

## CHAPTER 4

### SAFETY AND QUALITY IN THE ICU

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#### **LEARNING OUTCOMES: After completing this e-chapter you will be able to:**

1. Discuss the importance of patient safety as a discipline.
2. Identify learnings on patient safety.
3. Be motivated by the sharing of a Philippine quality story.
4. Implement safety control principles
5. Define Total Quality management.
6. Describe the Demming cycle

#### **CHAPTER OVERVIEW**

The critical care unit remains to be one of the challenging areas in the hospital that is besieged with high intensity care and activity. It is the place where the sickest patients are kept for vigorous round the clock monitoring and management, and as such iatrogenic complications in the critical care units are inevitable, often leading to medical emergencies. Iatrogenic complication results from the activity of a health care provider, or an adverse condition in a patient resulting from treatment by a physician, nurse or allied health professional. Human errors account for most

of them, affecting the elderly and the most severely ill patients (Laskou et al, 2006). This situation may affect the clinical course of patients by increasing morbidity and mortality. An error is defined as the failure of a planned action to be completed as or the use of a wrong plan to achieve an aim (Reason, 1990).

In 1981 the red flag was raised for the medical community to articulate the serious risk associated with hospitalization. Despite the many advances of diagnostics and therapeutic interventions at this time, it has not matched the reduction in iatrogenic illness suffered by patients in the hospital (Steel et al, 2004). Until now the health care industry strives to identify measures that will improve and make progress to keep the patient safe. Aptly to say the World Health Organization provided the simplest definition of patient safety by stating that this is the prevention of errors and adverse effects to patients associated with health care.

Vigilance in care remains to be top priority skills amongst the health care practitioner in this area to keep patient safe. However, studies have shown that a great number of patients still suffer from adverse events and error while critical care is instituted. As a response to this grim scenario, patient safety is a new discipline that emphasizes the reporting, analysis and prevention of medical error that often leads to adverse healthcare events.

An important aspect to this realization of preventing patient harm has been the growth of interest in patient safety. It is increasingly clear that patient safety has become a discipline, complete with an integrated body of knowledge and expertise, and that it has the potential to revolutionize health care, perhaps as radically as molecular biology once dramatically increased the therapeutic power in medicine (Emanuel et al, 2008). According to the Patient Safety Alliance, the frequency and magnitude of avoidable adverse patient events was not well known until in

1990s, when multiple countries reported staggering numbers of patients harmed and killed by medical errors. Recognizing that healthcare errors impact 1 in every 10 patients around the world, the World Health Organization calls patient safety an endemic concern (WHO, 2008)

### **Learnings on Patient Safety**

The field of patient safety is maturing rapidly. More training on safety awareness are provided for the healthcare practitioners; clinicians and researchers are designing interventions, health systems are implementing safety initiatives and programs, regulators are evaluating practices and governments are launching national health care safety agencies. Globally, even in the developing areas of the world, WHO itself is implementing safety projects with its international partners.

In the last decade, the global community learned about the nature of safety in health care. The article published in the WHO Patient Safety website written by Pronovost stated the following learnings: there are no quick fixes to this problem of patient safety; measures must be meaningful and valid to the clinicians who ultimately have to use them to improve safety; science is necessary to ensure that patients are really safe; and no one discipline or single theory alone will be sufficient (Pronovost, n.d.)

Critical care nurses and administrators strive to prevent errors from happening and have instituted various initiatives and interventions to promote patient safety. It is with the understanding that the key to the attainment of safety is the development of a culture of safety amongst the healthcare providers caring for the critically ill. Likewise, efforts should be exerted to identify the common factors contributing to error or adverse event so that a viable and appropriate solution can be developed.

## **Case Study: Philippine Scenario on Patient Safety**

The Philippines, as a developing country, is striving to attain safety culture in health care. As a country, it is besieged with challenges in health care that impact on safety. The factors relevant to these challenges are the following: issues on human resource for health such as nursing supply and demand; changes in the disease pattern and implementation of health care safety systems.

