USING THE PRINCIPLES OF FAILURE TO RESCUE IN PREVENTION OF MATERNAL HARM

Kim Werkmeister, RN, CPHQ
WHAT IS “FAILURE TO RESCUE”?
WHAT IS FAILURE TO RESCUE?

• Code Blue on the surgical floor for a patient who recently underwent knee surgery

• Patient on the medical floor who develops septic shock before we recognize a problem

• Post-partum patient who has a stroke days after delivery
FAILURE TO RESCUE

A measure of quality of care given in the hospital – the mortality rate for patients following the onset of a complication that the patient did not have at the time of admission.

Silber, Medical Care 1992;30:615-29.
WHY?

We fail as an organization to recognize early and respond appropriately to changes in a patient’s condition.

Johnston, M et.al Annal of Surg, 2014
PROGRESSIVE FAILURES

• Failure to recognize patient’s risk for mortality from complications

• Failure to recognize clinical deterioration in a timely manner

• Failure to respond to clinical deterioration

• Failure to learn from past cases
MULTI-PRONGED APPROACH PREVENTION

• Afferent Arm
• Efferent Arm
• Data Arm
• Leadership Arm
DRIVERS FOR PREVENTION OF FTR

**Afferent Arm: Crisis detection**
Implement standardized assessment tools to identify patients at risk of a serious event or complication. Develop standardized mechanisms for engaging patient family members in risk recognition.

**Efferent Arm: Crisis response**
Develop a protocol or process for obtaining resources quickly.

**Data Driven Resources**
Collection of input and feedback from providers, care teams, patients, and family members about experiences with and evaluations/reviews of events.

**Leadership support**
Implement and maintain a rapid response system structure.
AFFERENT ARM: CRISIS DETECTION

Can we identify patients at risk for rapid clinical deterioration?
THINK ABOUT IT....

How many patients seem to need a Rapid Response Team, or even a Code Blue Team, with seemingly little warning?

*How many of those patients are able to recover?*
MODIFIED EARLY WARNING SYSTEM

• Standardized risk assessment

• Early recognition of patients in trouble - *triggers*
### Modified Early Warning Score (MEWS)

<table>
<thead>
<tr>
<th>Scores</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP</td>
<td>≤70</td>
<td>71-80</td>
<td>81-100</td>
<td>101-199</td>
<td>&gt;200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>≤40</td>
<td>41-50</td>
<td>51-100</td>
<td>101-110</td>
<td>111-129</td>
<td>&gt; 129</td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>≤8</td>
<td>9-14</td>
<td>15-20</td>
<td>21-29</td>
<td>&gt;29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp.</td>
<td>≤95</td>
<td>&lt;97</td>
<td>97-99.5</td>
<td>99.6-100.4</td>
<td>&gt;100.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UO</td>
<td>zero</td>
<td>≤30 mL in last 2 hours</td>
<td>Alert</td>
<td>Rxn to Voice</td>
<td>Rxn to Pain</td>
<td>Unresponsive</td>
<td></td>
</tr>
<tr>
<td>CNS/AVPU</td>
<td></td>
<td></td>
<td>Alert</td>
<td>Rxn to Voice</td>
<td>Rxn to Pain</td>
<td>Unresponsive</td>
<td></td>
</tr>
</tbody>
</table>

### Early Warning Score Referral Pathway

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Observe</td>
</tr>
</tbody>
</table>
| 3           | Repeat V/S
              | Repeat CNS ✓
              | Calculate UO after 1 hour
              | Inform CSM. |
| 4           | Inform Attending MD if not already aware. |
| ≥5          | Call Rapid Response Team and Attending MD |

