TRANSLATING RESEARCH(EVIDENCE) INTO PRACTICE

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Different Quality and Process Improvement Tools

- PDSA Model of Improvement
- Six Sigma - DMAIC
- CUSP
- Translating Evidence into Practice (TRIP)
Overview

• Discuss TRIP model-Translating Research Into Practice
• Apply the TRIP model to sepsis program implementation
Translating Research Into Practice

1. Summarize the evidence
2. Identify local barriers to implementation
3. Measure performance
4. Ensure that all patients receive the interventions

Envision the problem within the larger system
Engage collaborative multidisciplinary teams centrally and locally

Ensure All Patients Receive the Evidence (4 Es)¹

Ensure that all patients receive interventions

Engage
How can we engage hearts and minds?

Educate
How can we turn the evidence into behaviors?

Execute
How can we do this?

Evaluate
How do we know if we made a difference?

# 4 E’s for Implementing Change

<table>
<thead>
<tr>
<th>Engage adaptive</th>
<th>Executive Leaders</th>
<th>Team Leaders</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How Do I Make the World a Better Place?</strong></td>
<td><strong>How do I create an organization that is safe for patients and rewarding for staff?</strong></td>
<td><strong>How do I create a unit that is safe for patients and rewarding for staff?</strong></td>
<td><strong>How do I make the world a better place?</strong></td>
</tr>
<tr>
<td><strong>How do I create an organization that is safe for patients and rewarding for staff?</strong></td>
<td><strong>How does this strategy fit our mission?</strong></td>
<td><strong>How do I touch their hearts?</strong></td>
<td><strong>Do I believe I can change the world, starting with my unit?</strong></td>
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<table>
<thead>
<tr>
<th>Educate technical</th>
<th>Executive Leaders</th>
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<tbody>
<tr>
<td><strong>What Do I Need to Know?</strong></td>
<td><strong>What is the business case?</strong></td>
<td><strong>What is the evidence?</strong></td>
<td><strong>What Do I Need to Know?</strong></td>
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<tr>
<td><strong>What Do I Need to Know?</strong></td>
<td><strong>How do I engage the Board and Medical Staff?</strong></td>
<td><strong>Do I have executive and medical staff support?</strong></td>
<td><strong>Why is this change important?</strong></td>
</tr>
<tr>
<td><strong>How do I engage the Board and Medical Staff?</strong></td>
<td><strong>How can I monitor progress?</strong></td>
<td><strong>Are there tools to help me develop a plan?</strong></td>
<td><strong>How are patient outcomes likely to improve?</strong></td>
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<tbody>
<tr>
<td><strong>What Do I Need to Do?</strong></td>
<td><strong>Do the Board and Medical Staff support the plan and have the skills and vision to implement?</strong></td>
<td><strong>Do the Staff Know the plan and do they have the skills and commitment to implement?</strong></td>
<td><strong>Can I be a better team member and team leader?</strong></td>
</tr>
<tr>
<td><strong>Do the Board and Medical Staff support the plan and have the skills and vision to implement?</strong></td>
<td><strong>How do I know the team has sufficient resources, incentives and organizational support?</strong></td>
<td><strong>Have we tailored this to our environment?</strong></td>
<td><strong>How can I share what I know to make care better?</strong></td>
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<table>
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<tr>
<td><strong>How Will I Know I Made a Difference?</strong></td>
<td><strong>Have resources been allocated to collect and use safety data?</strong></td>
<td><strong>Have I created a system for data collection, unit level reporting, and using data to improve?</strong></td>
<td><strong>What is our unit level report card?</strong></td>
</tr>
<tr>
<td><strong>Have resources been allocated to collect and use safety data?</strong></td>
<td><strong>Is the work climate better?</strong></td>
<td><strong>Is the work climate better?</strong></td>
<td><strong>Is the unit a better place to work?</strong></td>
</tr>
<tr>
<td><strong>Is the work climate better?</strong></td>
<td><strong>Are patients safer?</strong></td>
<td><strong>Are patients safer?</strong></td>
<td><strong>Is teamwork better?</strong></td>
</tr>
<tr>
<td><strong>Are patients safer?</strong></td>
<td><strong>How do I know?</strong></td>
<td><strong>How do I know?</strong></td>
<td><strong>Are patients safer?</strong></td>
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</tbody>
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Translating Evidence into practice: Sepsis
First Step

The Problem:
• More than 1.7 million cases of severe sepsis in the US annually\(^3\)
• Sepsis occurs in just 10% of U.S. hospital patients, but it contributes to as many as half of all hospital deaths,
• 1 of every 2-3 deaths in hospital are the result of sepsis\(^4\)

• What is the sepsis mortality at your hospital?
• Impact of sepsis mortality on VBP?
• What is your sepsis readmission rate?

