IJAHSP
The Internet Journal of Allied Health Sciences and Practice
http://ijahsp.nova.edu

A Peer Reviewed Publication of the College of Allied Health & Nursing at Nova Southeastern University
Dedicated to allied health professional practice and education
http://ijahsp.nova.edu Vol. 4 No. 4 ISSN 1540-580X

Approach to Medical Futility in a Community Hospital: Is Use of a Prognostic Scoring System Applicable?

Sandra M. Terra RN BSN, MS, DHSc(c) CCM, CPUR
Director, Resource Management
Putnam Community Medical Center

Citation:
Terra, S. Approach to medical futility in a community hospital: Is use of a prognostic scoring system applicable? *The Internet Journal of Allied Health Sciences and Practice*. October 2006. Volume 4 Number 4.

Abstract
All acute care medical facilities and healthcare providers are faced with cases of medical futility. Guidance must ensure the initiation of communication with the patient or family regarding end of life planning. Identification of certain physiological features may provide impetus for such communication. In an effort to identify the physiological variables that may trigger discussion in a futile medical treatment policy, the application of a prognostic scoring system is examined. The Acute Physiology and Chronic Health Evaluation Score (APACHE II) system, a widely applied set of acute, chronic and diagnostic variables, is identified through literature review. This paper examines the applicability of the prognostic scoring system APACHE II in a rural, community intensive care unit. Data from internal systems identified a pool from which a sample of medical records were selected and retrospectively reviewed. Records for all patients who expired and a representative number of those discharged to home are selected, comprising 23% of the original pool of 300 patients. Data abstracted from these records was entered into a web enabled APACHE II scoring program. Resultant scores along with length of stay (LOS) and demographic data were analyzed to examine the accuracy of mortality prediction. Although study design proved to be limited and multiple opportunities for improvement can be noted, clearly identifiable parameters of mortality were evident. In spite of study design flaws it was recommended that a prognostic system such as APACHE II be adopted in the ICU as a routine part of each patient admission.

Introduction

"Clinical ethics is the identification, analysis, and resolution of moral problems that arise in the care of patients."[1] The changing face of health care has created a significant number of clinical ethics questions. Technology is providing opportunity to extend life and sometimes heal critically ill patients, patients that previously would not have survived their injury or illness. Cultural and ethnic diversity is increasing, the population is aging, costs are increasing, and resources are decreasing. An increasing number of people are uninsured, health disparity is rising and practice settings are shifting. Cumulatively, these factors have a profound effect on ethical healthcare decision making.

These changes effect health care providers at every level, are a challenge in both the tertiary and community settings, and are compounded by the scope of services delivered and the population served. These challenges can often be more difficult to overcome in rural facilities. There is increased health disparity in the rural setting and the population is older, sicker and poorer.

Putnam Community Medical Center (PCMC), a 141-bed facility, provides normal obstetric and acute community hospital services for the population of Putnam County, Florida. The hospital has an active Emergency Department (ED) and a 10-bed Intensive Care Unit (ICU). Patients requiring certain interventions or specialty services must obtain care in regional tertiary facilities. PCMC, like most rural facilities, is less able to provide a full spectrum of services due to financial constraints, physician practice mix, staffing concerns, and other factors.

The primary population served by PCMC is over 70 years of age, at or near poverty level, and suffering from 2 or more chronic health conditions. Many live alone or with an

elderly spouse. Some live in sub-standard housing with no resources for improvement or relocation and no family or other relatives to turn to or to speak for them. Those in need of care suffer at the lack of local publicly funded programs and scarce community resources. At least 30% of the inpatients have had more than 2 previous admissions. These factors ensure the ethical question of medical futility will be raised among the healthcare providers delivering care to this population.

Nature of the Problem

In broad terms, medical futility is defined as a treatment, procedure, or medication that will not result in a therapeutic benefit to the patient. Among other considerations, medical futility is concerned with those actions associated with provision of interventional medical care to those who are so seriously ill or injured that restoration of health and function are unattainable.[2] Issues of medical futility can arise when a patient is moribund (death is imminent), terminally ill, or hopelessly ill. This can apply to the newly born as in the case of neonates, or the elderly, chronically ill patient.

In all cases of medical futility, the principles of respect for autonomy, nonmaleficence, and beneficence dominate.[2] Due to the high likelihood of death in critically ill patients, the burden of end of life decision making often falls to the patients' family. Generally unprepared for such catastrophic decision making, families are often stressed and overwhelmed. "These families need careful explanations, time to process information, and consistent professional support to meet the challenges to their decision-making capacities."[3] Early initiation of communication with the family and exploration of quality of life and contextual issues can greatly reduce the trauma of decision making in a medically futile situation.

Cases of medical futility are present in all acute care facilities and many other healthcare settings. Several facilities have adopted or developed tools to aid the healthcare provider in identifying cases where further treatment will be futile. Along with a formal guideline, policy or position statement, prognostic systems such as the Acute Physiology and Chronic Health Evaluation Score (APACHE II) have been applied. These steps are taken to intervene in medically futile cases as early as possible, reducing emotional trauma of the family and observing fiscal responsibility.