If no response, activate Chain of Command.
# DIFFERENT VISUAL TOOLS

<table>
<thead>
<tr>
<th>ZONE</th>
<th>Indicator</th>
<th>Mandatory Action</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>Any vital sign in the yellow zone or total EWS 1-5</td>
<td>Manage pain, fever or distress. Increase frequency of vital sign monitoring</td>
<td>1</td>
</tr>
<tr>
<td>ORANGE</td>
<td>Any vital sign in the orange zone or total EWS 6-7; Acute illness or unstable chronic disease</td>
<td>House officer review within 60 minutes. Discuss with nurse in charge and inform PAR nurse. Increase frequency of vital signs monitoring.</td>
<td>2</td>
</tr>
<tr>
<td>RED</td>
<td>Any vital sign in the red zone or total EWS 8-9; Likely to deteriorate rapidly</td>
<td>Registrar review within 20 minutes &amp; consider ICU referral. Inform PAR nurse, house officer and nurse in charge. Increase frequency of vital signs monitoring.</td>
<td>3</td>
</tr>
<tr>
<td>BLUE</td>
<td>Any vital sign in the blue zone or total EWS 10 or more; Immediately life threatening critical illness</td>
<td>Dial 777, state ‘Medical Emergency Team’ &amp; give your location. Support Airway, Breathing &amp; Circulation</td>
<td>MET</td>
</tr>
<tr>
<td>Vital Sign Zone</td>
<td>Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pink zone or total score 8 or more</td>
<td>Dial 777 &amp; state ‘Medical Emergency Team’ (MET): STAY WITH THE PATIENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange zone or total score 6-7</td>
<td>Registrar review within 20 minutes: inform PAR Nurse (page 6785), House Officer and Nurse in charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold zone or total score 4-5</td>
<td>House Officer review within 60 minutes: discuss with Nurse in charge and inform PAR Nurse (page 6785)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow zone or total score 1-3</td>
<td>Manage pain, fever or distress: consider increasing frequency of vital sign observations and discussion with Nurse in charge/referral for review</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A CASE STUDY IN REVIEW

“I had a 9-year-old daughter and she was diagnosed with leukemia on a Monday and she died 10 days later”
WHAT HAPPENED?

Upon admission March 6 at 1615:
Pulse 77, Resp 20, BP 105/55

24 hours later on March 7 at 1600:
Pulse 75, Resp 14, BP 101/49
Then....March 8

2000 Pulse 62, Resp 26, BP 125/80 – physician at bedside, pt c/o abdominal pain, MD documents “anxiety” and patient given Ativan

0000 Pulse 68, Resp 16, BP 125/80

0245 Pulse 118, Resp 20, BP 121/77

0315 Pulse 137, Resp 25, BP 136/84

0400 Pulse 150, Resp 23, BP 117/71

0515 Pulse 174, Resp 28, BP 181/41

MD notified at 0515, patient transferred to ICU, intubated and unresponsive
COULD WE HAVE INTERVENED EARLIER?

0245 Pulse 118, Resp 20, BP 121/77 – Early warning score = 3

0315 Pulse 137, Resp 25, BP 136/84 – Early warning score = 5

0400 Pulse 150, Resp 23, BP 117/71 – Early warning score = 5

0515 Pulse 174, Resp 28, BP 181/41 – Early warning score = 5
“ANCHORING” ON A DIAGNOSIS

- “Anxiety” – given Ativan
- *From that point on* – abdominal pain related to anxiety, diarrhea related to anxiety, level of consciousness changes related to Ativan
- *Instead of* – sudden, severe onset of abdominal pain with vital sign changes related to another disease process, decrease level of consciousness related to deterioration in condition
BUT YOU ARE TALKING ABOUT MED-SURG PATIENTS - *WHAT DOES THIS HAVE TO DO WITH OB?*
DRIVERS FOR IMPROVEMENT IN MATERNAL SAFETY
Implement standardized assessment tools to identify patients at risk of a serious event or complication. Develop standardized mechanisms for engaging patient family members in risk recognition.

Develop a protocol or process for obtaining resources quickly.

Collection of input and feedback from providers, care teams, patients, and family members about experiences with and evaluations/reviews of events.

