

- I. **Title:** U/SS case 4
Hypotensive Female with Ruptured Ectopic Pregnancy
- II. **Date Created:** January 22, 2006
Date Revised: December 8, 2006
- III. **Category:** Ultrasound Simulation; Teamwork / Resident Core Curriculum; ACLS
- IV. **Target Audience:** undergraduate and graduate medical trainees and staff,
nurses, paramedics
- V. **Learning Objectives or Assessment Objectives**
 - A. Primary -
 - a.) recognition and management of non-trauma hypotensive patient
 - b.) recognition and management of ruptured ectopic pregnancy (EP) causing hemodynamic instability or collapse
 - c.) integration of bedside ultrasonography into an organized medical resuscitation
 - d.) deployment of teamwork behaviors
 - B. Secondary -
 - a.) appropriate airway management
 - b.) appropriate circulatory support
 - c.) appropriate consultation and disposition
 - C. Critical actions checklist (see Appendix A)-
 - 1. Simple checklist of critical actions
 - a.) recognition of unresponsiveness
 - b.) recognition of respiratory dysfunction (hypoxia)
 - c.) recognition of impending circulatory failure
 - d.) call for help
 - e.) establishment of team structure with role assignment
 - f.) deployment of appropriate communications and teamwork behaviors
 - g.) basic airway management (100% oxygen administration with bag-valve-mask ventilation)
 - h.) advanced airway management (endotracheal intubation or laryngeal mask airway deployment, placement confirmation and securement, ventilator management)
 - i.) advanced circulatory support (cardiac monitor, fluid hydration)
 - j.) non-trauma hypotension evaluation and management (reviews differential diagnosis, implementation of specific testing and treatment)
 - k.) recognition of pregnancy (+ urine or beta HCG)
 - l.) Foley placement to maximize bedside ultrasonography yield

- m.) recognition of ruptured ectopic pregnancy as possible source of hypotension in non-trauma young female patient; use of bedside ultrasonography to assess for ectopic pregnancy
- n.) early consideration of packed red blood cell (PRBC) transfusion
- o.) supportive therapies upon improvement of circulatory function
- p.) emergent OB/GYN consultation
- q.) disposition to operating room (OR)

- 2. Optimal sequence of critical actions- expected sequence as above
- 3. Duration to critical actions- resuscitation to be completed within 20-25 minutes of starting scenario
- 4. Behavioral ratings- see Appendix A

VI. ACGME Competencies Assessed

- A. Patient Care
- B. Medical Knowledge
- C. Interpersonal/Communication Skills

VII. Environment and Props

- A. Lab Set Up – Emergency Department in simulation center / lab
- B. Manikin Set Up –
 - a.) advanced medical simulation manikin
 - b.) female patient moulage with street clothing
 - c.) lines needed: bilateral antecubital 18g IVs
 - d.) drugs needed: PRBC, fluid (NS)
- C. Props – see “USS CASE 4 IMAGES” folder (basic airway and code blue cart is assumed)
 - a.) ECGs: sinus tachycardia 150
 - b.) bedside ultrasound: fluid in Morrison’s Pouch; empty uterus
 - c.) Foley: 300cc fluid
 - d.) special airway equipment (laryngeal mask airway [LMA])
- D. Distractors – none

VIII. Simulation Personnel and Assigned Roles (Faculty, Actors, etc)

- A. Roles – paramedic x 1-2, nurse x 1, OB/GYN consultant
- B. Who may play them – other residents, other students, actors
- C. Action Role – supportive (see narrative)

IX. Case Narrative (describes what the learner will experience)

A. Paragraph narrative overview of case and how case starts-

At 5pm, EMS brings in a 23 year old woman who was at home with roommates when she went to the bathroom. Friends heard a loud noise and found the patient unresponsive in the bathroom; her roommates called 911. The patient had a faint pulse as per EMS, and was brought, boarded and collared with 2 large bore peripheral access to the ED.

