Assessment of Intensive Care Performance

Prof. Assem Abdel Razek
Alexandria Faculty of Medicine
ICU is expensive
A Good ICU

- Well organized
  trust
  coordinated care
- **Full-time intensivist**: daily round
- **protocol & policies** (eg: how to DC elective operation when bed not available)
- **bedside nurses** (master degree)↑
A Good ICU

- A team: doctors, nurses, R/T, pharmacists
  - led by full time intensivists
  - critical care trained
  - available in a timely fashion (24hr/day)
  - no competing clinical responsibilities during duty
  - closed units, if resources allow
Intensive Care Performance

Good Performance

Synonym

Good Quality
INCREASING IMPORTANCE OF PERFORMANCE MEASURES IN THE HOSPITAL SECTOR

Equity under pressure?

Katrien Verleye
CONTEXT

REGULATORS AND OTHER ENTITIES

HOSPITAL’S PERFORMANCE

Internal members

Suppliers

Consumers and purchasers

Suppliers

Key Dimensions of Quality

- Appropriateness
- Availability (Access to service)
- Competency
- Continuity
- Effectiveness

- Efficacy
- Efficiency
- Respect and Caring
- Safety
- Timeliness
Effectiveness

Efficiency

Performance measures

- Staff satisfaction
- Customer satisfaction
- Growth & Development
Complex but includes elements of

- **Effectiveness**: the effect of care on Mortality and Health
- **Efficiency**: The effect per unit cost
- **Satisfaction**: Acceptability to patients, their relatives and staff, including the ability to meet external demand
To be

- safe
- Affordable to the society
- Have the ability to produce an impact on
  - Morbidity
  - Mortality
  - Disability
  - Malnutrition

WHO, 1988
Factors affecting performance

- Structure
  - Personnel and staffing
    - Equipments
    - Environments
  - Patients
Measurement of the Quality of Healthcare

- Careful Observation

- Structure

- Processes

- Out comes
Investigating the Quality of Care

It is important to maintain a distinction between structure, process and outcomes.

**Structure**
Relates to the material resources, human resources and the organizational structure of a health care organization.

**Process**
Relates to what is done to and for the patient.

**Outcomes**
Is how the process and structure allow patients to achieve desired changes in health status.
Evaluating and improving the effectiveness of our practices

Performance is more than effectiveness

Performance including
  ◦ the efficiency of our practices
  ◦ their cost–effectiveness,
both within the scope of intensive care medicine and in comparison to other health interventions
(KPIs) are the most effective tool in measuring and therefore improving business-wide performance.

- No improvement can take place without valid, accurate data.

where the organization is now

what steps can be taken to move the enterprise forward

where inefficiencies and blockages exist

showing
The Quality circle (Plan -Do-study-act)
MANAGING DATA FOR PERFORMANCE IMPROVEMENT

- Managing Data for Performance Improvement module reviews four primary steps of data management
  - 1. Collecting data
  - 2. Tracking data
  - 3. Analyzing and interpreting data
  - 4. Acting on data
Indicators

- Prevalence of Nosocomial Infection
- Morbidity and Mortality
- Incidence Reporting
- Environmental Care and Reporting
- Staffing
- Qualification
SWOT Analysis

- **Strengths**
- **Weaknesses**
- **Opportunities**
- **Threats**

**Internal Factors**

**External Factors**

**Positive**

**Negative**
Assessment Model: SWOT

Internal Assessment: Organizational assets, resources, people, culture, systems, partnerships, suppliers, . . .

External Assessment: Marketplace, competitor’s, social trends, technology, regulatory environment, economic cycles.