The determination of medical futility at PCMC is made solely upon patient and provider preference and no evidence-based reasoning is routinely applied. Although physicians can often predict the outcome for critically ill patients, prognostic scoring systems may plot the course of critical illness and help clinical decision making. In addition, prognostic scoring systems can be an early alert for the healthcare team and prompt exploration of ethical issues. Investigation of the applicability of currently available prognostic scoring systems is undertaken as an aid in decision making for timing of discussion regarding end of life issues in critically ill patients.

Purpose of the Study

This purpose of this paper is three fold; first, to examine the concept of medical futility; second, to examine available predictive scoring systems; and third, to determine applicability of such a system to the rural patient population of PCMC.

Significance to the Organization

PCMC has limited resources and conflicting end-of-life perspectives among the medical staff, employees, and patient population. The medical staff is comprised of individuals from 35 countries. Although cultures may be similar, there is still significant diversity in the perspectives of the medical staff. The Moslem and Hindu religions are well represented and are practiced as routinely as Christian-based denominations. There are a large number of physicians whose culture and/or religion proscribes that all efforts must be made to preserve life regardless of futility. End-of-life perspectives vary greatly among the physician population based upon both culture and religion.

Those providing bedside care, the Nursing staff, Respiratory, Physical, Speech, and Occupational Therapists, Radiology, laboratory, and pharmacy staff are predominantly long term, local residents. The primary religions practiced by the employees are Christian-based and include Baptist, Catholic, and a variety of the charismatic denominations. White or Caucasian culture predominates, with Hispanic and Afro-American or Black cultures common. The patient population mirrors that of the employee base, but is augmented by a local Thai community which practices Buddhism, seasonal migrant workers from Mexico, and “snowbirds” from the northeast corridor. This amalgamation of cultures and beliefs includes both those patients and staff who hold to making all efforts in sustaining life and those who hold to natural events and do not wish or agree with certain medical intervention. These three groups, the medical staff, the employee health care workers, and the patient population often have conflicting values and ethics. This results in either avoidance or refusal to discuss end-of-life issues by the physician or the patient and his or her representatives. The addition of a prognostic system and accompanying application guideline can provide a mechanism to ensure the issue of medical futility is addressed, communication and planning are initiated, and resources are appropriately utilized.

Research Question

There is one research question to be answered by this paper: Would a medically predictive scoring system aid

PCMC in identifying cases of medical futility and, as a part of a comprehensive policy, provide more timely communication and subsequent appropriate medical care in a limited resource setting?

Review of the Literature

This literature review is focused upon describing the concept of medical futility, scarcity of medical resources, bioethical communication and the efficacy of predictive scoring systems.

The Concept of Medical Futility: Definitions and Controversies

There is a plethora of literature addressing the concept of medical futility. The 1990's brought about an intense debate concerning the meaning and usefulness of the concept of medical futility.[4] The authors provide a succinct analysis of the content of 35 articles with content relevant to defining or identifying what may be regarded as futile, pointing out apparent confusion and conflict. "The term (medical futility) is fraught with confusion, inconsistency, and controversy."[5] Others researchers reflect similar observation.[6,7,8,9,10]

Typically, the term "medically futile" refers to situations in which the patient or the patient's surrogate requests treatments or interventions that are considered pointless by the physician. In other words, the determination of medical futility is made by the physician and is a result of the combined ethics, values, morals, experience, and perspectives of the physician. This contention is supported in the literature as discussed in a frequently asked questions (FAQ) format and in addressing the notion that physicians need not consult the patient in cases they have deemed medically futile.[11,10] This is also supported with the proposal of three strictly defined senses when unilateral decision making by the physician is acceptable.[5]

A distinction is also made between patient/surrogate insistence and physician insistence upon futile intervention in the broader scope of futile intervention considering each perspective.[5] In the event of patient insistence upon futile intervention, the ethical principle of beneficence is applied, seeking to serve the best interest of the patient. In the reverse case, that of physician insistence, personal integrity is often cited as is the autonomy of the caregiver. Physician insistence upon initiating or continuing futile treatment is also influenced by culture and religious beliefs and is highly problematic.[5] There is broad agreement that resource allocation should be based upon explicit or implicit criteria and should follow the identification of a case of medical futility.[9,2,4]

Medical Scarcity and Resource Utilization

The ethical problem of medical futility includes medical scarcity and resource allocation. In a 2002 study, the variation between death as a result of withdrawal of life support and the withholding of life support varied as much as 78%, indicating a need to develop best practices in death in the ICU setting.[12] The cost to care for these patients also varies. "The issue of the allocation of resources in health is here to stay."[13] This study from the Netherlands concludes that resource allocation is justified, but only when the best interest of the patient is paramount and it is not the primary driver of elimination or restriction of resources.

"Rationing of healthcare is a reality in the UK (United Kingdom of England and Ireland).[14] After an examination of the rule of rescue – that which provides high cost services to save the lives of the one – the authors conclude that it is wrong to pay more for life saved by rescue than by prevention.

The role of the healthcare manager in the development of policy and determination of medical futility is addressed, citing a policy as a means to support physician position while providing a means to resolving dispute as to what is futile.[15] Proactively addressing the topic of medical futility and developing a policy and structured approach to investigation is imperative so that physicians and patient "have a framework and resources that can aid in decision making."[15] Clearly, the literature supports the need to address medical futility and with it, resource allocation. Ethical practice demands this not be the sole determinant but a contributing source of information.