B. Board format overview of patient:

1. Name/Age/Sex: Joan Franklin, 23 year old female
2. Mode of arrival: EMS
3. Accompanied by: Roommates (can be in waiting area until later)
4. Triage Note: n/a
5. Chief Complaint: [syncope/hypotension]
6. Past Medical History: none
7. Medications and Allergies: **BCP**, no known allergies
8. Family and Social History: n/a
9. Patient's Initial Exam:

Vital signs: heart rate: **142 bpm**
blood pressure: **82/45**
respiratory rate: 14
oxygen saturation: **94%**
temperature: 98.4

Airway: **moaning, not responsive to verbal stimuli**
Breathing: **poor spontaneous effort**
Circulation: **weak femoral pulses, warm extremities**

Secondary Exam: young female
HEENT: **contusion to chin**
Neck: no JVP noted
Lungs: clear bilateral
Cardiac: **tachycardic**
Abdomen: **peritoneal**
Extremities: warm
Neurologic: **GCS 9 (E2/V3/M5)**. pupils 5mm

Additional information:

Fingerstick blood sugar: normal

EKG: **rapid narrow complex rhythm 140-150s**

CXR: normal

Bedside FAST: **+fluid in right upper quadrant (Morrison's Pouch)**

Bedside abdominal ultrasound: **gestational sac present with
no yolk sac or fetus
(i.e. pseudogestational sac)**

PCP: None

- C. Flow diagram with branch points, times of expected interventions and reactions from Sim Man with notes (see Appendix A + B)

Case progression:

1. Uncooperative hypotensive young female in extremis.
Despite fluid hydration, continues to be hypotensive.
2. Basic ATLS protocol to exclude a traumatic cause of hypotension.
3. FAST exam noted to show fluid in RUQ indicating intraabdominal hemorrhage as cause of hypotension. Can perform quick abdominal ultrasound to show empty uterus.
4. Aggressive crystalloid and colloid infusion with call to OB/GYN for urgent consultation.
5. If early aggressive management of hypotension not addressed, patient can go into PEA arrest in about 10 minutes.

Optional: Inability to intubate -> LMA

- D. Distracters in case: patient on BCP

- E. Trends needed: (see Appendix B)

X. Instructors Notes (what the instructor must do to create the experience)

- A. Tips to keep scenario flowing in lab and via computer
 - presentation of patient in extremis hypotension.
 - lulls in activity may be broken with entry of EMS and/or roommates
- B. Tips to direct actors- as above
- C. Scenario programming- see Appendix B
 1. Optimal management path
 2. Potential complications path(s)
 3. Potential errors path(s)
 4. Program debugging

XI. Debriefing Plan

A. Method of debriefing

1. This is the classical situation of a non-trauma hypotensive episode in a young female. Aggressive resuscitation with a quick FAST exam and pregnancy test can help obtain definitive therapy to stop bleeding (OR). Early resuscitation with crystalloid and colloid, with emergent OB/GYN consultation can prevent patient from hypotensive arrest.

2. Debriefing Topics

a.) didactic content

- airway management
 - indications and technique of endotracheal intubation
 - indications and technique of LMA use
- ruptured ectopic pregnancy
 - presentation
 - vaginal bleeding (?), abdominal pain and + pregnancy test
 - *may* have profound hemodynamic instability
 - evaluation
 - role of bedside FAST to assess presence of intra-abdominal bleeding
 - formal ultrasonography if patient is stable
 - treatment
 - hypotension
 - aggressive hemodynamic resuscitation
 - early goal-directed use of bedside ultrasonography
 - early OB/GYN consultation
 - disposition
 - operation as definitive management of unstable ruptured / bleeding ectopic pregnancy
- emergency ultrasound in ? pregnant patients
 - FAST for intraabdominal fluid
 - abdominopelvic ultrasound for ? intrauterine pregnancy
- PEA
 - assessment of “electrical” cardiac activity
 - assessment of “mechanical” cardiac activity
 - differential diagnosis (reversible causes)
 - hypovolemia
 - hypoxia
 - hydrogen ion
 - hyper- or hypo-kalemia
 - hypothermia
 - tablets