Implement and maintain a rapid response system structure.
NHS Trigger Tool for Obstetrics:

graphical display of vital signs:
“Contact doctor if one red or two yellows”

With kind permission of Fiona McIvenney, PhD

CMQCC - California Maternal Quality Care Collaborative
# OBSTETRICS MEWS

## Modified Early Obstetric Warning System

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate (bpm)</td>
<td></td>
<td>&lt; 8</td>
<td>9-18</td>
<td>19-25</td>
<td>26-30</td>
<td>&gt; 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse rate (bpm)</td>
<td></td>
<td>&lt; 40</td>
<td>40-50</td>
<td>51-100</td>
<td>101-110</td>
<td>111-129</td>
<td>&gt; 129</td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure (mmHg)</td>
<td>&lt; 70</td>
<td>71-80</td>
<td>81-100</td>
<td>101-164</td>
<td>165-200</td>
<td>&gt; 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure (mmHg)</td>
<td>&lt; 95</td>
<td>95-104</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscious Level</td>
<td></td>
<td>unresponsive</td>
<td>responds to pain</td>
<td>responds to voice</td>
<td>alert</td>
<td>irritated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine hourly (ml/hr)</td>
<td></td>
<td>0</td>
<td>&lt; 20</td>
<td>&lt; 45</td>
<td>&lt; 45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or in 24 hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Final Score

= sum of individual scores at any one time

### Action:

- **Score 0 or 1**: Repeat observations when appropriate for clinical scenario
- **Score 2**: Inform resident on duty, consultant in charge repeat in 15 minutes
- **Score 3**: Inform resident on duty, consultant in charge and duty anesthetist
- **Score 4 ≥**: All residents and consultant doctors on duty should be informed.
  Consider informing duty consultant anesthesiologist and intensive care team.
QUESTIONS FOR THE GROUP

• Do you have some sort of early warning system at your hospital?
• What are the challenges to operating an efficient early warning system at your hospital?
• How have you improved the process?
DRIVERS FOR PREVENTION OF FTR

Prevent FTR

Afferent Arm: Crisis detection
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Leadership support
Implement and maintain a rapid response system structure
CAN WE IDENTIFY AT RISK PATIENTS EARLIER?
Readiness:

- Hemorrhage Cart / with Procedural Instructions (balloons, stitches)
- Partnership with Blood Bank
- Regular unit-based drills (with debriefs)
- Ensure rapid availability of medications
- Establish easily availability for special case resources
- Unit Education to protocols

Recognition:

- Assessment of hemorrhage risk on admission and late in labor
- Early Warning Tool for vital signs and symptoms
- Assessment of semi-quantitative CUMMULATIVE blood loss

Response:

- Unit-standard OB Hemorrhage Protocol with checklists

Prevention / Learning:

- Universal use of Active Management of 3rd Stage
- Establish a culture of Post-event Debrief / Huddle
- Review all serious cases for systems issues (mini RCA format)
Hemorrhage Risk Assessment

• Evaluation at Admission
  – Multiple gestation, macrosomia, polyhydramnios
  – History of PPH, coagulation problems, anemia
  – Prior CS, previa or abruption

• Evaluation at Late labor/2nd Stage
  – Long labor, prolonged oxytocin (>12hrs)
  – Chorioamnionitis
  – Prolonged Magnesium SO4 use

• Anticipation
  – Blood bank, back-ups
Formal Quantification of Blood Loss at Birth (QBL)

• How can we improve the clinical measurement of blood loss during vaginal and cesarean birth?

• How can communication of blood loss be improved among caregivers?
## Obstetric Hemorrhage Care Guidelines: Table Chart Format

<table>
<thead>
<tr>
<th>Stage 0</th>
<th>Assessments</th>
<th>Meds/Procedures</th>
<th>Blood Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every woman in labor/giving birth</td>
<td>Assess every woman for risk factors for hemorrhage</td>
<td>Active Management 3rd Stage:</td>
<td>If Medium Risk: T&amp;Scr</td>
</tr>
<tr>
<td>Stage 0 focuses on risk assessment and active management of the third stage.</td>
<td>Ongoing quantitative evaluation of blood loss on every birth</td>
<td>• Oxytocin IV infusion or 10u IM</td>
<td>If High Risk: T&amp;C 2 U</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fundal Massage-vigorous, 15 seconds min.</td>
<td>If Positive Antibody Screen (prenatal or current, exclude low level anti-D from RhoGam): T&amp;C 2 U</td>
</tr>
</tbody>
</table>