Envision the problem within the larger system
Engage collaborative multidisciplinary teams centrally and locally
Sepsis is a Public Health Problem

- Affects >1.7 million Americans per year
- 3rd leading cause of death in the US
- 1-week mortality for Medicare beneficiaries with sepsis is 18% vs 4.1% with no sepsis
- Sepsis occurs in just 10% of U.S. hospital patients, but it contributes to as many as half of all hospital deaths
- $41.5 billion spent on sepsis inpatient care and skilled nursing for Medicare beneficiaries in 2018
- 87% of all adult sepsis cases begin outside the hospital

> 700 people die each day from sepsis in the U.S.

Organize a Multidisciplinary Team

• **Members:**
  – ED, ICU, Patient Care Unit Representatives, Administration, Medical Staff, Nursing, Pharmacy, Performance Improvement, Case Management, Laboratory (should include bedside nurses)

• **Must** have nurse and physician champions from ED and ICU

• **Must** be linked in the organization’s quality or operational structure

• Team members **must** be well educated on the evidence and armed with tools and knowledge to change behavior at the bedside

• **Must** have an executive sponsor
Summarize the Evidence

What is the evidence around sepsis?

• Early recognition/screening
• Management
  – 3 hour bundle
  – 6 hour bundle
SSC Guidelines

Screening

- We recommend routine screening of potentially infected seriously ill patients for severe sepsis to increase the early identification of sepsis and allow implementation of early sepsis therapy (1C)

- Performance improvement efforts in severe sepsis should be used to improve patient outcomes (UG)

Dellinger, CCM, 2013
Screening for Severe Sepsis

- Develop screening process for ED, rapid response team, ICU and house wide
  (To screen effectively, it must be part of the nurses’ daily routines—i.e., part of admission and shift assessment)
- Education beyond PowerPoint…case studies
- Develop audit process to evaluate compliance and effectiveness
- Ensure screening process has clear “next steps” defined for nursing staff

If you don’t screen you will miss patients that may have benefited from the interventions

Schorr C. et al Journal of Hospital Medicine, 2016;11:S32-S39
Electronic Routine Screening

**Sepsis Screening Tool**

The purpose of this tool is to facilitate EARLY RECOGNITION & TREATMENT OF SEPSIS. THIS TOOL DOES NOT REPLACE CLINICAL JUDGEMENT.

### SIRS/Organ Dysfunction/Sepsis Screening Tool Retrieval

**SIRS**
- Temperature Celsius: 38.6 (09/20/2017 07:30)
- Pulse Rate: 89 (09/20/2017 07:30)

**Note:** Blood sugar > or = 140 is SIRS criteria for a non-diabetic patient.

### Retrieval Script includes:
- SIRS, Organ Dysfunction and Sepsis Screening Tool

**Temp <36 C (96.8 °F) or Temp > 38.3 (101 °F)**

**Severe Sepsis Screen**

- **Organ Dysfunction Screen**
  - No criteria identified
  - Lactic acid greater than 2 mEq/L within 12 hrs
  - Systolic blood pressure (SBP) less than 90 mmHg
  - Mean Blood Pressure (MAP) less than 65 mmHg
  - Systolic blood pressure (SBP) decrease of 40 mmHg from baseline
  - Acute respiratory failure: BIPAP or Mechanical Ventilation
  - Creatinine increase more than 0.5 mg/dL within past 72 hrs
  - Creatinine greater than 2 mg/dL in past 72 hrs not chronic kidney dx
  - Bilirubin greater than 2 mg/dL within past 72 hrs
  - Platelet count less than 100,000 K/µL within past 72 hrs
  - aPTT greater than 60 sec in past 72 hrs without anticoagulants
  - INR greater than 1.5 within past 72 hrs without anticoagulants

**A POSITIVE Sepsis Screen Result plus 1 or more signs of Organ Dysfunction = Positive SEVERE Sepsis**

**Severe Sepsis Screening Result**
- Negative SEVERE Sepsis Screen
- Positive SEVERE Sepsis Screen

**Negative SEVERE Sepsis Screen** occurs when criteria for positive screen is not met.

**Positive SEVERE Sepsis Screen Occurs when one selection is chosen once one Organ Dysfunction is identified.**

Automatically defaults to a Positive SEVERE Sepsis Screen.