The human resources for health in the Philippines are enormous but unevenly distributed. There is a maldistribution of health professionals, stemming from the lack of budget for the human resource for health positions or plantilla items. The nurse-to-population ratio is about 0.31 per 1000 people in 1993, but since then, this number grew dramatically to 4.43 per 1000 in 2000 and stabilized until 2005 (WHO-WPRO, 2013). This large increase was mainly due to the high demand for nurses in other countries, thus making the Philippines the major source of health professional to other countries.

The social forces of globalization and urbanization that shape today's civilization, has influenced the changes in the Philippines' disease patterns. Fifty percent (50%) of disease pattern are related to non-communicable disease. The burden of these specific diseases is heavily concentrated on the young and working adults or the poor (Ravichandran, n.d.). Likewise, cyclones and typhoons in the Philippines are causing frequent mudslide flooding leading to other communicable disease.

These events brought about by the maldistribution of human resource for health, demographic trend of disease burden, financial pressures and the demand for health care and

nursing service leads to combination of circumstances that aggravates the health care situation and patient safety in the Philippines.

### **A Quality Story on Patient Safety**

Confronted by the identified challenges, the health practitioners in the Philippines manage to make great efforts in attaining patient safety. Guided by the Institute of Medicine's principles of "safe, effective, patient-centered, timely, efficient and equitable (IOM, 2001)" care, initiatives and programs are innovatively designed and implemented to ensure that the patients they cared for are safe.

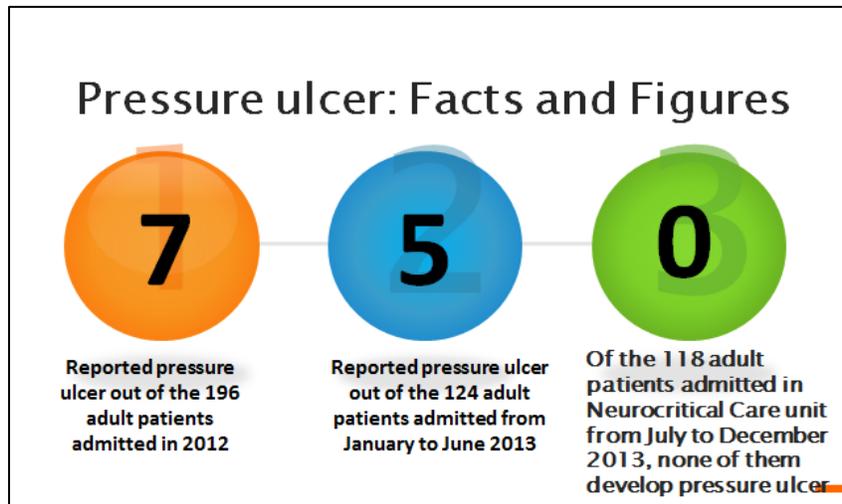
Critical care nurses in the Philippines share their innovative patient safety practices during the yearly congress of the Critical Care Nurses Association of the Philippines, Inc. (CCNAPI). Their innovative practices emphasize that safety and quality are concepts on a continuum. A quality story that was shared during the 2014 CCNAPI Congress demonstrated safety and quality continuum while the nurses implement the safety practice on pressure ulcer prevention. For the purpose of sharing, this story from neurocritical care nurses in a tertiary hospital will be discussed in this article. It emphasized that safety simply will go beyond turning.

**Beyond turning.** This quality story was presented by nurses from the Neurocritical Care Unit & Epilepsy Monitoring Unit (NCU-EMU). The team was composed of 18 critical care nurses, a nurse manager and a neuro-intensivist and they were so concerned about the occurrence of pressure ulcers in their unit. With the commitment and desire to put patient's safety first, they strived to succeed, prevail and overcome the pressure ulcer concern threatening the safety of the patient....and so they started to know their facts.

The data as shown in Figure 1 revealed a diminishing trend in the occurrence of pressure ulcer until an absolute “zero” was attained. This summarizes the achievement that they had after instituting the quality measures on the project against pressure ulcers.

How was this possible? The NCU-EMU team adopted the Six Sigma techniques as the tool for process improvement. Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes. Originally developed in 1996 by Motorola, the business management strategy is now used in many different industries in an effort to improve the quality or products or services produced by the business through the removal of defects and error (BusinesDictionary.com).