Bioethical Health Communication

Aspects of bioethical communication require inclusion of cultural and societal (contextual) factors.[16,17] "Most deaths are now somehow "negotiated," underscoring the need to study and improve end-of-life care."[3] The authors conducted a study to evaluate the effect of a communication team on the Length of Stay (LOS) and utilization in an ICU. The study indicates a positive financial benefit to engaging in end-of-life communication with families and supports the development of a policy that initiates communication early in the process.

Of equal importance are the cultural and societal factors that must be considered in all level of communication.[17] Religious, moral, cultural, and even racial factors influence our view of the world, and each person must be allowed the respect to have his or her wishes prevail. Establishing effective communication between those of differing perspectives requires a fundamental understanding of other religions and cultures. It is the responsibility of every healthcare provider to obtain such education.[17]

Prognostic Scoring Systems and Outcome Prediction

"Outcome has usually been measured as death before discharge from hospital after intensive care."[18] Patients

admitted to an ICU have a much higher death rate than do general medical or surgical patients. Various characteristics have been identified as contributing to a higher risk of death. Age, underlying conditions, and surgical status in the critically ill are three characteristics that contribute to a poor outcome. These factors and physiological data are weighted to produce a severity of illness score. There are several systems available that will deliver such a score or guideline. "Scoring systems are aimed at quantifying case mix and using the resulting score to estimate outcome."[18]

One such system used to aid in health care decision making is a prognostic survival scoring system known as the Acute Physiological and Chronic Health Evaluation (APACHE) II. This system is widely used to aid the prediction of patient survival in large teaching and tertiary institutions. Evidence is found for the use of the system, citing correlation between survival and predictive scores.[19,20,21]

Other studies have found the APACHE system inferior to physician prognostic skills and other predictive approaches.[22,23,24,25] The use of predictive modeling systems is considered dependent on several factors including consistent and accurate data collection.[26]

Accuracy of prediction is equally dependent upon the population from which the scale was developed and as many as 7 other variations that may be present in the medical care of the patient, all influencing outcome.[26] Predictive scoring systems must be able to be calibrated to individual ICU's if they are to be used as sole decision making tool in the withdrawal or withholding medical treatment.

To add to the debate, a study from Taiwan indicates that the complexities of the system may not be appreciated by nursing staff, and that when such systems are applied, sustained training is required.[27] This is supported by a 2005 study that concludes APACHE II, the most widely used system, is not an appropriate tool for sole resource allocation decisions based upon frequent miscalculation of scores.[28] Error rates are attributed to numerous and complex data calculations that introduce opportunity to miscalculate individual severity of illness scores.

In summary, the combined consensus does not support using a prognostic system as a sole decision making instrument but does indicate the predictive accuracy of score to mortality. Application of prognostic systems as an early detection tool applied to initiate communication is not addressed.

Methodology and Procedures

A causal-comparative methodology was applied to this study. Data was collected from medical records retrospectively and entered into a web-enabled prognostic scoring version of APACHE II. Resultant scores were compared to actual mortality to assess the accuracy of this scoring system in identifying those patients who will have a high risk of a poor outcome.

Sample

A pool of patients who had received care at some time during their admission in the ICU and had expired or been discharged between December 1, 2005 and May 31, 2006 were identified. Of this pool, all of those patients who had expired and a random selection of 30 patients who had been discharged from the hospital to home were selected. Patients who were discharged to home health, a nursing facility, or other level of care were excluded from the study groups.

APACHE II Score

The APACHE II score was calculated based upon data abstracted from retrospective medical record review. APACHE II calculation required data from 12 physiological variables, patient age, presence of acute renal failure, operative status, presence of chronic conditions or disease states, and the Glascow Coma Score (GCS). The score from the Glasgow Coma Scale is a standard measure and establishes a level of neurological function. The worst acute measurements identified in the first 24 hours of ICU admission were used. Data was abstracted and entered by a single researcher not officially trained in the use of the APACHE II prognostic system.

Procedures

There were 6 procedures used in the investigation of the prognostic scoring system. The first procedure was a literature review of materials no older than five years. The second procedure was an Internet search to review currently existing prognostic systems. The third procedure was a review of currently existing policies and/or procedures. This review included analysis of corporate, division, and hospital level policies and procedures. The fourth procedure was an extraction of medical data from electronic and paper medical records. The fifth procedure was data entry of medical indicators into an electronic APACHE II calculator with subsequent score calculation. The final procedure was an analysis of demographics, resource allocation, and APACHE II score accuracy to mortality.

Technological Platforms and Reference Material

Several software programs were used to create this document and collaterals. Microsoft Word was coupled with APA Reference Point Software to create the base document. Graphs and charts were created in Microsoft Excel and imported into the Word document.

Nova Southeastern University's Health Professions Division Electronic Library was accessed to allow initial literature search. EBSCOhost Database was selected. A search across multiple contributing EBSCOhost databases including Medline, Alt HealthWatch, AgeLine, CINAHL, IPA, SportDiscus, CDSR, DARE, CCTR, Biomedical Reference Collection, Nursing & Allied Health Collection, and Pre-CINAHL provided ample peer-reviewed literature. Key word search was made on medical futility, APACHE II, prognostic scoring systems and resource allocation. Privately owned libraries were searched for relevant contributions. Topics reviewed included cultural diversity, ethical decision making, and healthcare communications.

