Two Eyes Are Better Than One

Leveraging Telemedicine in the ICU

Wendy Deibert, RN, BSN
Operations Director, Mercy SafeWatch and Executive Director Telemedicine Services

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• **Tele-ICU Overview**
  » Become familiar with a Tele-ICU program and how we assist the bedside team
  » Understand why Mercy Health developed this program
  » Discuss ICU processes impacted by the Tele-ICU program
  » Identify roles and responsibilities of ICU and Tele-ICU staff
  » Describe the Mercy SafeWatch / Tele-ICU’s potential impact on patient care & safety
Mercy SafeWatch and the Tele-ICU Program
What is a Tele-ICU program?

- **Group of subject matter experts in one room, monitoring a large group of patients, using real-time data feeds and 2-way audio/video**

- **Subject matter experts can include**
  - Physicians
  - NP, PA or Advance Practice Nurses
  - Nurses
  - Ancillary (pharmacy, wound, respiratory therapy, etc.)
VISICU/Philips was started by two Johns Hopkins Intensivists as a means to leverage resources and improve outcomes.

VISICU is located in downtown Baltimore.

The 1st operational eICU™ system was at Sentara Healthcare in Norfolk, VA in July 2000.
Currently Across the United States - eICU™ Centers

- 200 hospitals in 40 health systems across 28 states
- 300,000 patients monitored each year
- 800,000 patients served since 2000
- 10% of U.S. adult ICU patients
Why Did Mercy Health Choose The Tele-ICU Program?

Mercy’s Program Goals

» Reduce clinical complications by providing proactive care
» Acts as a patient safety initiative
» Assist the bedside caregivers
» Provide a consistent level of care to all ICU patients
» Leverage resources (Intensivists)
Who is Mercy SafeWatch?

- Largest single-hub electronic intensive care unit
- 425+ monitored beds across 13 hospitals located in four states (AR, KS, OK, MO)
- 25 ICU/Stepdown units supported
- Inception: September 2006
- Housed within the Heart and Vascular Hospital on the campus of Mercy-St. Louis
### IMPLEMENTATIONS

**Tele-ICU Core located in St. Louis, MO**

- **13 Hospitals**
- **4 States**
- **24 ICUs/Step-down Units**
- **425 Beds Monitored**

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<thead>
<tr>
<th>Site</th>
<th>Beds</th>
<th>Implementation Date</th>
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<tbody>
<tr>
<td>Oklahoma City, OK</td>
<td>36</td>
<td>September-06</td>
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<td>Ardmore, OK</td>
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<td>April-07</td>
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<td>September-07</td>
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<td>Springfield, MO</td>
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<td>March-08</td>
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<td>Mountain Home, AR</td>
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<td>St. Louis, MO (LTACH)</td>
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<td>December-10</td>
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<td>Lebanon, MO</td>
<td>6</td>
<td>November-2011</td>
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<td>Joplin, MO</td>
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<td>May 2012</td>
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Mercy SafeWatch - Medical & Nursing Staff

**Medical Staff**
- 47 Board Certified Critical Care Medicine Physicians
- 16 Neuro Critical Care Certified Physicians
- Teaching faculty & bedside clinicians
  - *Currently licensed in AR, KS, MO, OK*
  - *Epic and PowerChart experienced*

**Nursing Staff**
- 50+ Critical Care Nurses
- 24.4 average years of nursing experience
- 18.6 average years of ICU nursing experience
- Minimum 5 years of nursing experience required
  - *Currently licensed in AR, KS, MO, OK*
  - *Epic and PowerChart experienced*
Mercy SafeWatch: Staffing Model

- **Intensivists:**
  - 2 per shift, 24 hours/day, Monday-Friday
  - 24 hours/day on weekends
  - Assigned 150-200 patients, but focuses on Red Acuity patients (30-40 patients)