Figure 1: NCU-EMU Data on pressure ulcers



The safety project entitled “Beyond Turning: Reducing the rate of hospital-acquired pressure ulcer” addresses the challenges and opportunities of pressure ulcer prevention to the

nursing workforce. The project required five phased of the Six Sigma: Design – Measure – Analyze – Improve – Control.

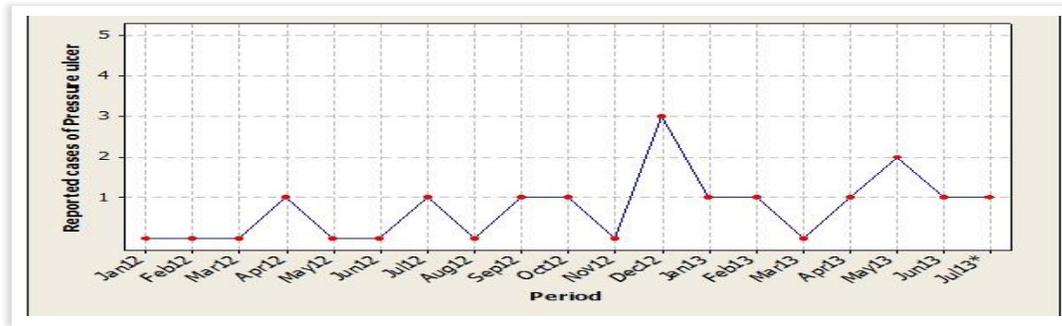
The first phase – Define is summarized in In Figure 2 by showing the project description in terms of the problem/issue, purpose/ objective, importance, expected deliverables and project scope.

Figure 2: Beyond Turning Project Description

Project Description	
<b>Problem or Issue</b>	Pressure ulcers are difficult to treat and costly but most of them are preventable if good clinical practice is strictly followed. Prevention, early detection and appropriate management are essential elements needed to eliminate, if not minimize the incidence of pressure ulcers. However, despite of the availability of resources on PU prevention a considerable number of cases of pressure ulcer particularly hospital-acquired are still being reported.
<b>Purpose or Objective</b>	<ul style="list-style-type: none"> <li>*Examine current state of hospital-acquired pressure ulcer in the hospital especially among Neuro-ICU patients</li> <li>*Determine contributing risk factors of pressure ulcer development in critical care unit.</li> <li>*Develop action plan that will address pressure ulcer development.</li> <li>*Develop reference guide in preventing and managing pressure ulcer.</li> <li>*Reduce the rate of Hospital-acquire Pressure Ulcer by 50%.</li> </ul>
<b>Importance</b>	This study will address the challenges and opportunities of pressure ulcer prevention to the nursing workforce. Moreover, this study aims to eradicate, if not reduce the number of reported hospital-acquired pressure ulcer thereby delivering better quality nursing care.
<b>Expected Deliverables</b>	This study is expected to create improvement in the prevention, detection and management of pressure ulcer. Likewise, reference guide and Bundle of Care for pressure ulcer are expected written output.
<b>Project Scope</b>	Patients who are 19 years old and up and admitted at the Neurocritical care unit within 24 hours are the scope of this project. Patients with pressure ulcer at the time of admission, either hospital-acquired or home-acquired, are not included in this study.

The second phase – Measure was demonstrated in Figure 3 which showed the data measured from January 2012 to July 2013. The team studied the trend and focused on the numbers. They closely examined the factors that can be attributed to the occurrence of the pressure ulcers.

Figure 3: Number of reported HAPU in NCU-EMU



The third phase – Analyze was demonstrated in Figure 4. Ishikawa Fishbone diagram also called Cause-and-Effect diagram identifies many possible cause for an effect or a problem (ASQ, 2005). The NCU-EMU team used this diagram structure to brainstorm on the pressure ulcer concern because it immediately sorts the ideas into useful categories. Figure 5 on the other hand shows the frequency distribution of the factors related to the presence of hospital acquired pressure ulcers. Surprisingly, the brainstorming of the NCU-EMU team presented that the factor with highest frequency pertains to the lack of proper knowledge on pressure ulcers common among the nurses. The nurses realized that the skin care issues previously reported as pressure ulcer were not really pressure ulcers in the strictest sense and that not all pressure ulcers are preventable.

