

QATAR CRITICAL CARE CONFERENCE ABSTRACT

What is the future of ICUs?

Janice L. Zimmerman

Address for Correspondence:

Janice L. Zimmerman

Institute for Academic Medicine, Houston
Methodist, Weill Cornell Medical College, USA
Email: janicez@houstonmethodist.org

<http://dx.doi.org/10.5339/qmj.2019.qccc.46>

Submitted: 21 May 2019

Accepted: 30 June 2019

© 2019 Zimmerman, licensee HBKU Press.

This is an open access article distributed under the terms of the Creative Commons Attribution license CC BY 4.0, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Zimmerman JL. What is the future of ICUs? Qatar Medical Journal, Qatar Critical Care Conference 2019:46 <http://dx.doi.org/10.5339/qmj.2019.qccc.46>

كيساينس
QSCIENCE

دار جامعة حمد بن خليفة للنشر
HAMAD BIN KHALIFA UNIVERSITY PRESS

ABSTRACT

ICUs in the future will comprise a larger percentage of hospital beds as care of less seriously ill patients shifts to home and other environments. ICUs will need to adapt to increased demand for services and concomitant economic pressures with efficiency and innovation. The future ICU will see changes in form, function, personnel and patients.

The type of patients in ICUs and their medical conditions will be different. Prevention, early detection, and timely treatment of conditions such as infection and respiratory failure should decrease the need for many ICU admissions. Patients needing ICU care will have multiple complex problems that shift the epidemiology of critical care. This shift in patient populations will not change the need for compassionate and empathetic care.

Precision medicine for patient care is the goal of the future ICU—tailoring therapy for conditions based on individual characteristics, risk profile or genetic markers¹. Protocols and guidelines will require the ability to adapt to defined patient groups.

The physical ICU environment of the future must promote a healing environment for patients, families, visitors and ICU staff². Optimal design should reduce noise, maximize work efficiency, minimize potential for errors, decrease infection risk, reduce stress and provide comfort for families and

visitors. The environment will address sound, light, temperature, smell, art and entertainment needs. The ICU of the future must be a flexible environment with built-in adaptability for technological advances. Cohorting of critically ill patients in a defined ICU area will continue for efficiency but the flexibility to deliver critical care outside the physical ICU must also be provided. Patient-centered care will continue to drive services in the future.

The ICU of the future continues to require a highly trained collaborative team of professionals but roles and responsibilities as well as composition of the team will change. Intensivists will still oversee these teams but advanced practice providers and non-intensivist physicians may play greater roles in direct patient care. Greater emphasis will be placed on preventing burn out in team members through use of smart technology, optimum work environment and professional support.

Technology will be the most constantly changing variable in future ICUs that will

affect the environment, patients, and staff. Sophisticated informatics will interface all hospital systems with the ICU and advance individualized care³. These systems must have characteristics of association, interoperability, integration, security, safety, and real-time synchronization⁴. Artificial intelligence and learning will address the challenges of information overload and integration of data to enable optimum decision making. Electronic "sniffers" will detect and interpret changes in patients' clinical status and send alerts to clinicians or potentially initiate interventions. In addition, alarm systems will screen out irrelevant signals and decrease the danger of "alarm fatigue" but at the same time provide early alerts to safety issues and provide suggested actions. An outgrowth of advances in information technology will be the use of "big data" to optimize immediate patient care as well as advance research in the ICU⁵.

Keywords: informatics, ICU: technology

REFERENCES

1. Shankar-Hari M, Fan E, Ferguson ND. Acute respiratory distress syndrome (ARDS) phenotyping. *Intensive Care Med.* 2019;45(5):516–519.
2. Thompson DR, Hamilton DK, Cadenhead CD, Swoboda SM, Schwindel SM, et al. Guidelines for intensive care unit design. *Crit Care Med.* 2012;40(5):1586–1600.
3. Halpern NA. Innovative designs for the smart ICU: Part 3: advanced ICU informatics. *Chest.* 2014;145(4):903–912.
4. Pickering BW, Herasevich V, Ahmed A, Gajic O. Novel Representation of Clinical Information in the ICU: Developing User Interfaces which Reduce Information Overload. *Appl Clin Inf.* 2010;1(2):116–131.
5. Roski J, Bo-Linn GW, Andrews TA. Creating value in health care through big data: opportunities and policy implications. *Health Aff.* 2014;33(7):1115–1122.