The Future of Critical Care Healthcare

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Objectives

- Discuss future trends for critical care practice
- Identify strategies for meeting future healthcare needs in critical care
The first ICUs were established in the late 1950s and the specialty of critical care medicine began to develop. Since those early days, huge improvements have been made in terms of technological advances.

Critical Care Medicine is one of the fastest-growing hospital specialties.

Changing place of the ICU within the hospital. Schematic to demonstrate the increasingly large place that the ICU of tomorrow will occupy within the hospital system compared with the past with ICU beds representing a much larger percentage of total hospital beds.
Worldwide variability in ICU bed capacity:
In the U.S., up to 20% of hospital beds can be labeled as ICU beds; in comparison, in the United Kingdom, ICU usually will comprise only up to 2% of total beds.

ICU Landscape

Facts:
- At present, the U.S. Population uses 23.2 million ICU days at an estimated cost of $81.7 billion annually.
- This equates with 13.4% of hospital costs & 4.1% of the national health expenditure.

More than 5 million patients are admitted annually to ICUs in the United States. The five primary ICU admission diagnoses are:

- Respiratory insufficiency/failure
- Postoperative management
- Ischemic heart disorder
- Sepsis
- Heart failure

http://www.sccm.org/Communications/Pages/CriticalCareStats.aspx

Source: Analysis of Bureau of Census population projections

HRSA Critical Care Workforce http://bhpr.hrsa.gov/healthworkforce/reports/studycriticalcarephys.pdf
With a greater reliance on technology to keep critically ill patients alive (i.e., mechanical ventilation, hemodialysis, plasmapheresis, extracorporeal membrane oxygenation), the number of ICU beds has grown dramatically in the U.S., with the current estimate being >6,000

> 950,000 staffed beds

http://www.sccm.org/Communications/Pages/CriticalCareStats.aspx
Demand for Intensivists

Projected Supply vs. Optimal Utilization for Intensivists

HRSA Critical Care Workforce http://bhpr.hrsa.gov/healthworkforce/reports/studycriticalcarephys.pdf
Who will work in the ICU of the Future?

- The changing demographic of the “ICU Team”
- The role of technology
- Expansion of scope of practice of team members
- Development of new roles

ICU Volume 14 - Issue 1 - Spring 2014 - Cover Story: ICU Organisation & Design

Creating the ICU of the Future: A Day of Innovation

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Main Concepts of an ideal ICU

- Create intelligent clinical systems
- Use computer-based technology to automate tasks (e.g., voice dictation), improve access to all data from any device (e.g., smartphone, tablet), and establish safeguards and reminders to assist clinicians in medical care and decisions.
- Such a system would eliminate duplicate documentation and data input, improve clinical diagnostics, decrease clinician’s reliance on memory, and reduce the potential for medical error.

Pronovost P. et al 2014; Creating the ICU of the Future

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Main Concepts of an ideal ICU

- Create an integrated information ecosystem
- Build an electronic platform to connect devices (e.g., ventilators, medication pumps), monitors, intelligent clinical systems (described in point 1), and the patient’s EMR.
- The ecosystem would use wireless technology, have accurate sensors, and communicate information in real time to clinicians and patients. For example, the ecosystem would couple smart alarms to the patient’s room equipment and EMR and communicate.

Pronovost P. et al 2014; Creating the ICU of the Future
Main Concepts of an ideal ICU

- Engage the patient and family in the medical care experience
- Design a patient room with smart screens that display patient information in a timely and understandable manner, offer multilingual translations, and play instructional videos tailored to the patient’s medical situation.
- Reduce clutter (e.g., wireless connection of equipment, described in point 2) and provide an area of comfort for family members. Involve the family in the patient’s care (e.g., provide oral care, help with mobility). This last point will increase engagement and reduce the sense of hopelessness felt when a loved one is critically ill (Hibbard and Greene 2013). Such involvement will also reduce the burden on caregiver.

Pravovost P. et al 2014: Creating the ICU of the Future

Main Concepts of an ideal ICU

- Use technology to improve communications
- One key recommendation was the use of technology to allow everyone involved in care – patient, family, and care team – to communicate with each other as easily and often as possible.

Pravovost P. et al 2014: Creating the ICU of the Future
The green screening does not only contribute to the well-being of the patient. It also regulates the circadian rhythm. The supervision room is located outside in the background; ©Tobias Hain/ graftlab
ICU of the Future: Semi-reflective surfaces in the patient room ensure that each disinfecting light reaches every corner of the room. Rashid M. CCNQ 2011;34:332-360

ICU of the Future: Lighting for procedures (1); Lighting for routine work (2); Lighting for sleep time (3) Rashid M. CCNQ 2011;34:332-360
The smart surface at the integrated headwall system in its idle state, and the waste collection inlets in the patient room.

Rashid M. CCNQ 2011;34:332-360

The multi-touch surface on the foot wall of the patient room can be used as a communication and collaboration tool for the patient, family, and staff. It can also be used as a form of entertainment for the patient and family.

