INTENSIVE CARE UNIT UTILIZATION

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ICU RESOURCES

*ICU resources* are those resources that provide intensive care to critically ill, injured, physiologically unstable, or potentially unstable patients. Although referred to as ICU beds, they include not only the beds but also the full complement of professional staff and capacities for physiological monitoring and invasive diagnostic and therapeutic interventions.
INTRODUCTION

- Research on Intensive Care Unit (ICU) outcomes provides valuable inputs in developing more improved models for patient-centered outcomes, more robust predictions of resource use, better individual outcome prediction, and alternative outcome predictions under different treatment paradigms.

- Among the studies examining strategies to improve quality and reduce costs by changing the way care is provided to critically ill patients, attention has recently focused on assessing patients with a prolonged length of stay (LOS) in the ICU.
• Prolonged ICU stay can adversely affect the health status by increasing the risk of infection, complications, and possibly, mortality.
• Operationally, it impacts upon ICU bed availability and results in cancellation of elective surgeries, leading to long waiting times. The lead-time, defined as the time spent on the ward before ICU admission, is also prolonged, a factor known to affect patient outcome.
• There is a need for optimizing an efficient distribution and use of ICU resources.
• There are many measures to assess ICU resource utilization. A simple and readily available measure is ICU LOS.
• Another measure is the duration of mechanical ventilation, as this is one of the most common procedures in the ICU.
To calculate the average length of stay and mechanical ventilation days to identify their impact on ICU utilization.

And to study the average length of stay of patients admitted in intensive care unit for benchmarking.
Study population and setting

• Paras hospital is a 250-bed multi super specialty tertiary care hospital in Gurgaon, Haryana, India. Its 40-bed ICU (MICU, NSICU, SICU, CCU and HDU) is staffed with full time intensivists, senior and junior consultants and highly experienced nursing staff. The hospital has a separate NICU and CTVS; the patients admitted to these units are not included in the study.
• This study includes all the consecutive admissions in this ICU in the month of May 2010. Data analyzed includes the patient length of stay in ICU and mechanical ventilator days. Average length of stay is calculated as the ratio of total discharge days to the total discharges (including deaths and transfers). The LOS is considered prolonged if exceeds 14 days.
Utilization of resources

NSICU

- The average length of stay of a patient in NSICU is found to be 5.82 days.
NSICU

- 7.31% short stay
- 92.69% long stay

Patient days of short stay patients: 46.03%
Patient days of prolonged stay patients: 53.97%
NSICU

- 57% Mechanical ventilation days of short stay patients
- 43% Mechanical ventilation days of Long stay patients
SICU

• The average length of stay of a patient in SICU is 6.37 days.
SICU

- **Short Stay**: 86.04%
- **Long Stay**: 13.95%

- **Patient Days of Short Stay Patients**: 52.18%
- **Patient Days of Prolonged Stay Patients**: 47.82%
SICU

- 57.14%: Mechanical ventilation days of short stay patients
- 42.57%: Mechanical ventilation days of long stay patients
MICU

• The average length of stay of a patient in MICU is 3.08 days.
MICU

- 98.80% short stay
- 1.20% long stay

- 94.15% Patient days of short stay patients
- 5.85% Patient days of prolonged stay patients
MICU

- **91.81%** Mechanical ventilation days of Long stay patients
- **8.91%** Mechanical ventilation days of short stay patients
• The average length of stay of a patient in CCU is 1.23 days. No patient was on mechanical ventilator and on prolonged stay.

• The average length of stay of a patient in HDU is 1.59 days. No patient was on mechanical ventilator and on prolonged stay.
Comparison between different intensive care units.

Length of stay (days):

- NSICU: 1 (MIN), 5.82 (AVERAGE), 50 (MAX)
- SICU: 1 (MIN), 6.09 (AVERAGE), 39 (MAX)
- MICU: 1 (MIN), 3.08 (AVERAGE), 15 (MAX)
- CCU: 1 (MIN), 11.23 (AVERAGE), 7 (MAX)
- HDU: 1 (MIN), 11.59 (AVERAGE), 6 (MAX)
Correlation between ICU's mechanical ventilation days and LOS

Duration of mechanical ventilation days
• This shows that these patients consume a significant proportion of ICU resources specially the ones in NSICU and SICU. If the length of stay of such prolonged stay patients in NSICU is reduced by 50%, then there will be 23% decrease in the average length of stay resulting in 4.48 days.

• Similarly, if the length of stay of such patients in SICU is reduced by 50 percent, then there will be 26% decrease in the average length of stay resulting in 4.69 days.
• ICU patients are a heterogeneous group with severe illness, multiple system dysfunctions, and multiple coexisting medical problems.

• A systematic evaluation of LOS information provides information of practical and operational significance that is essential for strategic planning.
In the present study, prospective collection and analysis of data on ICU LOS and mechanical ventilator days, helped in identifying that prolonged stay patients consume a significant proportion of ICU resources and there is a need to identify the ways by which ICU resources can be fairly utilized, the factors which affect the ICU length of stay and the predictors of the prolonged ICU stay, which can be used in targeting this group to further improve resource utilization and efficiency of ICU care.

Such systematic and well planned studies can provide valuable inputs for providing quality care for more patients through better targeted and more effective services.
• The average length of stay in NSICU is 5.82 days, 6.37 days in SICU, 3.08 days in MICU, 1.23 days in CCU, and 1.59 days in HDU which is very less and can be established as a benchmark.

• But, to meet the international standards, the ALOS of NSICU and SICU needs to be further reduced.
The reduction in the length of stay will have a major impact in the following ways:-

- **Operational**: - more patients can be admitted and cared in the ICU with available resources; lead time for admission in the ICU can be reduced.

- **Qualitative**: - this will ensure a more optimal utilization of scarce resources for providing quality care to the ICU patients really in need of it.

- **Financial**: - decrease in ICU LOS will reduce the cost per patient in the ICU.
References and Bibliography


• www.parashospitals.com


• Quality indicators for ICU; Indian Society of Critical Care Medicine 2009.