- Easy to Understand
- Apply at any organizational level
- Needs to be Analytical and Specific
- Be honest about your weaknesses

SWOT

Good Points
- Easy to Understand
- Apply at any organizational level

Possible Pitfalls
- Needs to be Analytical and Specific
- Be honest about your weaknesses
**SWOT**

- **Strengths** – identifying existing organisational strengths
- **Weaknesses** – identifying existing organisational weaknesses
- **Opportunities** – what market opportunities might there be for the organisation to exploit?
- **Threats** – where might the threats to the future success come from?
6 competencies to transform systems are not linear but are broad and overlapping

- Informatics
- Patient centered care
- Teamwork and collaboration
- Quality improvement
- Evidence Based practice
- Safety
Key Performance Indicators in Intensive Care Medicine. A Retrospective Matched Cohort Study

M Kastrup¹, V von Dossow¹,², M Seeling¹, R Ahlborn², A Tamarkin¹, P Conroy¹, W Boemke¹, K-D Wernecke³,⁴ and C Spies¹

¹Department of Anaesthesiology and Intensive Care, Campus Virchow-Klinikum and Campus Charité Mitte, ²IT Department, and ³Institute for Biometrics and Clinical Epidemiology, Charité University Medicine Berlin, Berlin, Germany; ⁴Sotana GmbH, Berlin, Germany.
Key Performance Indicators in Intensive Care Medicine. A Retrospective Matched Cohort Study

M Kastrup, V von Dossow, M Seeling et al.
Key performance indicators in intensive care medicine

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition</th>
<th>Specification/deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal RASS</td>
<td>Goal for sedation documented once daily</td>
<td>Days with goal RASS not documented</td>
</tr>
<tr>
<td>Measured RASS</td>
<td>Evaluation at least once daily Evaluation at least three times daily</td>
<td>Days with no documentation Days with less than three documentations of RASS values</td>
</tr>
<tr>
<td>BPS</td>
<td>Evaluation at least once daily (non-ventilated patients) Evaluation at least once daily (non-ventilated patients) Evaluation at least three times daily (non ventilated patients)</td>
<td>Days in ventilated patients with no documented BPS score Days in ventilated patients with one documented BPS score Days with at least three BPS values documented in ventilated patients</td>
</tr>
<tr>
<td>MAP values</td>
<td>No. of values &lt; 60 mmHg</td>
<td>Days with at least three documented values &lt; 60 mmHg</td>
</tr>
<tr>
<td>TV</td>
<td>TV &gt; 6 ml/kg body weight</td>
<td>Days with at least three documented values &gt; 6 ml/kg body weight</td>
</tr>
<tr>
<td>PIP</td>
<td>Inspiratory PIP ≤ 35 cmH₂O</td>
<td>Days with at least three documented PIP values &gt; 35 cmH₂O</td>
</tr>
<tr>
<td>Blood glucose</td>
<td>Blood glucose 80 – 130 mg/dl</td>
<td>Days with at least three values &gt; 130 mg/dl Days with one value &lt; 80 mg/dl</td>
</tr>
</tbody>
</table>

RASS, Richmond Agitation-Sedation Score; BPS, behavioural pain scale; MAP, mean arterial pressure; TV, tidal volume; PIP, peak inspiratory pressure.
Conclusions:

- Interventions involving palliative care, ethics consultations, and other methods to increase communication between healthcare personnel, patients, and patients' families may be helpful in decreasing length of stay in the intensive care unit.
Self Extubation lead to increase LOS

<table>
<thead>
<tr>
<th>AGH</th>
<th>Self-Extubation: Dollars and Sense</th>
</tr>
</thead>
</table>

### Decreased LOS in ICU

<table>
<thead>
<tr>
<th>Decrease in Days:</th>
<th>3.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg LOS in Days (ICU)</td>
<td>6.01</td>
</tr>
<tr>
<td>Avg Cost of Stay (ICU):</td>
<td>$44,845.00</td>
</tr>
<tr>
<td>Avg Cost/Day (ICU):</td>
<td>$7,461.73</td>
</tr>
<tr>
<td>Avg. # of ICU Patients/Yr:</td>
<td>4,991</td>
</tr>
<tr>
<td>Annual Cost W/O Intervention</td>
<td>$223,821,395.00</td>
</tr>
<tr>
<td>Annual Cost W/ Intervention</td>
<td>$93,476,156.65</td>
</tr>
<tr>
<td><strong>Annual Savings</strong></td>
<td><strong>$130,345,238.35</strong></td>
</tr>
</tbody>
</table>