Internal Data

Data was abstracted from the MEDITECH electronic medical record system and downloaded to a single workstation. The file was then opened in Microsoft Notepad. Banners, page breaks and repetitive dates were deleted from the file and it was saved as a .txt file. The file was then imported into a Microsoft Access database and eventually exported to Microsoft Excel.

A variety of standard and *ad hoc* reports were available to identify most frequent admitting diagnosis, prevalence of presenting diagnosis and conditions, and other health care services provided. This information was available in terms of actual numbers as well as financial interpretation. All information is proprietary and is generalized and blinded as appropriate to ensure confidentiality.

Assumptions

There were four assumptions placed upon this practicum. The first assumption was that the literature was the most current available and pertinent to the topic. The second assumption was that the total number from which to select a sub-set was accurate and included all patients admitted to the ICU during a specific time period regardless of discharge disposition. The third assumption was that the web-enabled algorithm returned an accurate calculation. The fourth assumption was the accuracy of the GCS as recorded by Emergency Medical Services (EMS) staff and PCMC healthcare providers.

Limitations

There were two general limitations placed on this investigation. The first limitation was lack of training in the use of APACHE II, a factor demonstrated to be problematic in the literature. A single researcher abstracted data and performed data entry to maximize accuracy and consistency. The second limitation was the scope of the investigation and subject sample. Subjects are limited to those patients who received medical or surgical care in the ICU over a six month window. Subject selection is also limited to a single, rural community facility rather than a cross section of area hospitals. Additionally, the two selected subgroups were not matched for admission diagnosis, age and gender. Collection of specific APACHE II scores was not retained for further analysis.

Results

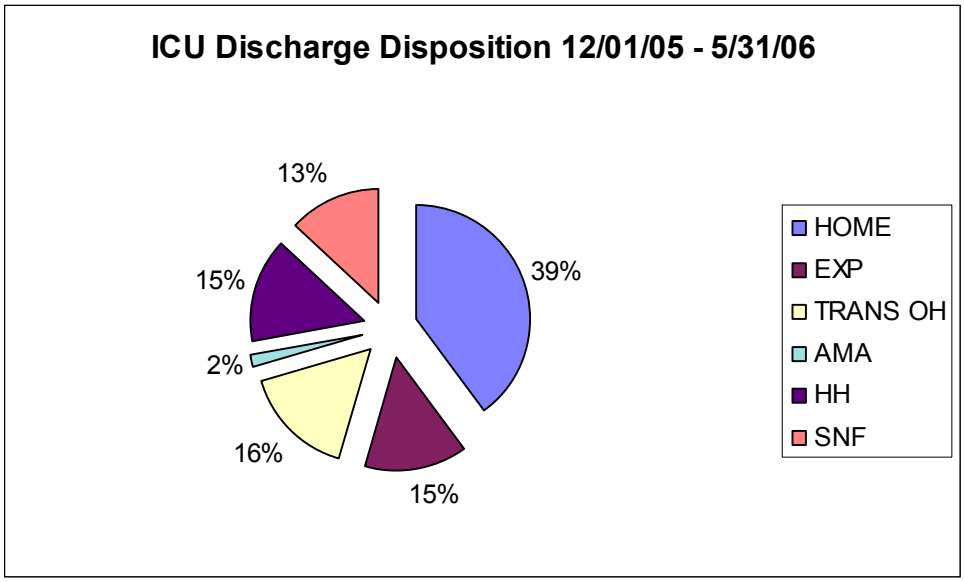
The purpose of this project was to investigate the applicability of a prognostic system in identifying cases of medical futility in a rural community hospital. Three hundred patients were identified from which to select a subset. Of this group, data was collected retrospectively from a subset of the medical records of the 300 patients. Only patients who died were included in the sample. Patients were classified as medical or surgical based upon their status at ICU admission.

Characteristics of the Sample

A total of 300 patients who, at some point in their admission to PCMC, had received medical or surgical care in the ICU and had a discharge date between December 1, 2005, and May 31, 2006, were identified. Of this sample, a subset of 70 patients was selected. All patients who had a discharge disposition of "expired" were selected and a random sample of 30 of the 129 patients who had a discharge disposition of "home." This constitutes 23.3% of the pool of discharges from the ICU identified during the study period. Details of discharge disposition for the study period are found in Figure 1.

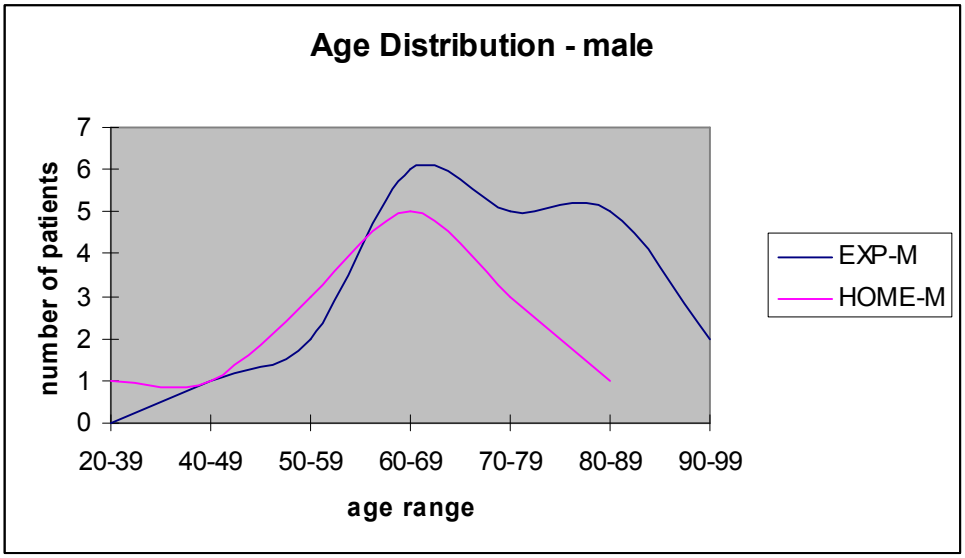
Not all selected records had complete data. Four records from the "expired" group were incomplete and were excluded. Three records from the "home" group were also excluded due to missing data. Data was sanitized in compliance with internal and regulatory requirements.

