Rational Medical Decision Making: Evidence-Based Practice at AIHA Partnerships

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Executive Summary

The following is an evaluation of AIHA's efforts to promote the rational practice of medicine via evidence-based practice (EBP) in non-Western healthcare contexts. Two independent evaluators collected interview and survey data while attending Regional LRC Dissemination Conferences in both CEE and the NIS, and performed textual analysis. The researchers sought to determine the degree to which information coordinators (ICs) understand, accept, and implement EBP as an innovation.

We found that although a number of ICs expressed an understanding and acceptance of EBP, there are still a number of material, infrastructural, institutional, and ideological barriers to its implementation and sustainability at partnership institutions. Problems with Internet connections and a lack of convenient computer workstations continue to hamper adoption of this important innovation. Language barriers continue to limit the accessibility of knowledge resources to significant numbers of clinical staff. Institutional constraints within Health Ministries and medical schools also present obstacles to the implementation of EBP. Most important are the ideological obstacles: problematic numbers of ICs still report the lack of a felt need for EBP, fear of EBP as a risky innovation, failure to recognize the principles of EBP as an innovation, and failure to regard EBP as a methodology to employ with *all* patients (not just those with rare or baffling conditions).

Nonetheless, the material support required to enable the implementation of EBP exists at partnership hospitals through the efforts of LRC project staff. With tighter focus on diffusing EBP through an EBP "point person" at partnership hospitals and additional training of this delegate, ICs, and clinical staff in the principles of EBP, the pieces are in place to permit more widespread adoption of EBP at AIHA partnership institutions.

Introduction

With the goal of attaining greater levels of sustainability in the Learning Resource Center project, AIHA seeks to critically evaluate its program through independent evaluations of the effectiveness of the various initiatives that are part of the LRC project. The present evaluation was intended to assess AIHA's efforts to promote evidence-based practice (EBP) among partnership institutions through the efforts of the LRC project staff.

Currently, the definition of EBP is in flux within the international medical community, as is agreement over how to appropriately deploy the principles and methods of EBP in everyday medical practice. For the purposes of this study, however, we needed a stable operational definition of "EBP." The practices recommended in the book *How to Teach and Practice Evidence-Based Medicine*, by David Sackett, et al. (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000), served as the EBP "gold standard" against which the specific practices of the various AIHA partnership institutions were evaluated.

Sackett, et al., define EBP as "the ability to track down, critically appraise (for its validity and usefulness), and incorporate this rapidly growing body of evidence into clinical practice" (Sackett, et al. 249). As such, EBP represents a genuine innovation in the practice of medicine that, if adopted, would require a restructuring of daily clinical practice. In this investigation, we evaluated how well ICs understand, accept, and are implementing the EBP innovation as a measure of the success with which AIHA is promoting EBP.

Method

From June 1–June 16, 2002, Dr. Ruth Cronje and Aaron Broege of the University of Wisconsin—Eau Claire attended two Regional LRC Dissemination Conferences (CEE in Zadar, Croatia; and West NIS in Odessa, Ukraine), which included site visits to five area healthcare facilities and LRCs.

During these visits, three types of data were collected:

- an anonymous survey instrument,
- one-on-one and group interviews with ICs, and
- textual analysis of various AIHA-generated and IC-generated texts.

Survey

An anonymous survey instrument was distributed to all ICs in attendance at the West NIS and CEE conferences. This survey (Appendix A) was designed with the help of Dr. Geoffrey Peterson, a specialist in survey design and statistical analysis. The survey was also translated by AIHA program staff into Russian (Appendix B).

The survey was designed to measure several factors that may influence the use and success of EBP in the institutions surveyed. The questions targeted four categories: knowledge of the basic principles of EBP; knowledge of the basic

principles of the scientific method; issues with the individual's practice of EBP; and institutional issues that may influence the adoption of EBP. In addition to these categories, a limited amount of demographic data was gathered.

For all of the nondemographic questions, the respondents were asked to rate the questions on a five-point scale ranging from "strongly agree" to "strongly disagree" and also included a "neutral" category. The instrument also included one open-ended question for the respondents to comment in general on EBP. Questions in the survey were expressed both as positive and as negative statements to avoid a pattern bias. Using Excel's randomization procedure, the questions were placed in random order in the survey to avoid an ordering bias. The survey was distributed to a total of 58 ICs and other medical professionals who were in attendance at the CEE and West NIS conferences: 28 in Croatia (where the survey was administered in English) and 30 in Ukraine (where the survey was administered in Russian). Of these, 45 conference attendees completed the survey, for an overall response rate of 78%.