- **eRNs:**
  - 8-10 RNs per shift, 24 hours/day, 7 days/week
  - Assigned 30-40 patients based on acuity (stepdown/LTACH)
  - Escalates highest acuity patients to ePhysician for review/monitoring
  - Reviews Best Practices (VAP Bundle, Central Line Observations, Foley audits, etc.)
  - APACHE data/benchmark data entry/collection

- **Secretaries:**
  - 3-4 per shift, 24 hours/day, 7 days/week
  - Triage phone calls
  - Admission/discharge/transfer data entry into eCareManager
  - Monitor confused patients upon request
  - Data collection (HOB, new positive cultures, etc.)
Tele-ICU: Our Program Goals

- **24hr/day nursing support**
  - Mentor/coach new and inexperienced nurses
  - Extend/enhance nurse coverage (high fall risk, transports, etc.)
  - Nursing documentation (vital signs, drips, events, codes, etc.)
  - Verification of high risk medications or processes

- **24 hr/day physician coverage**
  - Support current plan of care or augment care
  - Emergency or rapid response
  - Off-hour support with full data base access
  - Order and note writing capabilities

- **Specialty consultative support**

- **Augment process improvement initiatives**
  - Patient safety
  - Evidence-based medicine
  - Core measures
  - Quality audits
When To Use Tele-ICU

Push me when you intubate or extubate your patient.

Push me when you do a sedation vacation.

Push me when you get a new admit or leave ICU.

Push me to do medication second signature.

Push me to do blood product second signature.

Push me when you need help or a physician.

Push me to ask a question, get information, need an x-ray read.

Push me when you get behind with documentation.

Push me when your patient is confused and requires verbal cueing.

Push me when you are just not sure what is wrong.

Push me to update the eICU on the plan of care.
**Purpose:**
- The purpose of this policy is to create an operational definition of "emergency" and rapid response process for all ICU patients

**Policy:**
- ICU staff and/or Mercy SafeWatch staff are required to make contact (eLert Button or phone call) with the other side when an emergency condition is identified

**Responsibilities:**
- In emergency situations (as defined) Mercy SafeWatch will:
  - Issue orders to address the immediate clinical problem
  - Place a call and/or page to the primary managing physician. The Mercy SafeWatch physician will make every attempt to contact and communicate directly with the managing physician. This is vitally important for optimal patient care and to avoid misunderstandings.
  - A note will be written, in the medical record, by the Mercy SafeWatch physician that will describe the situation and interventions taken

**The physiologic disturbances listed below will constitute an emergency:**

**HEART RATE:**
1. Greater than 140 beats /per minute in a patient with known heart disease or Age > 50
2. Less than 50 beats /minute with symptoms of hypoperfusion or evidence of complete heart block

**BLOOD PRESSURE:**
1. Less than 80mm Hg systolic or less than 90mmHg if this constitutes a 20% drop from previous hour’s (> 110) systolic blood pressure ( < 50 MAP, < 60 if 20% drop ).
2. Systolic Blood pressure > 220mmHg or Diastolic Blood pressure >120mmHg

**RESPIRATORY DISTRESS:**
1. Sustained (> 5 minutes) arterial desaturation to SaO2 <86% or
2. PCO2 >70 torr and ph<7.20 or
3. Respiratory rate >35 per minute
4. Respiratory rate < 8 per minute

**POTASSIUM:**
1. Potassium < 2.5 mmol/l or
2. Potassium < 3.0 mmol/l with Ventricular ectopy or
3. Potassium > 6.0mmol/l

**NEUROLOGIC**
1. Active Generalized Seizure
2. Sustained intra cranial pressure > 30 cmH2O
3. Acute decrease in Glasgow coma score by 2 with absolute value < 12

**METABOLIC**
1. Glucose >1000mg/dl or < 40mg/dl
2. PH < 7.0
Tele-ICU: “WE ARE NOT”

- Big Brother
- Revenue Generator – eICU™ physician cannot bill for services
- Does not replace bedside physicians or nurses
- Does not dictate to or take away control from the on-site physician
- On-site physician always has ultimate decision making authority
Tele-ICU Tools
Integration - Technology