Figure 1. PCMC ICU Discharge Disposition.[29]



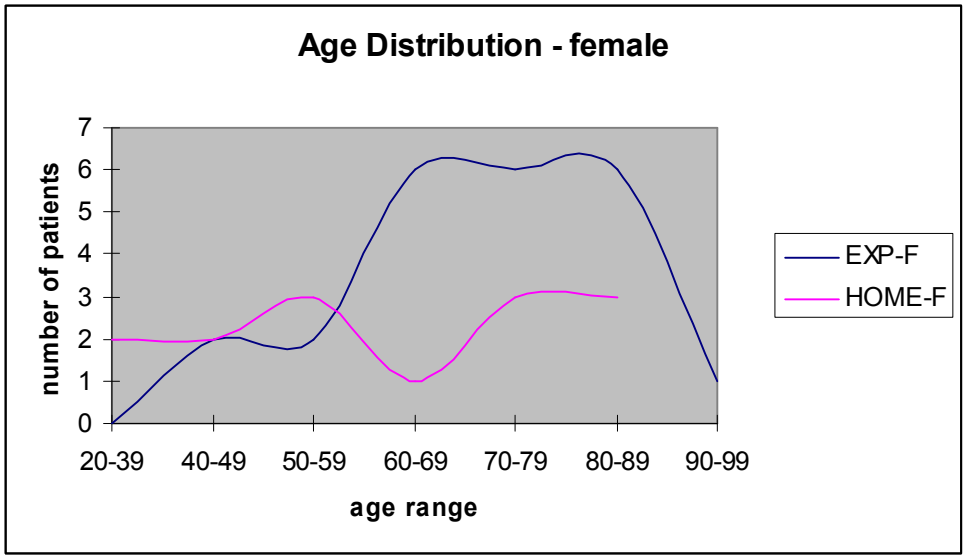
Age distribution by gender was reviewed to identify patterns. In both male and female categories, the group of patients who expired held a greater number of persons over 70 years of age than the group of patients who were discharged home. Of note is the sharp peak in age of males in the 60-69 range. The implication is a higher increase in mortality after age 69 for males. Data is charted in Figure 2.

Figure 2. ICU Admissions by Gender and Age – Male.[29]



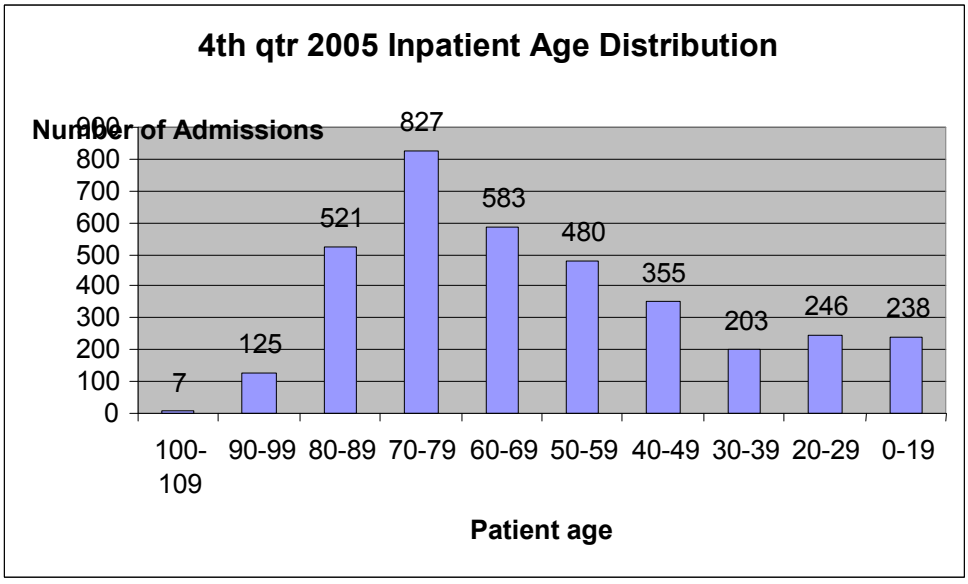
The implications of the age graphing for females is equally apparent with a sharp increase in number in the 60-69 age range for those patients who died. As in the graphing of the male population, there is a younger population of patients in the group discharged to home. Data is found in Figure 3.

Figure 3. ICU Admissions by Gender and Age – Female.[29]



This indication of an older population is consistent with general admission statistics for PCMC in the fourth quarter of 2005. Data can be found in Figure 4.

