administer sodium bicarbonate; check arterial blood gases

3. Formal transition of care with report of patient presentation, resuscitative events, treatment

<table>
<thead>
<tr>
<th>2</th>
<th>HISTORY / PHYSICAL EXAM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient report and acceptance</td>
</tr>
<tr>
<td></td>
<td>Acquisition and acknowledgement of all vital signs</td>
</tr>
<tr>
<td></td>
<td>Performance of history and exam targeted to situation and patient presentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>DISEASE PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>acetaminophen overdose</td>
</tr>
<tr>
<td></td>
<td>N-acetylcysteine dosing error</td>
</tr>
<tr>
<td></td>
<td>tricyclic antidepressant overdose (optional)</td>
</tr>
<tr>
<td></td>
<td>Rapid recognition of disease process with appropriate management actions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>DIFFERENTIAL DIAGNOSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>see scenario script</td>
</tr>
<tr>
<td></td>
<td>Proper consideration of alternate diagnoses and precipitants</td>
</tr>
<tr>
<td></td>
<td>Avoidance of premature diagnostic closure</td>
</tr>
<tr>
<td>5</td>
<td><strong>PRESENTATION SKILLS / INTERPERSONAL RELATIONS</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>□ Authority gradient</td>
<td></td>
</tr>
<tr>
<td>□ Conflict resolution</td>
<td></td>
</tr>
<tr>
<td>□ Transition of care</td>
<td></td>
</tr>
<tr>
<td>□ Error disclosure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safe medication ordering + error reduction during patient care</td>
</tr>
<tr>
<td></td>
<td>Respectful interaction with staff</td>
</tr>
<tr>
<td></td>
<td>Succinct and complete verbal presentation to accepting personnel</td>
</tr>
<tr>
<td></td>
<td>Objective disclosure of error to patient / family</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th><strong>SCENARIO SYNTHESIS / COGNITION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recognition of potentially critical patient state and need for emergent treatment</td>
</tr>
<tr>
<td></td>
<td>Awareness of unresolved issues</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th><strong>EXPERTISE / LEADERSHIP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manages scenario and leads team members with fluency, automaticity, simultaneity, rapidity and knowledge base</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>X</th>
<th><strong>INVESTIGATIVE PROBE:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Incorrect medication order is detected by treatment team and corrected</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B  Module 3 BARS Teamwork Behavioral Ratings

Note: Team Dimensions Rating Form not included due to copyright issues.
# Appendix C  Module 3 Scenario Setup Checklist

key: **solid text** - minimum requirements

**light text** - optional

## A. Environment

<table>
<thead>
<tr>
<th>Environment</th>
<th>Emergency Department (pediatric / general)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bed</td>
<td>Emergency Department stretcher</td>
</tr>
<tr>
<td>actor roles</td>
<td>Parent (mother)</td>
</tr>
<tr>
<td></td>
<td>ED attending physician</td>
</tr>
<tr>
<td></td>
<td>Pharmacist (expert)</td>
</tr>
<tr>
<td></td>
<td>Toxicology consultant (expert)</td>
</tr>
<tr>
<td>personnel</td>
<td>Manikin operator / Audiovisual technician</td>
</tr>
<tr>
<td></td>
<td>Facilitator x 1-2</td>
</tr>
<tr>
<td></td>
<td>Actor x 2-3</td>
</tr>
<tr>
<td>patient medical forms</td>
<td>(included in package)</td>
</tr>
</tbody>
</table>

## B. Advanced medical simulation pediatric manikin

<table>
<thead>
<tr>
<th>Gender</th>
<th>male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing</td>
<td>age-appropriate clothing</td>
</tr>
<tr>
<td>moulage / props</td>
<td>22g IV right arm</td>
</tr>
<tr>
<td>programming</td>
<td>Laerdal SimBaby scenario (included in package)</td>
</tr>
<tr>
<td>other manikin systems</td>
<td>will require on-site programming</td>
</tr>
</tbody>
</table>

## C. Medical equipment

- **pediatric patient assessment equipment**
  - blood pressure cuff
  - cardiac monitor / defibrillator (incl. electrodes, defib gel, recorder paper)
  - EKG machine
  - pulse oximeter
  - stethoscope

- **standard pediatric resuscitation equipment (“code cart” / “crash cart”)**
  - protective equipment (gloves, goggles, gowns)
  - CPR board
  - basic airway management devices
    - oropharyngeal airway (OPA; assorted)
    - nasopharyngeal airway (NPA; assorted)
    - bag-valve mask (pediatric)

DE-IDENTIFY IMAGES AND PROPS TO COMPLY WITH HIPAA REGULATIONS!!!
- intubation equipment
  - laryngoscope handles / blades / batteries (assorted)
  - water-based lubricant
  - endotracheal tubes (assorted)