Rashid M. CCNQ 2011;34:332-360
The smart patient bed. (1) The patient information interface in its regular position. (2) The patient information interface is pulled out.

1. Systems Computer
2. Battery Storage
3. Med-Gas Storage
4. External Pacemaker
5. Mechanical Ventilator
6. Defibrillator
7. Dialysis Equipment

A view of a private patient room.
### Future Critical Care

How can design improve the patient experience in the intensive care unit?

[Image of hospital setting]

A Glimpse into the Future ICU: The Closed Loop System

Submitted by Harris Rias on April 26, 2013 - 9:52 PM

The modern health care system owes its success to the technological advancements which are occurring at a breakneck pace. These advancements are necessary to overcome the burden of limited skilled manpower which healthcare has traditionally evidenced and this burden is likely to increase in the future.
THE ICU OF THE FUTURE

4 elements: lighting, privacy, maintain normalcy, silence

ICU of the Future: Expanded Use of Simulation
EVERY intensive care nurse and doctor needs to see this film
New eICU® Links FHN Intensive Care Unit with Team of UW Health Intensivists

FHN Memorial Hospital has debuted its eICU program, a collaboration between the Intensive Care Unit at FHN Memorial Hospital and UW Health’s critical care program.

FHN is among just 10 percent of all hospitals across the country who have an eICU in mountainous northern Illinois and southern Wisconsin with a program like eICU, which provides a unique additional level of care to ICU patients.

Small microphones and cameras in each ICU patient room provide a constant link to the e-Care team in Madison, which includes some of the nation’s most respected intensivists (physicians specializing in critical care medicine). Each ICU patient’s vital information, such as heart rate, blood pressure, medications and test results are monitored in the eICU and shared in real time with the e-Care team.

If a patient’s condition changes rapidly or unexpected and requires a medical response, the FHN physicians and nurses at the patient’s bedside can touch a button and activate a two-way visual and audio link for consultation with e-Care specialists.

The cameras and microphones can capture the smallest details for the e-Care specialists, from short changes in the patient’s side color to monitor readings across the room. The patient and his or her caregivers can also see and hear the critical care nurse or physician on the other end of the link, which adds value in that the caregiver is consulting with a person who isables an on-site.

The e-Care team members also are identified by name and credential information. eICU is the end hospital for critical care consultation.
ICU of the Future
Partnering with Patients & Families
PDOR-ICU Collaborative

Surviving Sepsis Campaign

ICU Liberation

Patient-Centered Outcomes

Project Description

Surgical Collaboratives

Study Definitions

Theme

Quality Collaborative

The Society is seeking intensive care unit (ICU) teams interested in participating in the PDOR-ICU Collaborative: Improving Care for Critically Ill Patients and Families through Research, Dissemination, and Implementation. This program is funded through a Patient-Centered Outcomes Research Institute (PCORI) Eugene Washington PCORI Engagement Award (292B-006).

Application

Application Review

Fact Sheet

Letter of Commitment

For additional information contact SCCM staff, Kathy Herman.

About PDOR-ICU Collaborative

Collaborative Members Only

About PDOR

Leadership

Unit of SCOR Research Initiative: Harriett Lane, PhD, RN, CPNP; Nicole F. Schriger, PhD, and Avery Z. Zivin, MD, PhD. PDOR, the PDOR-ICU Collaborative, and other SCOR initiatives bring together ICU leaders to implement patient- and family-centered care initiatives.

Each team will receive a project officer on various facets, including the culture of the institution to innovate and progress. The community served, hospital politics and processes required to approve new interventions, sustainability commitments and interests of the ICU staff to integrate changes into their work flow.
ICU of the Future
Promoting Healthy Work Environment

Burnout Syndrome in Critical Care Healthcare Professionals: A Call for Action
Provider Focused Interventions

- Stress reduction training
- Relaxation techniques
- Time management
- Assertiveness training
- Meditation
- Work-life balance measures: hobbies, family and social activities
- Self-care measures: ensuring adequate rest, exercise, healthy eating habits

Take breaks with a minimum of one meal break to be refreshed and reengaged for the dynamic environment that is our workload. Refreshed and engaged caregivers will provide higher quality care, keeping themselves and patients safer.
Midday Mindfulness Meditation

Every Thursday from noon to 12:30 p.m. in the Meditation Room

All are warmly invited to slow down and take a deep breath.
The ICU of the Future has only been envisioned

ICU clinicians have the opportunity to influence the future of the ICU
1) Which of the following trends is most likely to impact critical care?
A. Advanced informatics and technology
B. Changes in disease presentation
C. Aging population
D. Costs of healthcare
Answer A is the correct answer because while all of the trends will influence healthcare in the future, advances in clinical information systems, and communication technology will significantly impact the clinicians’ ability to manage patient data and coordinate care.

2) New models of care for the ICU for the future may include changes in the traditional roles of healthcare providers
A. True
B. False
Answer A is the correct answer because future models of care for the ICU will involve the use of smart technology, new ways of integrating care for critically ill patients, and new opportunities for healthcare providers including increased interprofessional education, training, and roles.