Evidenced-based Practice

Priorities and Implementation Strategies

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Hospitals and clinicians strive to provide the best care to patients. One major effort to achieve best patient care is the implementation of evidenced-based practice (EBP). In the United States, the Agency for Health Care Research and Quality (AHRQ) has led the way, providing many clinician guidelines using EBP.

Fortunately, better evidence is accumulating to aid clinicians in implementing EBP. However, clinicians have many areas of practice to improve. Prioritizing which practices should be addressed is also an important aspect of improving patient care.

Prioritization varies with each hospital's specific need. However, most hospitals strive to address the areas that most affect cost and outcome. In critical care, cost and outcome are clearly addressed by outlier management and severe sepsis.1–4

This article presents a review of the value of EBP and ways in which EBP can affect specific clinical practices, such as outliers and severe sepsis. This presentation clarifies both the value of EBP and how to prioritize the practices that should be addressed.

What is Evidence-based Practice?

EBP has different definitions ranging from strict use of the results from randomized clinical trials (RCTs) to a more encompassing view that includes evidence from more than RCTs using information from many resources.

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such as descriptive studies, case reports, and expert opinion. An example of this latter view is summarized in Table 1.\textsuperscript{5} This latter view is useful when summarizing the strength of evidence to support a particular position. In addition, a broader view of EBP has value because many practices do not have RCTs to support their use. In this review, EBP is defined as evidence that is more than just RCTs. This definition of EBP will be the basis for the review of the clinical practices involving outlier and sepsis management. One feature missing in the grading system in Table 1 is that it does not provide any indication of the importance of a problem. The focus on high-cost patients (outliers) and high mortality (severe sepsis) are illustrations of how to prioritize clinical problems.

\section*{Value of Evidence-based Practice}

The key value in EBP is the increased likelihood of identifying the best method to diagnose and treat patients. EBP helps clinicians avoid behaviors that are less effective and leads to the implementation of best practices. The use of EBP assists clinicians to avoid the use of opinions and conjecture in making decisions. Over 200 years ago David Hume stated that the strength of one’s opinion should be tied to the evidence.\textsuperscript{6}

Use of EBP also helps avoid errors in decision making. In the use of EBP, a key goal is to find the best answer to a question and in so doing, avoid one of two errors, Type I or Type II. A Type I error is often called a false-negative and a Type II error is a false-positive. Both types of errors can have dangerous implications in clinical practice although Type I errors tend to be more serious.

A Type I error is the acceptance of a practice that is, in reality, incorrect. For example, in the everyday world a Type I error would be the belief that touching a hot curling iron is safe. In clinical practice, a Type I error would be accepting the belief that a dose of 100 meq of intravenous potassium chloride is safe (which in reality is lethal). In the administrative world, it would be accepting that reducing the number of registered nurses is a good way to control costs (since it actually causes more problems and fails to reduce costs).

A Type II error is the rejection of a practice that is correct. In the everyday world, a Type II error would be avoiding checking the air in the tires of an automobile (resulting in poor handling of the car, premature wear, and flat tires). In the clinical world, it would be rejecting the use of antibiotics as a way for controlling infection or rejecting the use of insulin for the treatment of diabetes. In the administrative world, it would be rejecting the use of nurse-directed protocols as a cost-control measure.

EBP helps avoid both types of errors by attempting to establish causality between events or variables. There are many examples of Type I and Type II errors in clinical and administrative practices. The likelihood of avoiding these errors lies in the ability to employ the use of EBP.

Advanced practice nurses (APNs), due to the nature of their graduate preparation, often are well-prepared in the use of EBP process and can help the hospital avoid making Type I or II errors. The APN can help the hospital identify which practices are likely

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\begin{tabular}{|l|l|}
\hline
\textbf{Grading Recommendations} & \textbf{Level of Support}\textsuperscript{*} \\
\hline
Supported by at least 2 level-I investigations & Large, randomized trials with obvious results; low risk of false-positive or false-negative error \\
Supported by 1 level-I investigation & Small, randomized trials with uncertain results; moderate-to-high risk of false-positive or false-negative error \\
Supported by level-II investigations only & Nonrandomized, contemporaneous controls \\
Supported by at least 1 level-III investigation & Nonrandomized, historical controls and expert opinion \\
Supported by level-IV or level-V evidence & Case series, uncontrolled studies and expert opinion \\
\hline
\end{tabular}
\caption{Grading System Guidelines}
\end{table}

\textsuperscript{*}As defined in reference 23.
to help the hospital make the best decisions regarding patient care delivery.