- intravenous access equipment
  - tourniquets
  - gauze pads
  - intravenous catheters (assorted)
  - intravenous fluid tubing drip sets (micro + macro)
  - intravenous fluid bags (normal saline)
  - phlebotomy supplies
  - sterile saline for flushes
  - stopcocks and connectors

- dressings (assorted)
- naso-/oro-gastric tubes (assorted)
- nebulizer
- oxygen source
- oxygen delivery devices (face masks, nasal cannulas)
- syringes (catheter tip; assorted)
- syringes (lavage tip)
- tape
- urinary catheters (assorted)
- ventilator
- wall suction and suction tubing (Yankower and tracheal suction)

- medications (pediatric concentrations)
  - general medications
    - adenosine
    - amiodarone
    - atropine
    - dextrose (D5 / D10 / D25)
    - dopamine infusion
    - epinephrine
    - lidocaine
    - sodium bicarbonate

  - toxicology medications
    - activated charcoal (mixed in with chocolate milk)
    - N-acetylcysteine (oral formulation)
    - N-acetylcysteine (parenteral formulation)

  - rapid sequence induction / intubation medications (institution-specific)
    - e.g. etomidate / midazolam / ketamine
    - e.g. succinylcholine / vecuronium
D. Radiographs, electrocardiograms, and other patient data
   (included in package)
   □ laboratory values

E. For optional tricyclic antidepressant (TCA) overdose section:
   □ general medications
      □ adenosine
      □ amiodarone
      □ atropine
      □ dextrose (D5 / D10 / D25)
      □ dopamine infusion
      □ epinephrine
      □ lidocaine
      □ sodium bicarbonate
   □ EKG: widened QRS (> 0.25 second)
   □ CXR: intubated
EMERGENCY DEPARTMENT RECORD

PATIENT NAME: TIERSEN, Samuel
DATE OF BIRTH: 18 months old
MEDICAL RECORD NO.: 1778434

Triage Assessment: Tylenol ingestion

TIME IN: 
TIME OUT: 
ADMIT:

TIME, PLACE OF ACCIDENT OR ILLNESS
MODE OF ARRIVAL: ambulance
BROUGH BY: county EMS

ALLERGIES: SB

MEDICATIONS: none

IMMUNIZATIONS UP-TO-DATE

MEDICATIONS:

BARRIERS TO COMMUNICATION: SIGHT, HEARING, LANGUAGE (IF NOT ENGLISH)

INTERPRETER

LMP

CAD     IDDM  ASTHMA  GERD / ULCER  PSYCH  OTHER ________________
HTN     NIDDM  COPD  SEIZURES  MIGRAINE
MI      CHF  BACK PAIN  CANCER  SMOKER
CABG____ STENT____
FSBS____ AT _____  BREATHEALYZE____ AT _____  EKG AT _____

REGISTRATION CLERK NAME: 
TRIAGE RN SIGNATURE: SB

TIME

TIME

CRITICAL CARE TIME: ______
RESIDENT'S HX REVIEWED

Diagnosis:

ADMIT TO: PHYSICIAN 1  PHYSICIAN 2
**Community Hospital**  
A Standard Medical Corporation Partner

**EMERGENCY DEPARTMENT FLOW SHEET**

**PATIENT NAME:** TIERSEN, Samuel  
**DATE OF BIRTH:** 18 months old  
**MEDICAL RECORD NO.:** 1778434

| SHEET ____ OF ____ |

**Vital Signs:**

<table>
<thead>
<tr>
<th>TIME</th>
<th>TEMP</th>
<th>PULSE</th>
<th>RESP</th>
<th>BP</th>
<th>PULSE OX</th>
<th>INITIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IVs:**

<table>
<thead>
<tr>
<th>AMOUNT + TYPE</th>
<th>ADDED MEDICATIONS</th>
<th>CATH</th>
<th>SITE</th>
<th>RATE</th>
<th>TIME</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Medications:**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DOSE</th>
<th>ROUTE</th>
<th>SITE</th>
<th>RATE</th>
<th>TIME</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Nursing Assessment:**

<table>
<thead>
<tr>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**NURSE 1**  
**NURSE 2**  
**NURSE 3**
**EMERGENCY DEPARTMENT ORDER SHEET**

**PATIENT NAME:** TIERSEN, Samuel  
**DATE OF BIRTH:** 18 months old  
**MEDICAL RECORD NO.:** 1778434

### Tests:
- CBC
- URINALYSIS
- URINE DIP
- AMYLASE
- ALT
- AST
- LFT
- PT / PTT
- CPK / TROPONIN
- CHEM7 / BMP
- UCG
- LACTATE
- ABG
- Mylase
- Lipase
- WOUND
- SPUTUM
- OTHER
- TOXICOLOGY SCREEN
- SERUM
- URINE
- ALCOHOLS
- TYPE + SCREEN
- TYPE + CROSS
- EKG