**SEVERE Sepsis Screen is activated**
### GUIDELINE TITLE

### DEVELOPERS
Surviving Sepsis Campaign (SSC), Society of Critical Care Medicine (SCCM), and European Society of Intensive Care Medicine (ESICM)

### RELEASE DATE
January 18, 2017

### PRIOR VERSIONS
2012, 2008, 2004

### TARGET POPULATION
Adults with sepsis or septic shock

### SELECTED MAJOR RECOMMENDATIONS

Managing infection:
- **Antibiotics**: Administer broad-spectrum intravenous antimicrobials for all likely pathogens within 1 hour after sepsis recognition (strong recommendation; moderate quality of evidence [QOE]).
- **Source control**: Obtain anatomic source control as rapidly as is practical (best practice statement [BPS]).
- **Antibiotic stewardship**: Assess patients daily for deescalation of antimicrobials; narrow therapy based on cultures and/or clinical improvement (BPS).

Managing resuscitation:
- **Fluids**: For patients with sepsis-induced hypoperfusion, provide 30 mL/kg of intravenous crystalloid within 3 hours (strong recommendation; low QOE) with additional fluid based on frequent reassessment (BPS), preferentially using dynamic variables to assess fluid responsiveness (weak recommendation; low QOE).
- **Resuscitation targets**: For patients with septic shock requiring vasopressors, target a mean arterial pressure (MAP) of 65 mm Hg (strong recommendation; moderate QOE).
- **Vasopressors**: Use norepinephrine as a first-choice vasopressor (strong recommendation; moderate QOE).

Mechanical ventilation in patients with sepsis-related ARDS:
- **Target a tidal volume of 6 mL/kg of predicted body weight** (strong recommendation; high QOE) and a plateau pressure of ≤ 30 cm H₂O (strong recommendation; moderate QOE).

Formal improvement programs:
- **Hospitals and health systems** should implement programs to improve sepsis care that include sepsis screening (BPS).
TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION †:

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

† “time of presentation” is defined as the time of earliest chart annotation consistent with all elements severe sepsis or septic shock ascertained through chart review.
5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg

6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to table 1.

7. Re-measure lactate if initial lactate elevated.
TABLE 1

DOCUMENT REASSESSMENT OF VOLUME STATUS AND TISSUE PERFUSION WITH:

Either
• Repeat focused exam (after initial fluid resuscitation) by licensed independent practitioner can including vital signs, cardiopulmonary, capillary refill, pulse and skin findings. Or document sepsis reassessment completed

Or one of the following (for core measure after July, 2018)
• Measure CVP
• Measure ScvO2
• Bedside cardiovascular ultrasound
• Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge
Early Goal Directed Therapy

**Methodology:** 263 severe sepsis patients

- Early Goal-Directed Therapy (EGDT)
  - Continuous ScvO2 monitoring & tx with fluids, blood, inotropes &/or vasoactives to maintain:
    - $\text{ScvO2} \geq 70\%$, $\text{SaO2} \geq 93\%$, $\text{Hct} \geq 30\%$, $\text{CI/VO2}$
    - $\text{CVP} \geq 8-12$
    - $\text{MAP} \geq 65$
    - $\text{UO} \geq 0.5\text{ml/kg/hr}$

- Standard Therapy
  - $\text{CVP} \geq 8-12$
  - $\text{MAP} \geq 65$
  - $\text{UO} \geq 0.5\text{ml/kg/hr}$

Early Goal-Directed Therapy Results

28-day Mortality

- Standard Therapy: 49.2% (n=133)
- EGDT: 33.3% (n=130)

P = 0.01*

NNT = 7–8

*Key difference was in sudden CV collapse, not MODS

• 3723 patients at 138 hospitals in seven countries (all patients from the PROCESS, PROMIS and ARISE trials)

• Prior to randomization >92% of patients were identified early, and provided the 3 hour bundle (including 2L of fluid and antibiotics—given within 70 minutes of presentation to ED)