### Decreased Ventilator Support

<table>
<thead>
<tr>
<th>Decrease in Days:</th>
<th>2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg Time on Ventilator in Days (ICU)</td>
<td>12.5</td>
</tr>
<tr>
<td>Cost/Day (Ventilator Support):</td>
<td>$200.00</td>
</tr>
<tr>
<td>Avg. # of Patients on Ventilator Support/Yr:</td>
<td>314</td>
</tr>
<tr>
<td>Annual Cost W/O Intervention</td>
<td>$784,393.94</td>
</tr>
<tr>
<td>Annual Cost W/ Intervention</td>
<td>$627,515.15</td>
</tr>
<tr>
<td><strong>Annual Savings</strong></td>
<td><strong>$156,878.79</strong></td>
</tr>
</tbody>
</table>

### Decreased Self-Extubation Costs

<table>
<thead>
<tr>
<th>Percent Decrease:</th>
<th>40%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Rate of Self-Extubation</td>
<td>17%</td>
</tr>
<tr>
<td>Avg Number of Self-Extubations/Year</td>
<td>102</td>
</tr>
<tr>
<td>Avg. Rate of Self-Extubation W/ Intervention</td>
<td>10.2%</td>
</tr>
<tr>
<td>Cost of Reintubation</td>
<td>$117</td>
</tr>
<tr>
<td>Annual Cost W/O Intervention</td>
<td>$11,934.00</td>
</tr>
<tr>
<td>Annual Cost W/ Intervention</td>
<td>$7,160.40</td>
</tr>
<tr>
<td><strong>Annual Savings</strong></td>
<td><strong>$4,773.60</strong></td>
</tr>
</tbody>
</table>
Avery Telehealth has a proven track record of reducing 30-day readmissions. Below you will find 2012 outcomes for patients enrolled with a discharge diagnosis of Acute Myocardial Infarction (AMI), Heart Failure (HF), Pneumonia (PNA) & Chronic Obstructive Pulmonary Disease (COPD) patients.

2013 Performance Summary

Here are our results for 2013. Our patients included AMI, HF, PNA and COPD

- Reduced AMI, HF, PNA & COPD readmissions by more than 50%
- 85% Participation Rate (one of the highest in the country)
- ER Utilization 29%
- CHF 30 day readmission rate is 4.9%
- 89% PCP Follow up Appointment Attendance
- 80% Medication Fill Rate

Check out our online webinar:

Expanding Readmission Programs to New Diagnosis
WHY IS SURVEILLANCE AND REPORTING OF NOSOCOMIAL INFECTIONS IMPORTANT?
Evaluating Staff Performance in the ICU

- Incidence of
  - VAP
  - CV Catheter–related infection
  - Mean number of days on ventilation
  - Admission duration in the ICU and in the hospital
  - Decubitus
Ventilator–Associated Pneumonia: Getting to Zero...and Staying There
Catholic Healthcare West Hospitals
with ≥ 12 Months without a Ventilator Associated Pneumonia in ICUs

- Mercy Medical Center - Merced*, CA and St. Joseph’s Hospital - Stockton, CA
- Woodland Healthcare* - Woodland, CA
- St. Rose Sierra Hospital* - Henderson, NV
- Dominican Hospital* - Santa Cruz, CA and St. Rose DeLima Hospital* - Henderson, NV
- Marian Medical Center* - Santa Maria, CA

# of Months VAP Free (through June 2006)
Patient Safety and Quality of Care in ICU

Is My ICU Safe?
Dear Ed,

Be Safe

Neil Sean.
Medical errors occur in 3% of all hospitalizations.

Most common type of medical errors occur with the ordering or delivery of medications.