Upon our return from these conferences, we also administered this survey via email to ICs at all 142 partnership institutions, and encouraged all ICs to distribute the survey to other clinical staff at their institution. At the date of this writing, we continue to receive survey responses; this report will discuss the results of the 45 surveys gathered at the CEE and West NIS conferences plus an additional 24 surveys we received via email in time to include them in this data analysis.

Given the categorical nature of the data and the relatively small data pool, it was determined that the most effective course of statistical analysis was to focus on univariate and bivariate relationships. Although the data do offer some potential for multivariate analysis on a limited scale, the problems inherent in reducing the number of degrees of freedom were determined to outweigh the additional information that could be gleaned from such a process. Therefore, data analysis was conducted using the Kendall's Tau and χ^2 procedures.

Interviews

Interviews with ICs were conducted to give us richer and more detailed anecdotal data to compare with the other data sets. We interviewed 15 ICs in Croatia and eight in Ukraine using an interview schedule designed to elicit information regarding how well ICs understand, accept, and implement EBP (Appendix C). We sometimes deviated from the interview schedule to more thoroughly pursue lines of inquiry. Some of the interviews were conducted in groups to maximize the number of interviewees in the short period of time available in an effort to minimize the chances of idiosyncratic or outlier responses disproportionately influencing our interpretations. Individual interviews were also conducted to ensure that some of the interview data would be free from any dominating group consensus that would mask individual differences in understanding and attitude. In Croatia, all interviews were conducted in English; in Ukraine, most interviews were conducted with the help of translators who translated our questions into Russian and translated the responses of the interviewees into English. Interviews

were audio-tape recorded.

Textual analysis

We performed close textual analysis of various documents, including AIHA-generated promotional and training materials and IC-generated "success stories." Textual analysis was performed in conformity with the performative hermeneutic technique described by Habermas (Habermas, 1984).

We took these texts to represent the "official" discourse of AIHA and ICs, enabling us to assess

- what AIHA expects from the ICs and how it is supporting those expectations with training, materials, and services; and
- how and to what extent the ICs are complying with those expectations.

Triangulation

Collecting three forms of data enabled us to increase the validity of our interpretations through triangulation. Triangulation permits the investigator to identify parallels and tensions within and among the claim structures of the various data sets. We therefore analyzed all three types of data as a whole, looking for consistency and inconsistency of logic. Any logical inconsistencies and tensions identified can then be further investigated with specifically designed instruments.

Framework for Analysis

Rationality in medical practice

According to its proponents, the primary goal of EBP is to replace dogma, hunches, and habit in the practice of medicine with a more **rational** system for deciding how to diagnose and treat patients. Rationality is valued in medical decision making because it will "bring along an increase in reliability that would transcend the cognitive limitations of individuals" (Brown, 1990; 186); i.e., rational medical practice promises to result in more favorable patient outcomes because it is based on reasoning systems that are more **reliable** than dogma, hunches, and habit.

According to Harold I. Brown, in his book *Rationality*, rationality has the following features:

- Decisions regarding what action to take must be based on ***evidence***—i.e., information rather than emotions, whims, or arbitrariness. "If we are to be rational, we must believe on the basis of relevant evidence, and be prepared to alter our beliefs if the weight of evidence changes." (Brown 183).
- Decisions must rely upon ***judgement***, which "requires assessment of evidence and arguments," even in situations in which there is no set algorithm to follow. As Hellman points out,

  It is fallacious to suggest that...all information acquired [by a randomized clinical

> trial] is valid. Such experimental methods are intended to reduce error and bias and therefore reduce the uncertainty of the result. Uncertainty cannot be eliminated, however. The scientific method is based on increasing probabilities and increasingly refined approximations of the truth. (Hellman & Hellman, 1991; 1588)

Medical practice is just such a situation of uncertainty, in that each individual patient represents a unique case with context-dependent, situation-specific factors (including the patient's specific biology, specific economic and logistic constraints, preferences, and values) that must be taken into consideration to provide optimal care for each patient. General guidelines, no matter how valid or current they are, can only provide a practitioner with a "lockstep" guide; to apply those general guidelines in a manner that responds to each individual patient and his/her individual situation, the practitioner will need to exercise his/her expert judgement:

> When appropriate rules are available we expect a rational person to follow those rules. But we also expect a rational person to be capable of acting sensibly without rules, and we expect a rational person to provide reasons for whatever conclusion she eventually arrives at even when no rules are available (Brown 184).