Figure 4: Ishikawa Fishbone Diagram for HAPU in NCU-EMU

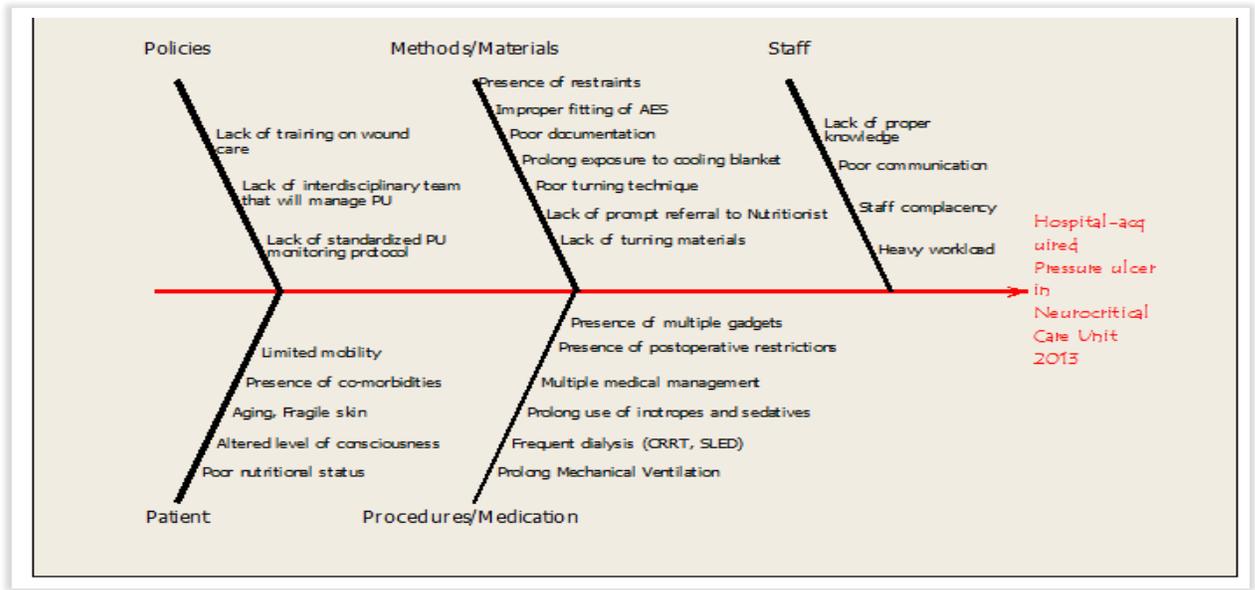
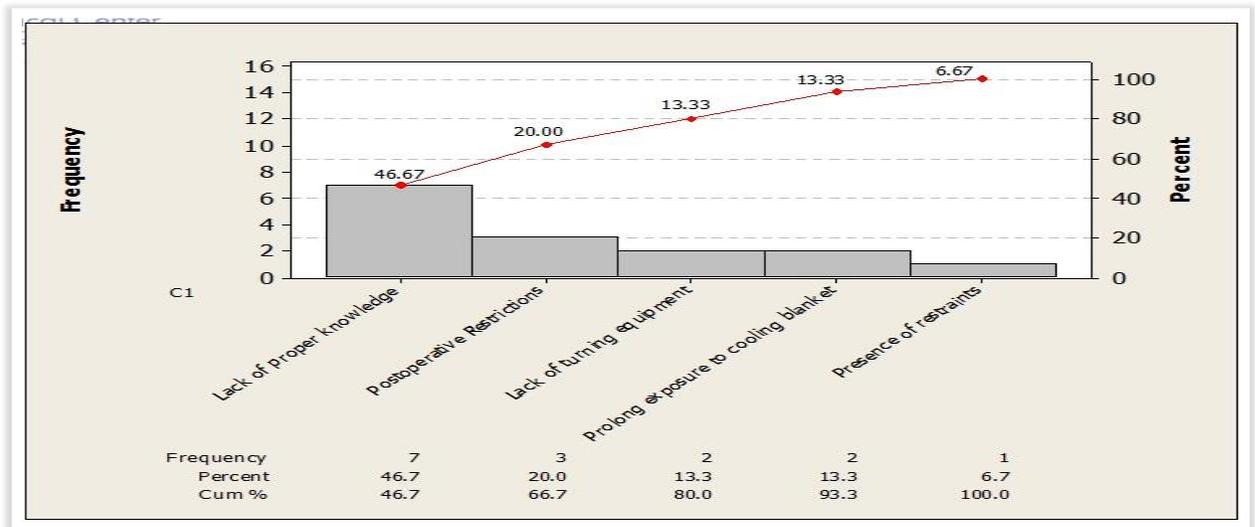