**Which Evidence-based Practice Should a Critical Care Unit Introduce?**

Many clinical practices exist that should be changed to EBP. Careful thought must be placed regarding which practices should be attempted because staff can change only a limited number of behaviors at once. The introduction of EBP should be part of a plan that is introduced over time. Which EBP should be adopted first is specific to each organization. However, the plan should likely address the key causes of increased costs and mortality.

Cost effectiveness plays an important role in evaluating intensive care unit (ICU) interventions. Determining which practices are supported by administration may be influenced by how the practices affect the hospital’s economic health.

Using these two principles, in critical care the most likely practices that need to be changed are the treatment of sepsis and outliers. In the following examples, addressing the area that is most important is contrasted with an inappropriate attempt to control the same area. This will illustrate the benefit of EBP in improving critical care practices.

**Example 1: Controlling Costs in Critical Care**

In order to control costs in critical care, a question must be answered: What are the key costs in critical care? In a typical critical care area, between 40 and 50% of resources are consumed by a small group (<10%) of patients. This group is often referred to as outliers. Outliers’ average cost per case, length of stay, and mortality rates are all higher than nonoutlier patients. The 90% of patients who consume the other 50 to 60% of resources have lower costs per case, shorter lengths of stay, and better mortality rates. Many often do not even need an ICU admission. An analysis of the 10% of patients who consume 50% of resources reveals this group is likely the real problem for inefficient or undesired costs. Addressing this group of patients will have a domino effect on all the costs. How does EBP suggest this problem be addressed?

**Controlling Costs: The Danger of Not Using Evidence-based Practice Strategies**

A simple albeit erroneous method to control costs would be to examine budget categories. The largest budget category is personnel costs, particularly nursing. An assumption could be made that reducing personnel costs would help reduce costs. No evidence supports the benefit of simply reducing personnel costs as a way of improving overall cost control. While research is limited in terms of impact of nursing outcome on staffing, preliminary evidence exists suggesting that reducing nurse staffing ratios negatively affects patient outcomes.

Reducing personnel often leads to a Type I error, ie, accepting a belief that is untrue. The problem is not of reducing personnel costs, but of reducing unnecessary or undesirable costs. Directly targeting personnel costs ignores the problem that produces the personnel costs, eg, inefficient or undesired care. Reducing personnel costs alone will actually potentially harm patients because it will also impact the 90% of patients whose care is likely efficient and cost effective. The result may be a deterioration of staff, patient, and family satisfaction as well as no change (or increased costs from complications due to poor staffing).

**Primary Evidence-based Practice Approach to Cost Control**

Programs that target the outlier population are likely to help critical care units control costs more effectively. Because the outlier group has high mortality rates, end-of-life management programs should be implemented to ensure treatment matches patient wishes. One recent study suggests that simply by utilizing an APN to help families better understand treatment options, outliers can be successfully addressed while better matching patient wishes to treatments. Millions of dollars may be saved by addressing end-of-life in critical care. Other programs that can have a major impact on outliers are those aimed at mechanical ventilation, a common theme in outlier patients.
Programs such as ventilator weaning programs and early tracheostomy have been shown to positively impact both costs and outcomes.\textsuperscript{12−16}

\section*{Secondary Evidence-based Practice Approach to Cost Control}

Clinicians have many practices that need EBP as a guiding principle. Prioritization is necessary for selecting the next program. If the above practice is successfully introduced, other practices can be selected for implementation. An analysis of which practice should be selected next could be based on the likelihood of impacting cost. Good secondary programs can include ventilator associated pneumonia management, weaning protocols, and sedation protocols. These programs all hold the potential to save hundreds of thousands of dollars.