### Imaging Tests:
- XRAY: C-SPINE CHEST PELVIS TLS EXTREMITY
- CT SCAN
- ULTRASOUND
- MRI

### IVs:

<table>
<thead>
<tr>
<th>AMOUNT + TYPE</th>
<th>ADDED MEDICATIONS</th>
<th>CATH</th>
<th>SITE</th>
<th>RATE</th>
<th>TIME</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Medications:

<table>
<thead>
<tr>
<th>NAME</th>
<th>DOSE</th>
<th>ROUTE</th>
<th>SITE</th>
<th>RATE</th>
<th>TIME</th>
<th>MD SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucomyst / N-AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First infusion</td>
<td>3mL/kg (39mL) of Mucomyst 20% to make 200mL of 200mL of dextrose 5% solution, administered over 40 minutes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second infusion</td>
<td>10mL/kg (130mL) of Mucomyst 20% to make 500mL of dextrose 5% solution, administered over 4 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third infusion:</td>
<td>20mL/kg (260mL) of Mucomyst 20% to make 1000mL of dextrose 5% solution, administered over 16 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Finlay MD</td>
</tr>
</tbody>
</table>
Appendix E  Module 3 Patient Laboratory Values

Module 3 Complete Blood Count

White Blood Cell (6.0-17.0) K/uL:  10.5
Hemoglobin (10.5-13.5) G/DL:  12.2
Hematocrit (33.0-39.0) %:  36.7
Platelet (150-300) K/uL:  245
Module 3 Chemistry Panel

Na⁺ (133-146) MEQ/L: 142
K⁺ (3.4-4.7) MEQ/L: 4.1
Cl⁻ (98-107) MEQ/L: 104
CO₂ (16-24) MEQ/L: 19
BUN (5-18) MG/DL: 15
Creat (0.3-0.7) MG/DL: 0.6
Glu (60-100) MG/DL: 88

Serum toxicology screen: pending

Serum APAP level (<10) MG/L: 55
Module 3 Urinalysis

Urinalysis: normal

Urine toxicology screen: pending
Appendix F  Module 3 SimBaby v1.2 Scenario Programming

Patient: Tiersen, Samuel
Monitor: Default Layout

**Initial State**
- Sinus Rhythm: 111 bpm
- Apneic
- Monitor Controls
- SpO2: 90
- eCO2: 34 mmHg
- T: 36.5°C
- Respiration: 22
- CO2 Exhalation: Off
- Breathing pattern: Normal
- Chest rise: Normal
- Blood Pressure: 98/62, No gap

Comment: STABLE STATE (PT ***STAYS*** IN THIS SCENARIO UNLESS OPTIONAL TCA ***STARTED***)

---

**Frame 1**
- Trend Max/Min
- SpO2: 100/79
- BP Sys.: 105/62
- BP Dia.: 56/32
- HR: 175/95
- RR: 50/22
- Stat. Trend: module 3 worse (Start: 0 min)

Comment: ***OPTIONAL***: UNIDENTIFIED CONCURRENT OVERDOSE OF TRICYCLIC ANTI-DEPRESSANTS - VENTRICULAR ARRHYTHMIAS - HEMODYNAMIC INSTABILITY - SEIZURE ACTIVITY

adequate TCA mana|FT=0.00

---

**Frame 3**
- Ventricular Tachycardia (VT): 157 bpm, PEA

Comment: OPTIONAL: VTACH STATE CLINICAL IMPROVEMENT REQUIRES AIRWAY MANAGEMENT, ELECTRICAL THERAPY, AND NAHCO3.

adequate TCA mana|FT=2.00

---

**Frame 7**
- Trend Max/Min
- SpO2: 96/95
- BP Sys.: 92/65
- BP Dia.: 66/37
- HR: 163/112
- RR: 49/33
- Stat. Trend (stop others): module 3 better (Start: 0 min)

Comment: RAPID IMPROVEMENT AFTER ADEQUATE TCA MANAGEMENT

---

**Frame 6**
- Asystole: 0 bpm

Comment: ASYSTOLE STATE

---

**Frame 4**
- Ventricular Fibrillation (VF): 0 bpm

Comment: PRE-TERMINAL VFIB STATE

adequate TCA mana|FT=1.00

---

Screenshot images used with permission from Laerdal Medical Corp.
Module 3 SimBaby v1.2 Scenario Trends

Screenshot images used with permission from Laerdal Medical Corp.