- tamponade
- tension PTX
- thrombosis (coronary)
- thrombosis (PE)
- use of epinephrine (not vasopressin)
- specific interventions
 - sodium bicarbonate
 - fluid bolus
 - needle decompression: bilateral
 - pericardiocentesis: use kit
 - thrombolytics
 - rewarming: target 92deg F
- continuing (prolonged) resuscitative efforts
 - hypothermia
 - PE

b.) teamwork behaviors

- leadership
 - resuscitation leadership establishment
 - role and responsibility assignment
- collaboration
 - recognition and integration of team input
 - error recognition and correction
- communication
 - callouts of critical information
 - callbacks for confirmation of information
- situational awareness
 - continued patient reassessment
 - plan development and execution
 - task prioritization
 - workload assessment
 - team member cross-monitoring
 - requests for assistance
- professionalism

XII. Pilot Testing and Revisions

- A. Numbers of participants- 3-5 learners (1-2 leaders)
- B. Performance expectations, anticipated management mistakes
 - not getting emergent pregnancy test
 - not performing a FAST exam to look for intra-abdominal bleeding
 - resistance to OB/GYN consultation
 - premature termination of resuscitative efforts

XIII. Authors and their affiliations

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XIV. Additional Debriefing Materials:

Braun RD. Surgical management of ectopic pregnancy. In eMedicine Specialties > Medicine, Ob/Gyn, Psychiatry, and Surgery > Obstetrics / gynecology. Kavanagh JJ, Talavera F, Whitman-Elia GF et al. (eds), eMedicine Web site. Updated September 1, 2005. Available at:

<http://www.emedicine.com/med/topic3316.htm> Accessed December 11, 2006.

Farquhar CM. Ectopic pregnancy. *Lancet* 2005; 366(9485): 583-91.

Moore C. Ultrasound in pregnancy. *Emerg Med Clin North Am* 2004; 22(3): 697-722.

Sepilian V, Wood E. Ectopic pregnancy. In eMedicine Specialties > Medicine, Ob/Gyn, Psychiatry, and Surgery > Obstetrics / gynecology. Zurawin RK, Talavera F, Barnes AD et al. (eds), eMedicine Web site. Updated October 10, 2005. Available at: <http://www.emedicine.com/med/topic3212.htm> Accessed December 11, 2006.

Tang A, Euerle B. Emergency department ultrasound and echocardiography. *Emerg Med Clin North Am* 2005; 23(4): 1179-94.

Appendix A

Scenario Evaluation Form



Resident Name _____

Examiner _____

Case Title _____



Scenario Type Single Patient Multiple Patient

Critical Actions Checklist

| | Critical Action | Yes | No | Time |
|-----------|--|-----|----|------|
| 1 | recognition of unresponsiveness | | | |
| 2 | recognition of respiratory dysfunction (hypoxia) | | | |
| 3 | recognition of impeding circulatory failure | | | |
| 4 | call for help | | | |
| 5 | establishment of team structure with role assignment | | | |
| 6 | deployment of appropriate communications and teamwork behaviors | | | |
| 7 | basic airway management (100% oxygen administration with bag-valve-mask ventilation) | | | |
| 8 | advanced airway management (endotracheal intubation or laryngeal mask airway deployment, placement confirmation and securement, ventilator management) | | | |
| 9 | advanced circulatory support (cardiac monitor, fluid hydration) | | | |
| 10 | non-trauma hypotension evaluation and management (reviews differential diagnosis, implementation of specific testing and treatment) | | | |
| 11 | recognition of pregnancy (+ urine or beta HCG) | | | |
| continued | | | | |