Figure 5: Frequency Distribution of Factors Related to HAPU



The fourth phase – Improve made the NCU-EMU team formulate the goal to be achieved by the project. The goal was “reduction of hospital-acquired pressure ulcer by fifty percent (50%) in six months”. An orientation on the process improvement “Beyond Turning” was made. Figure 6: Spread the Message demonstrated the great enthusiasm of the NCU-EMU nurses during the orientation.

Figure 6: Spread the Message

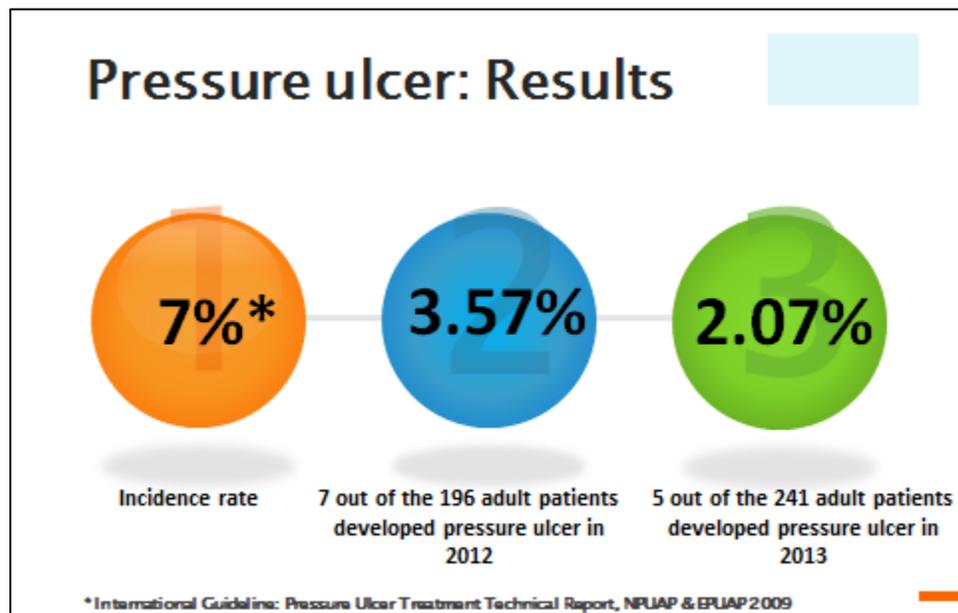


The orientation focused on educating the nurses on the definition of pressure ulcers and the stages of pressure ulcers following the guidelines of the National Pressure Ulcer Advisory Panel. The action did not stop with the orientation. The NCU-EMU team made their campaign visible and the nurses continued gaining knowledge through on-line courses, likewise, the team did not forget the patient's family. They involved the family in the plan of care for the patient and educated them on things they have to know about skin care and pressure ulcers, making the family partners in care.

The final phase of Six Sigma technique – Control was established by the team by putting a benchmark. Figure 7 shows the comparison of the data from the NCU-EMU with the benchmark

data from NPUAP –EPUAP (2009). The data demonstrated a 42% decrease in HAPU in 2013 or after six months of implementing actions for the project. The team understood that at the end of the improvements, it is necessary to calculate new process control limits and make these limits the triggers for corrective and preventive action (Six Sigma Materials, n.d.).

Figure 7: Pressure Ulcer Results



These neurocritical care nurses summarized their personal and professional learning as follows:

- KNOWING is one thing. UNDERSTANDING is another thing
- Nothing is great than EVIDENCE-BASE PRACTICE
- GREAT things come from SMALL beginnings
- TEAM work divides the task and multiplies the success
- CHANGE is easier when you know where you are going and why it's worth it.