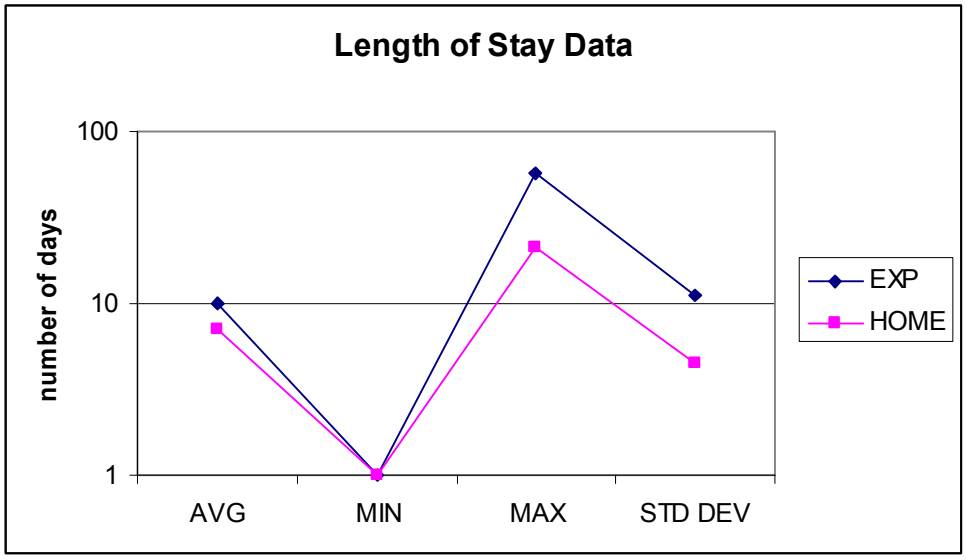
Figure 4. PCMC 4th qtr Age Distribution.[30]



Overall Length of Stay

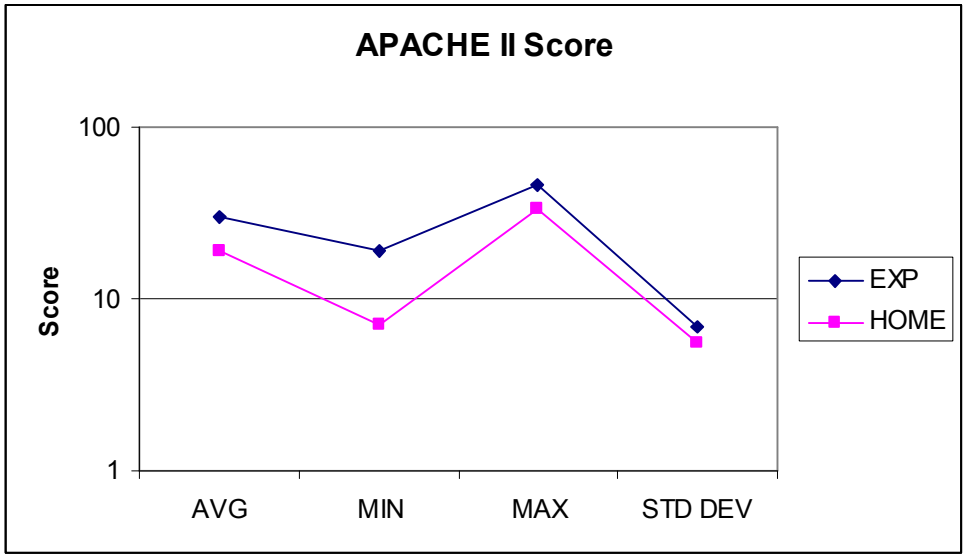
It is generally accepted that the first day of a hospital stay is the most expensive. Adding to initial cost is a cost of $100 per day, per subsequent day. Costs in the ICU are markedly increased. Although cost data was not considered due to proprietary reasons, length of stay was reviewed. Both groups had members with a length of stay of one day but the expired group's longest LOS of 57 days was more than double that of the longest stay of 21 days by the group discharged home. The expired group had a significantly longer length of stay, which can be equated with cost. LOS data is displayed in Figure 5.

Figure 5. LOS in ICU.[29]



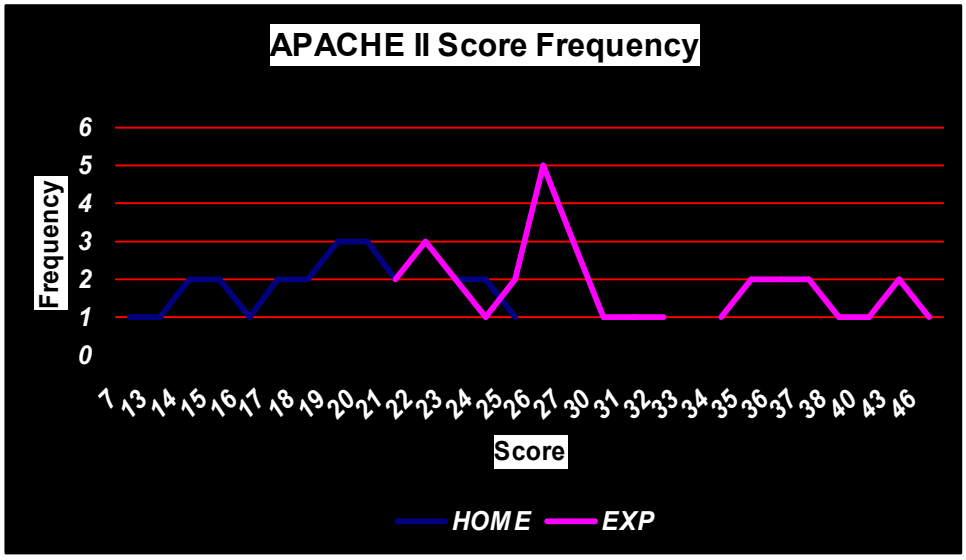
Of crucial importance in determining the applicability of a scoring system in the rural ICU setting is the distribution of the resulting APACHE II Scores. Plotting of scores indicated a consistently higher APACHE II Score in the expired group. An average LOS for the expired group was 10 days compared to the home group's average of 7 days. See Figure 6.