| | Critical Action | Yes | No | Time |
|----|--|-----|----|------|
| 12 | Foley placement to maximize bedside ultrasonography yield | | | |
| 13 | recognition of ruptured ectopic pregnancy as possible source of hypotension in non-trauma young female patient; use of bedside ultrasonography to assess for ectopic pregnancy | | | |
| 14 | early consideration of packed red blood cell (PRBC) transfusion | | | |
| 15 | supportive therapies upon improvement of circulatory function | | | |
| 16 | emergent OB/GYN consultation | | | |
| 17 | disposition to operating room (OR) | | | |

| ACGME Competencies | | |
|---|--|--------------|
| Competency | Required Skill | Check |
| <i>Patient Care</i> | | |
| | Caring and respectful behaviors | |
| | Interviewing | |
| | Informed decision-making | |
| | Develop & carry out patient management plans | |
| | Performance of procedures | |
| | a) Routine physical exam | |
| | b) Medical Procedures | |
| | Work within a team | |
| | | |
| <i>Medical Knowledge</i> | | |
| | Investigatory and analytic thinking | |
| | | |
| <i>Practice-Based Learning and Improvement</i> | | |
| | Analyze own practice for needed improvements | |
| | Use of information technology | |
| | Facilitate learning of others | |
| | | |
| <i>Interpersonal & Communication Skills</i> | | |
| | Creation of therapeutic relationship with patients | |
| | Listening skills | |
| | | |
| <i>Professionalism</i> | | |
| | Respectful, altruistic | |
| | Ethically sound practice | |
| | | |
| <i>System-Based Practice</i> | | |
| | Understand interaction of their practices with the larger system | |
| | Knowledge of practice and delivery systems | |
| | Practice cost-effective care | |

Teamwork Assessment Form

Date _____ Unit _____ Team _____ Shift _____

| | |
|---|---|
| 1. Maintain Team Structure & Climate | |
| a. | Establish the leader |
| b. | Designate roles and responsibilities |
| c. | Communicate essential team information |
| d. | Resolve conflicts constructively |
| Overall rating: | |
| 2. Plan & Problem Solve | |
| a. | Engage team members in the decision making process |
| b. | Identify established protocol to be used or develop a plan |
| c. | Communicate the plan to teammates |
| d. | Cross monitor actions of team members |
| Overall rating: | |
| 3. Communicate with the Team | |
| a. | Effective use situational awareness updates |
| b. | Call out critical information during emergent events |
| c. | Use check-backs to verify information transfer |
| d. | Systematically hand off responsibilities during team transitions |
| Overall rating: | |
| 4. Manage Workload | |
| a. | Re-prioritize patients care in response to overall caseload of team |
| b. | Execute team established plan |
| c. | Balance workload within the team |
| d. | Request assistance for task overload |
| Overall rating: | |
| 5. Improve Team Skills | |
| a. | Conduct event reviews |
| b. | Conduct shift reviews |
| Overall rating: | |

| | | | | | | |
|------------------|-------------|-----------------|-------------------|-------------|------------------|-----------------|
| Very Poor | Poor | Marginal | Acceptable | Good | Very Good | Superior |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