It is important to first implement practices that are critical in achieving the desired goal. Many practices can be implemented but might have minor benefit. Pulse oximetry is one such example.

Pulse oximetry is a widespread clinical tool designed to better monitor pulmonary function. The practice is evidenced based and the technology is accurate. Protocols were introduced to help improve pulmonary monitoring and reduce arterial blood case sampling.\textsuperscript{17−19} Reduction in the number of blood gases will reduce costs, but only slightly. For example, the charge for a blood gas differs from the hospital’s costs to run the test. Hospitals commonly charge more than $50 for a blood gas. However, blood gases only cost roughly $5 per test. If 1,000 blood gases were avoided due to a oximetry protocol, the hospital would only save $5,000. Use of oximetry is more of a patient comfort issue and a clinical monitoring tool. Pulse oximetry will not save the hospital much in terms of cost reduction.

\section*{Example 2: Addressing the Highest Cause of Mortality in Critical Care—Sepsis}

The highest cause of mortality in non-cardiac ICUs is severe sepsis.\textsuperscript{20−22} Patients with severe sepsis are also among the highest in terms of resource utilization. The problem posed by severe sepsis is so important that, like cost control, sepsis should be a major initiative for all hospitals. Fortunately, the implementation of EBP guidelines has been facilitated by professional societies. The Surviving Sepsis Campaign was developed in 2002 with the plan to reduce mortality from severe sepsis by 25\% in the next 5 years. The group identified an EBP approach to the treatment of severe sepsis (Table 2). The recommendations for treatment of severe sepsis were endorsed by 11 professional organizations.\textsuperscript{23}

\section*{What Not to Do: A Non-Evidence-based Practice Approach to Sepsis Management}

The treatment of sepsis has traditionally been antibiotics, fluids, and vasopressors. Unfortunately, these treatments have limited impact once sepsis has started. Perhaps the most important aspect of sepsis management is the need for rapid initiation of treatment. The decision to watch a patient to see if he or she will improve is potentially lethal in management of sepsis. Delay in treating sepsis by even 1 day increases mortality.\textsuperscript{24}

\section*{Primary Evidence-based Practice Approach to Severe Sepsis}

Severe sepsis must be treated aggressively and early. Early goal-directed treatment (administering fluids, inotropes, vasopressors, and blood to achieve oxygenation [S\text{v}O\text{2}] end points) initiated in the emergency department has been shown to improve outcome.\textsuperscript{25} Once the sepsis advances to producing organ dysfunction and high risk of death, activated protein C should be initiated.\textsuperscript{26}

\begin{table}[h]
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\caption{Surviving Guidelines}
\begin{tabular}{|l|l|}
\hline
\textbf{Treatments} & \textbf{Level of Support*} \\
\hline
Use of activated protein C & B \\
Goal directed treatment & B \\
Fluid administration & C \\
Replacement dose steroids & C \\
Tight glucose regulation & D \\
Vasopressors and inotropes & E \\
\hline
\end{tabular}
\end{table}

\textsuperscript{*}As defined in reference 23.
Secondary Evidence-based Practice Approach to Severe Sepsis

Treatments such as fluid therapy, steroid replacement, and glucose regulation should also be considered. Additional therapies such as vasopressor and inotropic support can be considered, although according to the Surviving Sepsis Campaign Guidelines, the evidence on improving patient outcome is limited.23

□ Implementation of Evidence-based Practice

Identifying the problem to be addressed and establishing the EBP methodology are key steps in improving practice. However, they are only the initial steps at problem solution. The implementation phase is, perhaps, the most important aspect of changing behavior to employ EBP.

Several key steps are necessary to ensure the successful implementation of EBP. Steps for implementation include assembling the team, establishing a sense of urgency, providing incentives for key leaders to change behavior, and implementing the program.

Step 1: Assembling the Team

Changing practice is simplified if a smaller number of clinicians are involved. For example, changing the behavior of an entire nursing staff is more difficult than changing a few charge nurses, which is more difficult than changing the behavior of a single APN. The same applies to the medical staff. It is more difficult to change the entire medical staff than it is to change the behaviors of the heads of each department. It is easier still to change the behavior of project leaders, particularly if they are already motivated to change practice to EBP. However, each hospital needs to evaluate how to best implement EBP within its infrastructure.