• No difference in 90 day mortality between EGDT and Usual Care groups

• Authors stated: “It remains possible that general advances in the provision of care for sepsis and septic shock, to the benefit of all patients, explain part or all of the difference in findings between the trial by Rivers et al. and the more recent trials”
In 2013, New York began requiring hospitals to follow protocols for the early identification of sepsis. From April 2014 to June 30, 2016, 49,331 patients at 149 hospitals were treated. 82.5% had the 3-hour bundle completed within 3 hours (median time was 1.3 hours). Longer time to completion of the 3-hour bundle was associated with higher risk-adjusted in-hospital mortality as well as longer time to administration of antibiotics (14% higher for both). Risk adjusted mortality decreased from 28.8% to 24.4% (p<0.001). Risk adjusted mortality decreased by 5% for every 10% increase in compliance with the 3- and 6-hour bundle. (Levy, M. AJRCC. Dec. 2018)
Identify Local Barriers

2. **Identify local barriers to implementation**

- Observe staff performing care delivery tasks
- Walk the process to identify defects at each step
- Solicit feedback from all stakeholders
- Identify potential gains or losses

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Identify Local Barriers

- Walk your process
- Perform a gap analysis between current performance and the ideal state
- Use several sources of information
  - Capture baseline data for sepsis identification and management
  - Speak with multiple providers with varying levels of expertise both in the field and in the unit
  - Seek multidisciplinary representation
1. List the process steps below each box
2. For each process step include job title of persons performing the step
3. For each queue quantify the delay time (D/T)
4. Then total each to get L/T for the overall process

If bundle is not used, describe these resuscitation components:

- Labs:
- Meds:
- IV’s:
- Monitoring:
- CVP:
- MAP:
- ScvO2:
- SV:
- Echo:
## Current State Issues

<table>
<thead>
<tr>
<th>Process Box &amp; Issue</th>
<th>Top 2 reasons why</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>1a</td>
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<td></td>
<td>1b</td>
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<td>4</td>
<td>4a</td>
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<td>4b</td>
</tr>
</tbody>
</table>
What Challenges/Process issues did you find?

- Timely antibiotics
- 30ml/kg fluid bolus
- Repeat lactate
- Sepsis reassessment

Must understand why issues exist and apply strategies to overcome them
Cause and Effect Diagram

Why is the initial 30ml/kg fluid bolus not being given

Themes:
1. Knowledge and comfort in using protocol
2. Accepting when physician doesn’t want to do protocol without going up chain of command
3. Fear of fluid in elderly, ESRD and CHF
4. Blame hypotension on other conditions
5. Unassertive RN staff

Communication
- Poor between residents and nursing staff
- Responses from physicians
- Physician aware and don’t respond and RN just accepts it
- Communication breakdown RN-RN shift report
- Not sure what they received on another unit
- Takes too long for physician to come and see the patient

Policy
- Appropriate labs not drawn/ordered
- Appears cardiogenic not septic
- "his BP has been low before" accept low BP as normal
- Unsure of baseline BP
- Delay in identifying change in condition
- Infection not suspected—other causes pursued
- Blame hypotension on other conditions or source (i.e. sedation)
- Physician pushback
- Nurse/doctor hesitant because being deferred
- Patient who hover or have unclear presentation

Environment/EMR
- Staff busy with more than one patient
- Getting orders in and charting in MAR (should treat like a code and chart later)
- Physical support especially on weekends
- Lack of documentation when fluid actually given

Material
- New intakes
- Staff not aware of sepsis protocol—doesn’t require physician order
- Unassertive RN staff—at advanced beginner stage
- Not properly using screening tool
- Fear of fluid overload of renal or CHF patients (RNs and doctors)
- Lack of education on appropriate fluid needed
- Physician not familiar with protocol and not consulting with senior

Process/critical thinking
- Give fluid over long period of time or just increase IV rate

People/knowledge
- Not trusting high lactate and continue to recheck
- Patient not symptomatic with low BP
- RN not sure where pts is on pathway
- SBP >90 but MAP < 65—Rn doesn’t know what might be in shock
- New RN a fluid of starting fluids on someone where no fluids are running
- Doctors order small amount of fluid
- Staff knowledge deficit
- Nurse like exact orders in EMR before starting interventions—causes delays

Need to elicit support of CNL and charge nurse/nurse coordinators
Measure Performance¹

Measure Performance

1. Identify metrics to define the current practice and to track progress over time
2. Collect data on current practice
3. Create a vision for desired state and share it with entire unit
4. Modify that vision through an iterative process until it reflects the unit’s shared vision
What are your outcome and process?