- Decision making must be ***socially validated***: "for a belief based on judgement to be a rational one, it must be submitted to the community of those who share the relevant expertise for evaluation against their own judgements" (Brown 187). The peer review process, in which a small group of experts judge the validity of a scientific article, is an excellent example of this type of social validation process. The judgements of other experts, including colleagues, must be enlisted in determining the most rational course of action. Finally, the expertise of the patient herself (who is the one best qualified to assess the effects of a medical decision on her specific circumstances) must be consulted and integrated into decisions to maximize the rationality of the decision.
- Collective judgement must be ***dynamic***—i.e., susceptible to change when better reasons are presented to it. Because even expert judgement might be wrong, it is necessary to continuously reconsider decisions in light of new evidence. "We expect a rational person" claims Brown, "to be amenable to new ideas " (Brown 183).
- This collective judgement must be completely ***free and uncoerced*** so that decisions can be influenced solely by the force of best reasons; " a consensus that is imposed on the members of a community by external political authority, or by force, or by manipulation of data, or by any of a number of other familiar, unsavory techniques, will not generate rational belief" (Brown 196). These "unsavory techniques" include scientific misconduct as well as the efforts of commercial organizations, such as pharmaceutical companies, to influence the diagnostic and therapeutic decisions of healthcare providers.

EBP as Rational Practice

In the book *How to Practice and Teach Evidence-Based Medicine*, by David L.

Sackett et al., the authors describe three modes of practicing medicine:

- the **replicating** mode, in which a practitioner "blindly" applies procedures that s/he has learned about from school or a colleague to the patient;

- the **searching** mode, in which a practitioner, guided by an understanding of scientific merit and clinical relevance, systematically and thoroughly consults the scientific literature on a given topic to make medical decisions;
- the **appraising** mode, in which the practitioner carefully and critically evaluates the knowledge sources s/he finds in order to judge their validity (Sackett, et al. 4);

According to Sackett, et al., the replicating mode does not conform to the principles of EBP, and healthcare providers who base their practice on this mode of decision making are not in a position to improve patient outcomes with more reliable approaches to medical decision making. Nor does the replicating mode conform to Brown's model of rationality: rather than relying on evidence, it relies upon traditions or the habits of colleagues. Often, these traditions and habits are dogma that has never undergone a process of social validation—and in institutions with powerful centralized authority, they may well represent the static, idiosyncratic bias of one authority figure (Chalmers, 1983). Often, practitioners do not feel free to deviate from that authority's mandates, using their best judgement to apply evidence from less-biased, socially validated sources, or to alter their practice when new evidence presents itself. This also makes it unlikely that the individual healthcare provider will be motivated or able to customize treatment to best fit the specifics of each patient's individual case.

The searching and appraising modes, on the other hand, embody practices that conform well to Brown's model of rationality. These modes—the foundation of EBP—call for practitioners to systematically, thoroughly, and critically consult the peer-reviewed scientific literature for the best current evidence, and to integrate that evidence into their practice decisions. In this way, healthcare providers are *free* to use their expert *judgement* to make medical decisions based on *evidence* that has been *validated* through the *social* process of peer review. In addition, the EBP approach requires that these procedures be repeated frequently so that new evidence can be integrated as it is published in the literature—i.e., these decision-making processes are *dynamic* and open to change. In this way, EBP conforms well with all five of the features of rationality identified by Brown.

Diffusing the EBP Innovation

In keeping with previous evaluations of AIHA's efforts to diffuse knowledge resources in CEE/NIS, our investigation of AIHA's efforts to promote the innovation of evidence-based practice (EBP) is based on our understanding of the diffusion theory of Everett Rogers, as explained in his book, *Diffusion of Innovations* (Rogers, 1995). Unlike the LRC project as a whole, which more integrally involves the diffusion of **objects** (i.e., computer hardware, software,

and Internet connections), EBP represents a more abstract innovation in **practices** (i.e., strategies for effectively searching the literature and for critically evaluating what is found), and **ideas** (i.e., an ideological commitment to the validity of knowledge produced by the scientific method and the application of biostatistics to medical practice). It should be emphasized, however, that these practices and ideas cannot be successfully implemented without the material and infrastructural—i.e., "**object**"—support that the LRC project provides at partnership institutions.