## Summary

Patient safety has gone along way, from what started as a concern, this is now a discipline. New body of knowledge, improving science and supporting the learnings with evidences are just some of the imperatives for the change we have to move to keep our patient safe from most of the advance practices and technologies that also evolved. As nurses and healthcare providers we always bear in mind and conscience the Hippocratic Oath of “*Primum non nocere*”(first, do no harm).

**CHECK YOUR PROGRESS: Assess your understanding of key points from the previous sections.**

- It is estimated that healthcare errors impact 1 in every 10 patients around the world. Due to the high risk of errors, the World Health Organization has identified patient safety as an endemic concern.
- Six Sigma is a technique to promote implementation of process improvement. It seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes.
- Six Sigma has 5 phases: Design – Measure – Analyze – Improve – Control.

1. Six Sigma was originally developed from which type of perspective?

- a. Research
- b. Clinical practice
- c. Policy
- d. Business management

Answer: D: Sigma was developed in 1996 by Motorola, as a business management strategy. It is now used in many different industries in an effort to improve the quality of products or services produced by the business through the removal of defects and error

## **QUALITY CONTROL**

Quality is defined as a set of properties and characteristics of products, processes or services that relate to the possibility of meeting the stipulated or implied needs. That portion of the product or service with minimal costs in the life cycle contributes to a maximum of purpose and health of the people involved in its production, distribution, use, maintenance and recycling, and with a low cost of all resources, and with an acceptable impact on society and the environment. This includes quality of the integration of work and the integration of responsibilities. Total Quality Management (TQM) is a comprehensive and structured approach to organizational management that seeks to improve the quality of products and services through ongoing refinements in response to continuous feedback. Total Quality Management involves the user, the philosophy of management to ensure the leadership, training and motivation for the purpose of continuous improvement of organizational processes (John M. Kelly). Quality control is a function of management in which the work is monitored, measured and remedial action in order to meet anticipated organizational goals. Quality management is the measurement and correction of all procedures in the process of work, in accordance with the adopted plan and goals of health care.

### **The basic principles of TQM:**

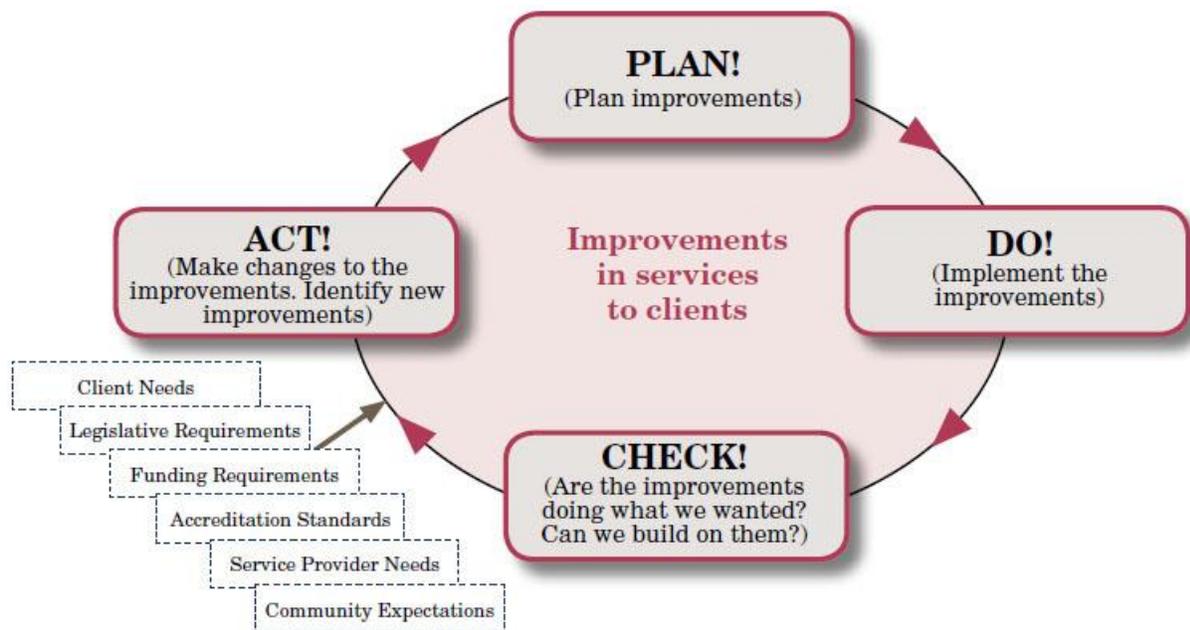
- User determines the quality

- Top management leads and takes the initiative
- Elimination of variation
- Continuous improvement with the use of measuring instruments (data and facts)