Who should be on the team? One strategy is to focus on key leaders in nursing and medicine. In nursing, the key leader is often an APN. While research is not available as to which role is best to serve as the leader, the APN is often in a strong position within the hospital infrastructure to fill this role. In medicine, the position should be filled by a physician who can impact a large number of patients affected by EBP. This might be the vice president of medical affairs, the unit director, or an attending physician with a large practice. It could also be an attending physician who has the respect of the medical staff and is likely to follow the leaders’ suggestions.

A statistician should be considered early in the planning program. The statistician’s role can be valuable as the measurement variables are identified and the plan of evaluation is developed. In addition, the statistician is essential when analyzing the results of the program.

Step 2: Establishing a Sense of Urgency

Establishing a sense of urgency for change is essential for clinicians to buy into the program. Helping establish the sense of urgency can be achieved by a combination of presenting the problem but also tying the problem into the problems the clinicians face on a daily basis. The goal is to create a desire to participate in the program.

The use of incentives may help with establishing a desire to participate. Incentives for behavior change vary with individuals. Some clinicians are motivated simply by knowing that EBP is the best practice for their patients. Other clinicians may require other incentives. As a guide, positive incentives outweigh negative incentives.27

Which incentives are applied should be carefully considered. Incentives are in place to encourage practice change and adherence to the new EBP guidelines. Incentives should not be a one-time benefit, but a continuing part of an expectation of practice. In nursing, this could be recognition in front of peers, preferential scheduling of shifts, a differential in salary, or other continuous incentives. In medicine, this could be a monetary performance award, recognition in front of their peers, or other continuous awards. Varieties of incentives are available and should be customized to clinicians involved in the implementation of EBP.

When considering incentives, the incentives should be powerful enough to attract clinicians to the EBP effort. Incentives should be available to any clinician interested in implementing the practice change. Incentives
are designed to be helpful at implementing change and should not be a source for division in the staff.

Step 3: Implementing Evidence-based Practice

Once the strategy and incentives for practice change are in place, practical implementation is now ready. The physician and nurse leader need a plan to identify targeted patients. One easy method to identify patients is to make daily rounds, either together or independently. The nurse leader can make rounds and then consult with the physician leader on each patient. The time spent identifying patients is very reasonable, usually not more than 1 hour.

Each patient should be assessed as to the degree of the EBP application. If all aspects of the plan are in place, then no action needs to occur. If parts of the EBP are not in place then the leaders act to directly change to practice. If this is not possible, then clinicians are contacted (either physicians or nurses) to identify reasons why the practice is not in place.

The more directly the program leaders can affect change, the easier the EBP change will occur. Trying to work through others is more difficult. If demonstrating success in a program is desired, working where program leaders can make direct changes is a good strategy.

A plan of implementation should include regular review of progress and barriers. Just like a research study, the most well-constructed plans may fail due to unanticipated barriers. Meeting to review success can help identify these barriers. At these meetings, all key leaders need to be involved. As barriers arise, different key leaders will take the leadership in each area where the barrier is present.

After the identified time period has been reached, the results of the EBP can be measured and presented to the leadership team. Once again, including the statistician as part of the team has major rewards, particularly at this phase. Plans should be in place to disseminate the results, both internally and externally.

Rewards and incentives for success should be in place throughout the program. However, the program’s success should be highlighted by the performance of the key leaders. Leaders in administration should be highlighted to the board of directors, physician leaders to the medical staff, and nursing leaders to the nursing staff.

Implementing EBP is a major effort to improve the outcomes, both clinical and financial, to ensure the success of hospitals, patients, and families.

□ Summary

This article presented the importance of EBP on patient and hospital practices. Two high-profile clinical examples (outlier management and sepsis) were presented as the most high-priority conditions to address from a cost and mortality perspective. Included in this presentation of EBP was an outline on how to implement the EBP practice. By following these examples and outline, a clear method to successfully implement EBP is present.

References