Figure 6. APACHE Score Distribution.[29]



Supporting the notion that a higher score results in mortality is the frequency distribution of individual scores. The scores for both groups are plotted. An overlap in scores in the 21 to 26 range occurs indicating a crucial range for potential mortality. Data is found in Table 7.

Figure 7. APACHE II Score Frequency Distribution.[29]



Discussion, Conclusions, Implications, and Recommendations

Modern medicine has evolved to the point where life can be prolonged indefinitely. Many legal and ethical issues concerning medical futility arise because of these advancements. Negotiating care when family and physician do not agree on treatment can be a delicate communication and requires clear direction to achieve the optimum level of respect and trust between the parties. Respecting the wishes of the family or patient regarding medical treatment demands that the healthcare provider exercise the principles of integrity, beneficence, and humility. Ultimately, respect for patient preference is essential and cost not a primary factor.

Hospitals are beginning to apply the concept of medically futile treatment to clinical treatment. In cases determined to be medically futile, the prohibiting clinical actions serving no useful purpose which may, in fact, cause undue suffering for the patient is a future standard in critical care. Identifying those patients and initiating communication with the family may reduce the overt resource allocation, and in the ethical sense, provide a higher quality of care.

There are many factors that contribute to the mortality of an individual patient. These factors reside in past medical history, lifestyle, age, and unexpected events. Often there is little to alert us to the potential of our own mortality. Communication regarding healthcare outcomes or end-of-life issues should be mandatory for all patients and/or their families who require medical care in the intensive care setting. Prognostic scoring systems, coupled with other tools, can cue the health care provider to initiate advance planning communication with the family.

A scoring system, however, is only as reliable as the data input necessary for score calculation. Several obstacles are inherent in a system that requires abstraction and entry by more than one person. Information may be missing and default values, if any, must be developed. Caution must be taken not to depend upon prognostic scoring systems for sole decision making.

Conclusions

APACHE II scores calculated at the time of admission to the ICU are predictive of mortality in the mixed medical-surgical, rural population. Such scores, generated at the time of admission or within the first 24 hours, can be an impetus to initiate communications regarding end-of-life planning. Communication with all those admitted to an intensive care setting is essential. Often, prioritizing cases may be required. Assisting families and patients in developing end-of-life plans is time consuming and must be done with respect for the fragility of those in crises. Variables exist that preclude the use of a prognostic system without additional input from all parties. Prognostic scoring systems are not always accurate but can be used as a guide to prioritize communication efforts.

Implications

There is great opportunity to study the applicability of a prognostic scoring system to the rural, community hospital setting. The poverty level, access to care, and health disparity issues of the rural community are explored in great depth in the literature as are the challenges faced by community hospitals. The addition of a prognostic tool to

spark communication in cases of medical futility may allow rural facilities to better deploy resources.

This study presents a plethora of ideas for future research. Being limited to a correlation between prognostic scores and mortality, this study did not explore the relationship between physician culture and LOS and mortality, resource allocation and APACHE II scores, the LOS of admission to ICU and subsequent death of the patient, and gender related data. Repeating the study with documentation and analysis of individual factors in scores may prove valuable. Studies specific to those patients scoring in the range of 21 to 27 in the APACHE II score may reveal patterns that could lead to more accurate prognosis.

Recommendations

Application of the APACHE II system or other prognostic scoring system in conjunction with a policy that supports initiation of communications regarding end-of-life planning should be adopted at PCMC. A scoring system can provide additional data to guide the healthcare practitioner in communicating essential medical information to the patient or family allowing them to make the most informed decision regarding further medical care.

Prior to adoption, several systems such as subsequent versions of APACHE should be examined for ease of use and inter-rater reliability. A system that is not user friendly will not be applied and will not result in the desired outcome of timely communication and resource husbandry, nor will a system used by personnel who have not been trained in its use provide consistent, applicable information.