### Stage 1

Blood loss: >500 ml vaginal or >1000 ml Cesarean, or VS changes (by >15% or HR ≥110, BP ≤85/45, O2 sat <95%)

- Activate OB Hemorrhage Protocol and Checklist
- Notify Charge nurse, Anesthesia Provider
- VS, O2 Sat q5'
- Calculate cumulative blood loss q5-15'
- Weigh bloody materials
- Careful inspection with good exposure of vaginal walls, cervix, uterine cavity, placenta
- IV Access: at least 18gauge
- Increase Oxytocin rate, and repeat fundal massage
- Methergine 0.2mg IM (if not hypertensive)
- May repeat if good response to first dose, BUT otherwise move on to 2nd level uterotonic drug (see below)
- Empty bladder: straight cath or place foley with urimeter
- T&C 2 Units PRBCs (if not already done)

### Stage 2

Continued bleeding with total blood loss under 1500ml
### Stage 2

**Continued bleeding with total blood loss under 1500ml**

- **OB back to bedside** (if not already there)
  - **Extra help**: 2nd OB, Rapid Response Team (per hospital), assign roles
  - VS & cumulative blood loss q 5-10 min
  - Weigh bloody materials
  - Complete evaluation of vaginal wall, cervix, placenta, uterine cavity
  - Send additional labs, including DIC labs
  - If in Postpartum: Move to L&D/OR
  - Evaluate for special cases:
    - Uterine Inversion
    - Amn. Fluid Embolism

- **2nd Level Uterotonic Drugs**:
  - Hemabate 250 mcg IM or
  - Misoprostol 800-100 mcg PR

- **2nd IV Access** (at least 18 gauge)
  - Bimanual massage

**Vaginal Birth** (typical order)
- Move to OR
- Repair any tears
- D&C: r/o retained placenta
- Place intrauterine balloon
- Selective Embolization (Interventional Radiology)

**Cesarean Birth** (still intra-op) (typical order)
- Inspect broad lig, posterior uterus and retained placenta
- B-Lynch Suture
- Place intrauterine balloon

- Notify Blood Bank of OB Hemorrhage
- Bring 2 Units PRBCs to bedside, transfuse per clinical signs – do not wait for lab values
- Use blood warmer for transfusion
- Consider thawing 2 FFP (takes 35+min), use if transfusing >2u PRBCs
- Determine availability of additional RBCs and other Coag products

### Stage 3

**Total blood loss over 1500ml, or >2 units PRBCs given or VS unstable or suspicion of DIC**

- **Mobilize team**
  - Advanced GYN surgeon
  - 2nd Anesthesia Provider

- **Activate Massive Hemorrhage Protocol**
  - Laparotomy:
    - B-Lynch Suture
  - Transfuse Aggressively

**Massive Hemorrhage Pack**
- Near 1:1 PRBC:FFP
- 1 PRBC, plasma, platelets

- **Other Hemorrhage Protocols**
  - **Abnormal Placental**: 2nd OB, L&D, L&D suite
  - **Severely Injured**: OB, L&D, L&D suite
  - **Severely Injured**: OB, L&D, L&D suite

- **Blood Bank**: RBC, Plasma, Platelets

- **Other Coag Products**: FFP, Cryoprecipitate, Tranexamic Acid
Every hospital will need to customize the protocol—but the point is every hospital needs one.
“Scientists have given a new name to the deaths that occur in surgery after something goes wrong—whether it is an infection or some bizarre twist of the stomach. They call them a “failure to rescue.” More than anything, this is what distinguished the great from the mediocre. **They didn’t fail less. They rescued more.**”

- Atul Gawande

- *The New Yorker* June 2012
THANK YOU!