Nursing standards are measurable definitions agreed and acceptable quality of nursing care at the specific workplace which is judged and evaluated current nursing practice. Define standards can be done by the head nurse or director at the level of institutions, but in every respect the most acceptable standards are adopted and accepted by all the nurses at the level of the Council, the Association or the other relevant institutions. They act as guidelines or objectives which determines whether the nursing activities certain quality. Standard defines a coherent level of quality and quantity of work. Standards are established rules that are used in measuring or defining the quality and value of services or procedures. Standards must be clear, realistic, acceptable and understandable. Standards of medical care must be adopted by the nurses, and based on knowledge and scientific basis.

Continuous quality improvement is a tool for improving the quality of services provided by organisations. Continuous quality improvement refers to having a systematic approach to collecting and reviewing data or information in order to identify opportunities to improve the operations of an organisation with the end result of delivering better services to customer or clients. A common approach to continuous quality improvement is to see it as an ongoing cycle involving planning, doing, checking, identifying more actions and then starting again that is Demming cycle shown in Fig.1.

Figure 1.



## QUALITY INDICATORS IN ICU

Full access to quality management it is possible to establish the implementation of the quality management system, defining the quality policy and procedures but which enable quality assurance and control. The principle of total quality management is a specific structure of an organization that provides services and products and at the same time striving to fully meet the needs of its clients. Quality indicators are quantitative measures of an important aspect of the service that determines if service set standards or requirements. Quality indicators are at the core

of the program quality improvement together with the criteria for monitoring staff and show which parts of the standards achieved.

Quality indicators are measurable, objective, quantitative indicators of the effectiveness of key system elements. Indicators show us the extent to which the system meets the needs and expectations of users. Systematic collection and analysis of quality indicators is the obligation of all accredited institutions. Indicators should have a very clear and unambiguous definition and interpretation, and the measurability of indicators is an essential prerequisite for their successful establishment. They must be related to the quality of the key, strategic and supporting processes.

#### **The most common quality indicators in ICU:**

- Nurse - patient ratio
- Skin integrity
- The amount of health care provided to the patient during the day
- Patient satisfaction with pain therapy
- patient satisfaction with provided information
- Patient satisfaction with nursing care
- Satisfaction of patients overall health care
- Nosocomial infections
- Nurses satisfaction

#### **End of Chapter Multiple Choice Questions**

**1) Which of the following is a principle of the Total Quality Management?**

- A. Continuous improvement with the use of measuring instruments (data and facts)**
- B. Reducing system variation**
- C. Promoting consistency among processes**
- D. Target quality metrics with high value to the organization**

**Answer: A. Rationale: The basic principles of Total Quality Management (TQM) include:**

**User determines the quality**

**Top management leads and takes the initiative**

**Elimination of variation**

**Continuous improvement with the use of measuring instruments (data and facts)**

**2) Which of the following is not considered a quality indicator in the ICU?**

**A. Catheter-associated blood stream infection rates**

**B. ICU length of stay**

**C. ICU mortality**

**D. Patient satisfaction**

**E. Rapid response team ICU transfers**

**Answer: E. Rationale: Quality indicators are measurable, objective, quantitative indicators of the effectiveness of key system elements. ICU quality indicators reflect on a component of care in the ICU. Common ICU quality indicators include measures such as infection rates, pressure ulcer development, patient falls, ICU length of stay, mortality rates and patient and family satisfaction. ICU transfers due to rapid response team calls would not be an ICU quality measure as the rate would not be influenced by care in the ICU.**

REFERENCES

Agency for Healthcare Research and Quality. What is health care quality and who decides? Statement of Carolyn Clancy before the Subcommittee on Health Care, Committee on Finance, U.S. Senate, 2009.