References

1. Meuller, P. S., Hook, C. C., & Fleming, K. C. (2004). Ethical issues in Geriatrics: A guide for clinicians. *Mayo Clinic Proceedings (Mayo Clin Proc), 79,* 554-562.
2. Jonsen, A. R., Siegler, M., & Winslade, W. J. (2002). *Clinical ethics: A practical approach to ethical decisions in clinical medicine* (5th ed.). New York, NY: McGraw-Hill Medical Publishing Division.
3. Ahrens, T., Yancey, V., & Kollef, M. (2003). Improving family communications at the end of life: Implications for length of stay in the intensive care unit and resource use. *American Journal of Critical Care, 12*(4), 317-323.
4. Lofmark, R., & Nilstun, T. (2002). Conditions and consequences of medical futility - from a literature review to a clinical model. *Journal of Medical Ethics (J Med Ethics), 28,* 115-119.
5. Lo, B. (2000). *Resolving ethical dilemmas* (2nd ed.). Philadelphia, PA: Lippincott Williams & Wilkins.
6. Angelucci, P. A. (2006). Grasping the concept of medical futility. *Nursing Management, Feb,* 12, 14.
7. Bailey, S. (2003). The concept of futility in health care decision making. *Nursing Ethics 2003, 11*(1), 77-83.
8. Burt, R. A. (2002). The medical futility debate: Patient choice, physician obligation, and end-of-life care. *Journal of Palliative Medicine, 5*(2), 249-254.
9. Dunphy, K. (2000). Futilitarianism;: knowing how much is enough in end-of-life health care . *Palliative Medicine, 14,* 313-322.
10. Wreen, M. (2004). Medical futility and physician discretion. *Journal of Medical Ethics (J Med Ethics), 30,* 275-278.
11. Kasman, D. L. (2004). When is medical treatment futile. *Journal of General Internal Medicine (J GEN INTERN MED), 19,* 1053-1056.
12. Way, J., Back, A. I., & Curtis, R. J. (2002). Withdrawing life support and resolution of conflict with families. *British Medical Journal (BMJ), 325,* 1342-1345.
13. van Delden, J. J. M., Vrakking, A. M., van der Heide, A., & van der Maas, P. J. (2004). Medical decision making in scarcity situations. *Journal of Medical Ethics (J Med Ethics), 30,* 207-211.
14. Hope, T. (2001). Rationing and life-saving treatments: should identifiable patients have higher priority? *Journal of Medical Ethics, 27,* 179-185.
15. Darr, K. (2000). Futile treatment and the health services manager. *Hospital Topics, 78*(3), 27-30.
16. Northouse, L. L., & Northouse, P. G. (1998). *Health Communication* (3rd ed.). Stamford, CT: Appleton & Lange.
17. Spector, R. E. (2004). *Cultural diversity in health and illness* (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.
18. Gunning, K., & Rowan, K. (1999). ABC of intensive care: outcome data and scoring systems. *British Medical Journal, 319*(July), 241-244.
19. Afessa, B., Keegan, M. T., Mohammad, Z., Finkielman, J. D., & Peters, S. G. (2004). Identifying potentially ineffective care in the sickest critically ill patients on the third ICU day. *Chest, 126*(6), 1905-1909.
20. Chang, L., Horng, C-F, Huang, Y-C T., & Hsieh, Y. Y. (2006). Prognostic accuracy of acute physiology and chronic health evaluation II scores in critically ill cancer patients. *American Journal of Critical Care, 15*(1), 47-53.
21. Goel, A., Pinckney, R. G., & Littenberg, B. (2003). APACHE II predicates long-term survival in COPD patients admitted to a general medical ward. *Journal of General Internal Medicine, 18,* 824-830.
22. Baskin, J. Z., Panagopoulos, G., Parks, C., & Komisar, A. (2005). Predicting outcome in aged and severely ill patients with prolonged respiratory failure. *Annals of Otology, Rhinology & Laryngology, 114*(12), 902-906.

23. Berge, K. H., Maiers, D. P., Jewell, S. M., Bechtle, P. S., Schroeder, D. R., Stevens, S. R., et al. (2005). Resource utilization and outcome in gravely ill intensive care unit patients with predicted in-hospital mortality rates of 95% or higher by APACHE III scores: The relationship with physician and family expectations. *Mayo Clinic Proceedings, 80*(2), 166-173.
24. Scholz, N., Basler, K., Saur, P., Burchardi, H., & Felder, S. (2004). Outcome predication in critical care: physicians' prognoses vs. scoring systems. *European Journal of Anaesthesiology, 24,* 606-611.
25. Schonhofer, B., Guo, J. J., Suchi, S., Kohler, D., & Lefering, R. (2004). The use of APACHE II prognostic system in difficult-to-wean patients after long-term mechanical ventilation. *European Journal of Anaesthesiology, 21,* 558-565.
26. Mendez-Tellez, P. A. (2005). Predicting patient outcomes, futility, and resource utilization in the Intensive Care Unit: The role of severity scoring systems and general outcome prediction models. *Mayo Clinic Proceedings (Mayo Clin Proc), 80*(2), 161-163.
27. Chen, S. L., Wei, I. L., Sang, Y. Y., & Tang, F. I. (2004). ICU nurses knowledge of, and attitudes towards, the APACHE II scoring system. *Journal of Clinical Nursing, 13,* 287-296.
28. Booth, F. V., Short, M., Shorr, A. F., Arkins, N., Bates, B., Qualy, R. L., et al. (2005). Application of a population-based severity scoring system to individual patients results in frequent misclassification. *Critical Care Forum, 9*(5), R522-R529.
29. PCMC (May 2006). *CCU Admissions* (No. 4). Palatka, Fl: Putnam Community Medical Center.
30. PCMC 10th Year End Trending Report)PCMC (10th). *Year End Trending Report* (Year End 2005). Palatka, FL: PCMC.

Acknowledgement is given to J. Robin Fleming for her support during the research.