- Understand your volume of sepsis, severe sepsis and septic shock—look at mortality, LOS, cost, readmission
- Stratify your data by:
  - POA, non-POA
  - Medical vs surgical
  - Discharge disposition
  - Sepsis severity
- Process Metrics
  - Overall SEP-1 compliance
  - 3 hour bundle compliance
  - Each individual element compliance
Envision the problem within the larger system

Engage collaborative multidisciplinary teams centrally and locally

1. Summarize the evidence

2. Identify local barriers to implementation

3. Measure performance

4. Ensure that all patients receive the interventions

Ensure All Patients Receive the Evidence (4 Es)\(^1\)

Ensure that all patients receive interventions

- **Engage**
  How can we engage hearts and minds?

- **Educate**
  How can we turn the evidence into behaviors?

- **Execute**
  How can we do this?

- **Evaluate**
  How do we know if we made a difference?

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## 4 E’s: Implementation Framework

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Engage (adaptive)</strong></td>
<td><strong>Ask, how does this make the world a better place?</strong></td>
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<tr>
<td></td>
<td>- Help staff understand the preventable harm</td>
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<td>- Share stories about patients affected</td>
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<td></td>
<td>- Estimate number of patients harmed</td>
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<tr>
<td></td>
<td>- Develop a business case</td>
</tr>
<tr>
<td><strong>Educate (technical)</strong></td>
<td><strong>What do I need to do?</strong></td>
</tr>
<tr>
<td></td>
<td>- Convert evidence into behaviors;</td>
</tr>
<tr>
<td></td>
<td>- Evaluate awareness and agreement</td>
</tr>
<tr>
<td><strong>Execute (adaptive)</strong></td>
<td><strong>How can I do it?</strong></td>
</tr>
<tr>
<td></td>
<td>- Listen to resisters</td>
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<td>- Standardize, create independent checks</td>
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<td>- Make it easy to do the right thing</td>
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<td></td>
<td>- Learn from mistakes</td>
</tr>
<tr>
<td><strong>Evaluate (technical)</strong></td>
<td><strong>How do I know we made a difference?</strong></td>
</tr>
<tr>
<td></td>
<td>- Define measures</td>
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<tr>
<td></td>
<td>- Regularly assess measures</td>
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</table>
Engage:

How can we engage hearts and minds?

Connecting to hearts and minds

• Survivor story

https://www.youtube.com/watch?v=12Qbn
n6XfH0
Engage:

How can we engage hearts and minds?

- One person dies every 2 minutes of sepsis
- Share then number of sepsis deaths at your hospital
- Business case increased mortality, increased LOS, increased cost
- Share clinical and business case with executive champion
Educate:

How can we turn the evidence into behaviors?

What are you going to do?

- Screening - early identification
- 3 hour bundle
- 6 hour bundle
Execute:
How can we do this?

- What barriers/issues did you find on gap analysis/walk the process? Define strategies to overcome
- Listen to resisters
- Standardize—policies, algorithm, order sets
- Easy to do the right thing—pocket cards, posters, web references
- Independent checks—add to IDR
Interdisciplinary Rounds – ABCDEF Bundle & Nursing Objectives

7. **Severe Sepsis** screen result?  + or –
   - On the bundle? What goals have not been met?
8. Vasoactive Infusions
9. **Skin**: Pressure Ulcer? POA?
   - Current description of PU
10. **Foley**: Can it be removed?
    - Renew Order
11. **Lines / Tubes**:
    - Other Tubes?
    - Vascular Access?
12. **Patient Diet / Tube Feeding / Bowel Regimen**: Nutrition concerns?
13. **Restraints**: Type? Time of Order Expiration?
14. Time of scheduled procedures today? Expected labs / tests
15. **Other**: Nursing concerns
Evaluate:

How do we know if we made a difference?

- Collect process measures
- Review data at sepsis team meetings
- Define compliance targets
- Understand defects
Translating Research Into Practice

1. Envision the problem within the larger system
2. Engage collaborative multidisciplinary teams centrally and locally
3. Summarize the evidence
4. Identify local barriers to implementation
5. Measure performance
6. Ensure that all patients receive the interventions

Summary

• Must utilize/follow a process improvement framework— which every you are comfortable with
• Multidisciplinary team to do the work; engage key stakeholder
• Share the ‘WHY’ behind a needed change
• Understand your current processes and draft what the future state needs to be
• Identify barriers—and use wisdom of frontline people in the process to resolve
• Use data to drive improvement
A Healthcare Imperative

“In medicine, as in any profession, we must grapple with systems, resources, circumstances, people—and our own shortcomings, as well. We face obstacles of seemingly endless variety. Yet somehow we must advance, we must refine, we must improve.”