Critically ill patients receive several medications and are clearly at a high risk of harm from medication error.
Incident reporting system

- Non-threatening to ICU staff
  - Anonymous
  - Voluntary
  - Legally & ethically appropriate
  - Focuses on system deficits
  - Multidisciplinary
  - Encourages team involvement
  - Cost effective

Focus on major, dangerous errors that occur relatively infrequently (vs. lower profile mistakes that occur virtually everyday)

Some adverse events do not lead to clinically relevant consequences (e.g. self extubation, ICU readmission)
Adverse event reporting in adult intensive care units and the impact of a multifaceted intervention on drug-related adverse events

Alberto Pagnamenta¹, Giovanni Rabito², Alessandra Arosio², Andreas Perren¹, Roberto Malacrida¹, Fabrizio Barazzoni³ and Guido Domenighetti¹*  
Bellinzona Switzerland

From 6,404 patients, totaling 17,434 patient days

- A total of 2,047 AEs were reported
- (32 events per 100 ICU patient admissions
117.4 events per 1,000 ICU patient days)

Pagnamenta A et al 2012
Adverse event reporting in adult intensive care units and the impact of a multifaceted intervention on drug-related adverse events

Alberto Pagnamenta, Giovanni Rabito, Alessandra Arosio, Andreas Perren, Roberto Malacrida, Fabrizio Barazzoni and Guido Domenighetti

Pagnamenta A et al 2012
Poor communication among caregivers (n = 776) and noncompliance with internal guidelines (n = 525) were the most prevalent contributing factors for AE occurrence.

The majority of AEs (n = 1155, 56.4%) was associated with minimal, temporary harm.
Fridkin and colleagues found that a reduction in the nurse-to-patient ratio from 1:1 to 1:2 independently increased the risk for catheter-related bloodstream infection.
Conflict Between Physicians

Should be Avoided

- Applying Policies and Procedures
- Treatment Protocols and Guidelines
Prognostic scores in intensive care
The Therapeutic Intervention Scoring System (TISS) and in part the Hannover Intensive Score (HIS) evaluate exclusively the amount of medical therapy required.

The TISS–Score might serve as a possible measure of resource use for the ICU portion of the hospital stay. Disease (e.g. Trauma Score, Injury of Severity Score) and patient (e.g. PRISM = Pediatric Risk of Mortality)
Environmental factors

- Noise,
- Ambient light,
- Restriction of mobility,
- Social isolation.
# Noise in ICU

## Table 1 Examples of commonplace noise levels

<table>
<thead>
<tr>
<th>Example of noise</th>
<th>Sound pressure level [dB(A)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jet aircraft taking off at 50 m/ship’s engine room</td>
<td>120</td>
</tr>
<tr>
<td>Loud music in a disco</td>
<td>100</td>
</tr>
<tr>
<td>Lawn mower at 1 m</td>
<td>90</td>
</tr>
<tr>
<td>Vacuum cleaner at 1 m</td>
<td>70</td>
</tr>
<tr>
<td><strong>Average ICU sound level</strong></td>
<td><strong>60–70</strong></td>
</tr>
<tr>
<td>Conversation at 50 m</td>
<td>55</td>
</tr>
<tr>
<td>Soft whisper in a library</td>
<td>40</td>
</tr>
</tbody>
</table>

Sleep caused by noise may become more important as a patient begins to recover from critical illness.\(^2\)
Noise from alarms and equipment is ever present on the ICU.

Reducing the volume of alarms, telephones, and intercoms should help to improve noise pollution.

Perhaps some of the equipment, or the telephones or intercom, could have a flashing light or vibrating system rather than a ring tone.
It is recognized that the human sleep–wake cycle is closely linked to the environment and, along with social cues and sounds, the light–dark cycle is probably the most powerful linking factor.
Training

- Minimal training requirements for physicians
- Minimal training requirements for nurses
- Continuous education program
- In services education for new equipments and procedures
- Duration of training and quality control
- Core skills for physicians and nurses
Adoption of Innovation

Speed of adoption

E Rogers Diffusion of Innovation 1995
ICU Performance

Personnel → Environments → Equipments → Protocols

Regular Assessment

→ Improve Outcome
ICU performance and evaluation will lead to better care and outcome

Regular Assessment of the performance will find our defect and will lead to innovation and upgrading the standards of Care.
Thank You