Annas GJ. The patients right to safety – Improving the quality of care through litigation against hospitals. *The New England Journal of Medicine* 2006; 2063 – 2066.

ASQ: The Global Voice of Quality. Fishbone (Ishikawa) Diagram. Excerpted from Nancy R. Tague's *The Quality Toolbox*, Second Edition, ASQ Quality Press, 2005, pages 247–249.

Retrieved December 8, 2015 from

<http://asq.org/learn-about-quality/cause-analysis-tools/overview/fishbone.html>

Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 2008; 27(3): 759-69.

BusinessDictionary.com. Six Sigma Definition. Retrieved December 8, 2015 from

<http://www.businessdictionary.com/definition/Six-Sigma.html>

Emanuel L, Berwick D, Conway J, Combes J, Hatlie M, Leape L, Reason J, Schyve P, Vincent C, Walton M (2008). What Exactly Is Patient Safety? *Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 1: Assessment)*. Retrieved December 8, 2015 from

<http://www.ncbi.nlm.nih.gov/books/NBK43629/>

Huber LD: *Leadership and Nursing Care Management*. Saunders, Philadelphia, 2000: 609 - 633.

Institute of Medicine (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century* Committee on Quality of Health Care in America, Washington, DC, USA: National Academies Press; 2001 Retrieved December 8, 2015 from

<http://www.ihp.org/resources/Pages/Publications/CrossingtheQualityChasmAnewHealthSystemforthe21stCentury.aspx>

Laskou M, Nikolaou H, Diamantea F, Vlahou A, Mathas C, Maguina N Published 21 March 2006 *Critical Care* 2006, 10(Suppl 1):P394 doi:10.1186/cc4741 Retrieved September 11, 2015 from <http://www.ccforum.com/content/10/S1/P394>

NPUAP-EPUAP (2009) International Guideline: Pressure Ulcer Treatment Technical Report

2009 Retrieved December 8, 2015 from <http://www.npuap.org/wp-content/uploads/2012/03/Final-2009-Treatment-Technical-Report1.pdf>

Mitchell M. How can we assure health care quality?. u. J. McCloskey & H. Graces (Eds.). *Current issues in nursing*. Mosby 1994: 287-294.

Patient Safety (n.d.) *Patient Safety Alliance* Retrieved December 8, 2015 from

<http://patientsafetyalliance.in/patient-safety/>

Pronovost P. (n.d.). Making progress in patient safety. *Patient Safety*. Retrieved December 8, 2015 from [http://www.who.int/patientsafety/news\\_events/news/edit\\_pronovost/en/](http://www.who.int/patientsafety/news_events/news/edit_pronovost/en/)

Ravichandran N. (n.d.). Health Poverty and Equity Mechanisms in the Philippines  
Institute of Social Medicine Research, New Delhi, India. Retrieved December 8, 2015 from  
<http://www.asianscholarship.org/asf/ejournal/articles/Nataraj.pdf>

Reason, James T. Human Error. Cambridge, MA: Cambridge University Press; 1990. Cited in *To Err is Human: Building a Safer Health System*. Errors in Health Care: A Leading Cause of Death and Injury. Retrieved December 10, 2015 from  
<http://www.ncbi.nlm.nih.gov/books/NBK225187/>

Six Sigma Materials (n.d.). Control. retrieved December 8, 2015 from <http://www.six-sigma-material.com/Control.html>

Steel K, Gertman P M, Crescenzi C, Anderson J (2004) Iatrogenic illness on a general medical service at a university hospital *Quality and Safe Health Care* 2004;13:76–81.  
doi: 10.1136/qshc.2002.003830 retrieved December 8, 2015 from  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1758071/pdf/v013p00076.pdf>

World Health Organization (2008). *World Patient Safety Day*. Retrieved December 8, 2015 from  
<http://www.gov.za/world-patient-safety-day>

World Health Organization Western Pacific Region. (2013) Human Resources for Health  
Country Profile Philippines Retrieved December 8, 2015 from  
[http://www.wpro.who.int/hrh/documents/publications/wpr\\_hrh\\_county\\_profiles\\_philippines\\_uploadv1.pdf?ua=1](http://www.wpro.who.int/hrh/documents/publications/wpr_hrh_county_profiles_philippines_uploadv1.pdf?ua=1)