[Images of medical equipment and technology]

[Images of medical professionals using technology]

[mercy safe watch logo]
Points of Integration

- ICU
- Emergency Department
- PACU
- Rapid Response
Mercy SafeWatch
Performance
Experience To Date

- **Potential to Improve Safety and Quality**
  - Dramatic examples that affect individual patients but impact only a few
  - Rapid Response – when appropriate
  - Mundane examples that affect many individuals and impact overall outcomes

- **Examples of Opportunity**
  - Redefining Emergency (Urgency)- Early resuscitation
  - Practice Variation (Surviving Sepsis/ ALI)
  - Evidence-based Medicine Performance (DVT & VAP)
  - Revise eICU workflow to address missed events

*Addressing these areas of opportunity will require time, relationship building and cultural changes*
**People Served**

More than **140,000** eICU patients in four states over five years.

- **4,900** KS
- **78,240** MO
- **18,400** OK
- **44,540** AR

**Performance Improvement**

**Ventilator Associated Pneumonia (VAP) Cases and VAP Bundle Compliance**

- **$20k/case**

**Clinical Trends that impact cost [4 states]**

- **Mercy is saving approximately $25 million annually** by reducing length of stay.
- **>1,500 patients** have gone home that weren’t expected to.

**Hospital Mortality**

- Mortality rates 30% below expected

**Hospital Length of Stay**

- 20% reduction in LOS at savings of $900/day

**APACHE Predicted**

*APACHE IV predictions began*

**People Served**

- **44,540** in 2008
- **4,900** in 2009
- **18,400** in 2010
- **78,240** in 2012

**More than 140,000 eICU patients** in four states over five years.
4th QTR 2010: Change in CDC Definition requiring inclusion of aspiration on intubation in VAP totals, resulting in a potential increase in VAP cases across the country.
While we have yet to achieve our goal of zero, on average we are performing **26% better** than the national benchmark.
NON-MERCY HOSPITAL – PRE / POST EICU IMPLEMENTATION
APACHE Summary Actual : Predicted Ratios

- 635 chart APACHE data abstraction, one year prior to eICU go-live, Qtr 4 2008 - Qtr 3 2009
- eICU real-time APACHE data collection, Qtr 4 2009 - Qtr 3 2010
### NON-MERCY HOSPITAL – PRE / POST EICU IMPLEMENTATION

APACHE Summary Actual : Predicted Ratios

<table>
<thead>
<tr>
<th>NON-MERCY ICU</th>
<th>APACHE SCORE</th>
<th>Actual to Predicted Ratios</th>
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<tr>
<td></td>
<td></td>
<td>ICU MORTALITY</td>
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<tr>
<td>Pre (Q4 2008 - Q3 2009)</td>
<td>49.7</td>
<td>1.45</td>
</tr>
<tr>
<td>Post (Q4 2009 - Q3 2010)</td>
<td>50.1</td>
<td>0.62</td>
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Shown in the table above are the actual to predicted ratios comparing pre and post implementation results. All showed improvement post implementation.
Disaster Management
Tornado Damage Ardmore, OK Feb 2009

This one was classified as an F4
Tele-Stroke
Mercy’s Stroke Collaborative
eCAREMANAGER – STROKE PROFILE

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**Stroke Timeline**

- **16:30**: Active Dx/Rx
- **16:30**: Vital Signs
- **16:30**: Flowsheet
- **16:30**: Laboratory
- **16:30**: Respiratory
- **16:30**: Microbiology
- **16:30**: Media-Update
- **16:30**: Order-Update
- **16:30**: Notes-Update
- **16:30**: The Source

**Care Timeline**

- **17:22**: Care Plan
- **18:30**: Line Log
- **18:30**: Medications
- **18:30**: Orders-Create
- **18:30**: Notes-Create
- **18:30**: Image
- **18:30**: Patient Registry