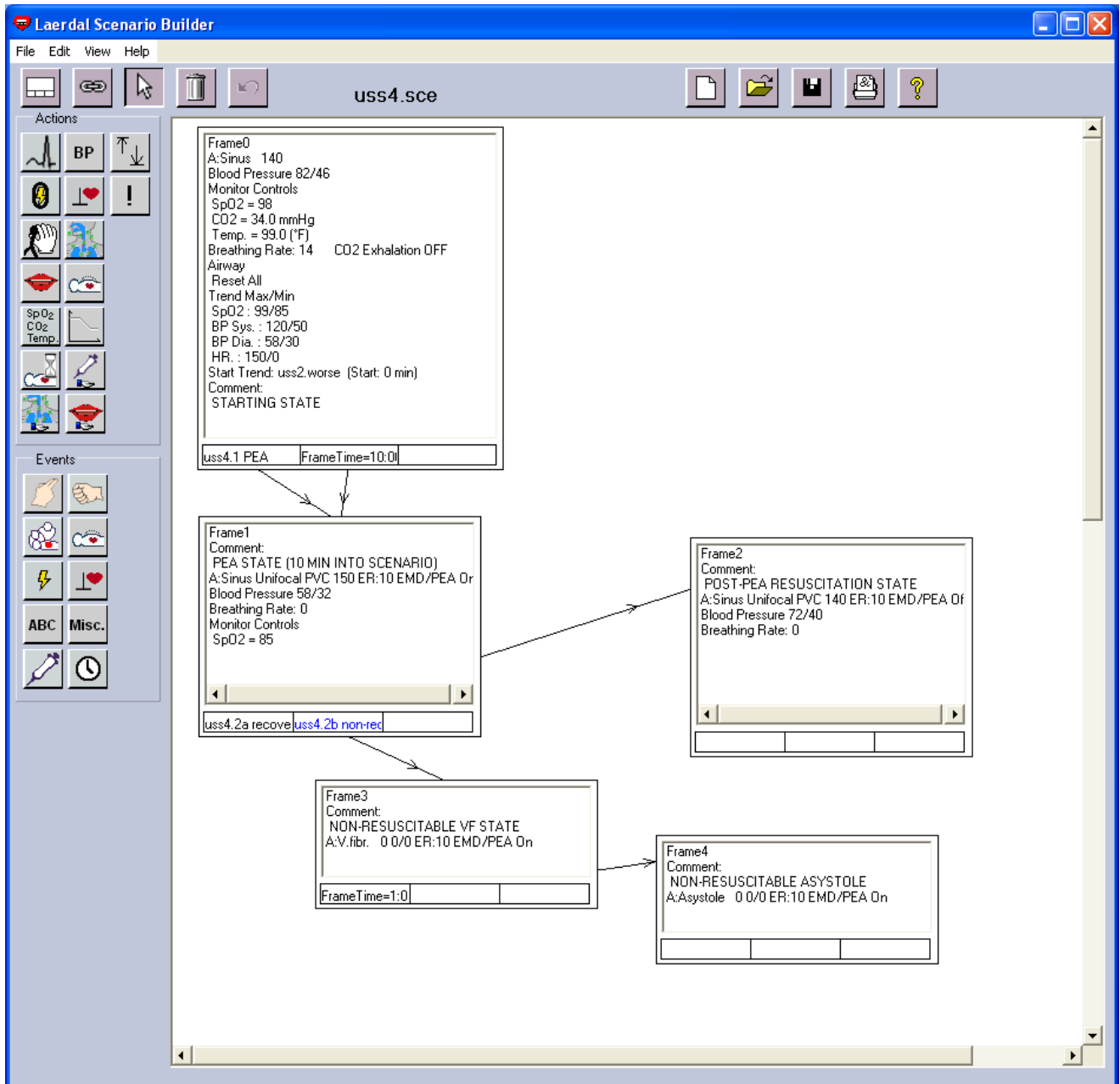
Teamwork Assessment Form

Likert Scale Descriptors

1. Very Poor
 - ❖ Teamwork principles operating minimally
 - ❖ Evidence of a hostile negative environment
2. Poor
 - ❖ Elements of teamwork observed about ten percent of the time
3. Marginal
 - ❖ Elements of teamwork observed about twenty-five percent of the time
4. Acceptable
 - ❖ Elements of teamwork observed about fifty percent of the time
5. Good
 - ❖ Elements of teamwork observed about seventy-five percent of the time
6. Very Good
 - ❖ Elements of teamwork observed about ninety percent of the time
7. Superior
 - ❖ Elements of teamwork observed ninety-eight percent of the time