**Care Goals**

- **18:30**: PhysIC
- **18:30**: Consult
- **18:30**: IFA

**Configure Time**

- **19:00**: Physician
- **19:00**: Consult
- **19:00**: IFA

**Condition and Treatment**

- **NIHSS Scores**
- **Radiology**
- **Dysphagia Screen Fail**
- **NPO until**
- **Dysphagia Screen Passed**
- **LOC**
- **Patient Symptoms**
- **Treatments**
- **Eligible for IFA**
- **Admin IFA**
- **IFPA (IV) Dose**
- **Notes**

**Diagnosis**

- **Previous Stroke**
- **Known Hypertension**

**Laboratory**

- **HGB**: n/a
- **PLT**: n/a
- **PT**: n/a
- **INR**: n/a
- **PTT**: n/a
- **Cr**: n/a
- **BUN**: n/a
- **GLU**: n/a

**Care Guidelines - Stroke**

- **ED Assessment**
- **Diagnoses**
- **Consultant Review**
- **Treatment**
- **Disposition**

**VS Timer**

- **Overdue**
Through the latest telemedicine technologies, the Virtual Care Center will serve as a hub for our Mercy physicians and nurses to enhance care to those who:

- Live in under-populated areas and may not have the specialist they require to get the care they need
- Need a consultation from a specialist
- Require monitored care
- Continue to heal at home

Mercy Ongoing Telemedicine Projects

- SafeWatch/Tele-ICU
- Stroke/Neurology
- Palliative Care
- Perinatal Outreach
- Home Monitoring
- Diabetic retinal Screening
- Psychiatry
- Headache
- Language & Hearing
- Pediatric Specialty Care: Neurology/ Cardiology
- Rural Extensions of Specialty Care
Mercy’s Telemedicine Milestones

**Mercy SafeWatch**
2006
Mercy launches Tele-ICU in
• 10 hospitals
• 350 beds
• across 4 states
• largest tele-ICU in the world
• one-way video

**Tele-ICU Outreach**
2009
Contracted with first non-Mercy hospital for tele-ICU services – 17 beds added
Total current beds 400
First 2-way video site

**LTACH – Tele-Special Care**
2010
Tele-ICU coverage added to 6 special care beds in St. Louis’s Long-term Acute Care Hospital - Mercy Continuing Care.
Mercy’s Telemedicine Milestones

**Tele-Perinatology**

2011

Tele-perinatal services offered in O’Fallon and Washington, MO with a free-standing Maternal and Fetal Health Center opening in Maryville, IL

While You Are Waiting tele-education/support group for women on bedrest

**Tele-Stroke/Tele-Neurology**

2011

Tele-stroke / Tele-Neurology services launched in 8 Mercy Hospitals, using 2 different models of service delivery, and continued expansion planned

**Tele-Consults**

2011

Mercy has built a foundation for face-to-face video consults through the use of Tandberg/Cisco units and Movi, a software application that is easily deployed to any Mercy computer. Dr. Scarrow has developed the ability to see patients post-operatively in NWA, Cassville and Lebanon using this technology.
Mercy’s Telemedicine Milestones

**Tele-Clinics**

2011

The region’s most technologically advanced healthcare clinic is located in Rolla, MO. Three telemedicine rooms have been created to allow physicians from a distant location perform specialty tele-consults. Currently tele-headache, tele-psychiatry and telepulmonology visits are performed here.

**Remote Home Monitoring**

2011

The ability to manage a patient/disease population at home has become possible with the introduction of remote home monitoring. Mercy has developed interfaces for remote devices to send data to MyMercy. New CHF nurses can now monitor that data from a distance and work to keep patients home/out of the ED/hospital.

**Tele-Sepsis**

2012

The virtual sepsis unit is being created to monitor patients across the entire hospital and not just in the ICU. The algorithms from the tele-ICU are being applied to all inpatients for early sepsis identification and treatment.
Questions