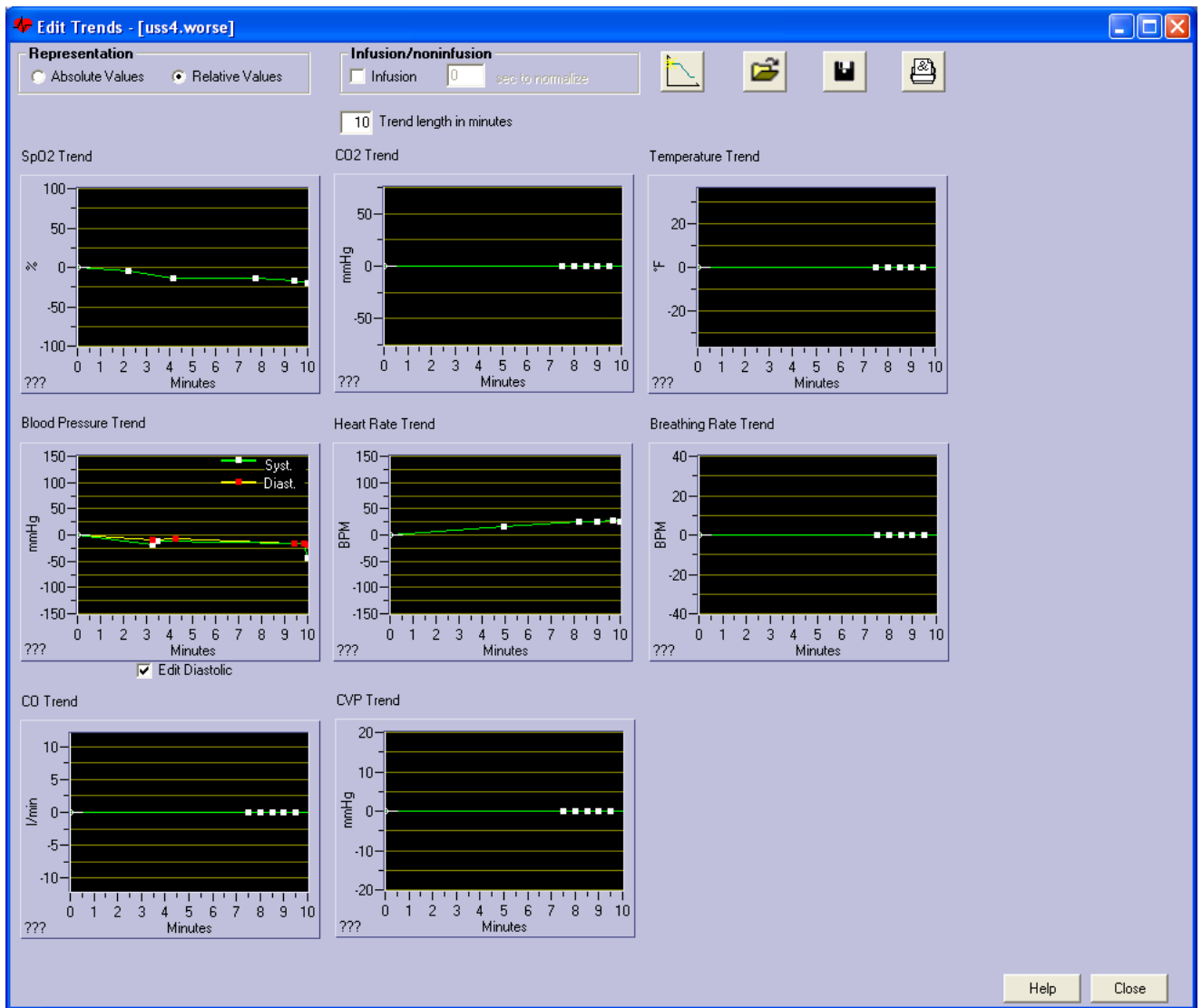
Appendix B

Laerdal SimMan v2.2 scenario content



Note: The events to force transitions to a new frame will need to be edited via the “Edit Event Menus” feature within Scenario Builder

Laerdal SimMan v2.2 trend content



Note: The trend data points will have to be entered manually via the “Edit Trends” feature.