Levels of Knowledge of an Innovation

Because EBP is an innovation in practices and ideas, **knowledge** of this innovation is a particularly important factor in its diffusion. Rogers claims that there are three "levels" of knowledge that contribute to the diffusion of an innovation (such as EBP):

- awareness knowledge,
- how-to knowledge, and
- principles knowledge (Rogers 165–166).

Awareness knowledge—i.e., being aware of the innovation—is obviously crucial to its adoption. To ensure ongoing use of an innovation, how-to knowledge—i.e., knowing how to use the innovation—is also important. In addition, Rogers claims that some innovations require adopters to gain principles-knowledge to ensure that adoption will be complete and permanent. As Rogers observes,

> it is usually possible to adopt an innovation without principles-knowledge, but the danger of misusing the new ideas is greater, and discontinuance may result. Certainly, the competence of individuals to decide whether or not to adopt an innovation is facilitated by principles know-how. If a problem occurs in an individual's use of an innovation, principles-knowledge may be essential in solving it (Rogers 166).

We would argue that EBP represents an innovation for which potential adopters need principles-knowledge: as a particular system of rationality, it requires behaviors and beliefs that are in some senses counterintuitive, and as such is unlikely to be adopted unless the principles of rationality that underlie it are both understood and accepted.

Assessing the Diffusion of Evidence-Based Practice

Many of the same factors that influence the diffusion of the technologies that are part of the LRC project as a whole also have an impact on the diffusion of EBP among partnership institutions. In general, we found the following factors to have an influence over the success with which EBP is being adopted and diffused at partnership institutions:

Material infrastructure

Communication channels

Institutional conditions

Identification with EBP objectives

Role of the Information Coordinator

Partnership with US Institution

Material infrastructure

Material resources provided to partnership institutions by AIHA's LRC project (computers, connection to the Internet, other knowledge resources) are crucial to the implementation of EBP. Some ICs, however, continue to report breakdowns in their infrastructural situations, such as difficulty in securing an affordable Internet connection, which make access to knowledge resources problematic. Limitations in funding also do not permit AIHA to provide a full range of knowledge resources, such as books and journal subscriptions, to all partnership institutions; nor can they afford to fund the multiple computer workstations that some institutions need to most effectively and efficiently implement EBP into daily practice.

At one hospital we visited, for example, a computer was available in the cardiology unit; this computer, however, did not have a connection to the Internet, so the staff in this unit have to go to the LRC to gain access to the knowledge resources required to practice EBP. Not surprisingly, a cardiologist working in this area indicated that he doesn't routinely access the Internet to find knowledge resources to support his practice decisions. The survey responses suggest that this is not an unusual situation among partnership institutions. Many of the ICs indicated in interviews that the time it takes to implement EBP is a significant obstacle to its adoption. Thirty-five percent of ICs agreed that EBP takes too long to implement, and 47% of ICs believe their colleagues feel EBP requires too much effort. While searching for and appraising information does take time in and of itself, the additional time it takes healthcare staff to get to a computer with an Internet connection exacerbates this obstacle to the adoption of EBP in partnership institutions. As one IC remarked, "we need to bring EBP to the patient's bedside."

In addition, some ICs reported that the lack of medical materials, including diagnostic equipment and medications, can be a significant disincentive for the adoption of EBP. "You need to...take into consideration that this new medications are far more expensive that the usual ones used in everyday practice," claimed one IC. "After the patient will know the price, he'll come to this physician and say that your doctor is kind-of trying to torture me, because he gave me the medication that I am never going to be able to buy." Therefore, to some extent ICs believe that incentives to adopt EBP "depends on the opportunity. For example, if [the diagnostic methodology or medication] is not available here, they can't use it." It seems likely that until material resources—both technical and medical—become more plentiful, these infrastructural constraints will continue to have a detrimental impact on the likelihood that clinical staff will adopt EBP.

At the same time, there is growing awareness among some ICs that EBP can help direct scarce resources into those strategies that would be most effective in improving healthcare outcomes for patients, ultimately helping partnership institutions to spend money more efficiently. One IC, for example, illustrated his belief that EBP can help hospitals become more cost-efficient with this example:

> Looking at the results [of scientific studies], they say that the [back] pain will disappear 3 weeks after it starts, no matter what you're doing now. If the pain doesn't disappear, you have to visit a specialist to see what's going on. But in our country, the first thing you do when someone has back pain is to send them to the radiology department to see what is wrong with their spine... [The study says] not to spend money on radiology...So you lose money, you are wasting your money.

The same IC, however, cited medical funding practices that provide disincentives for practitioners to attempt to integrate evidence into their practice:

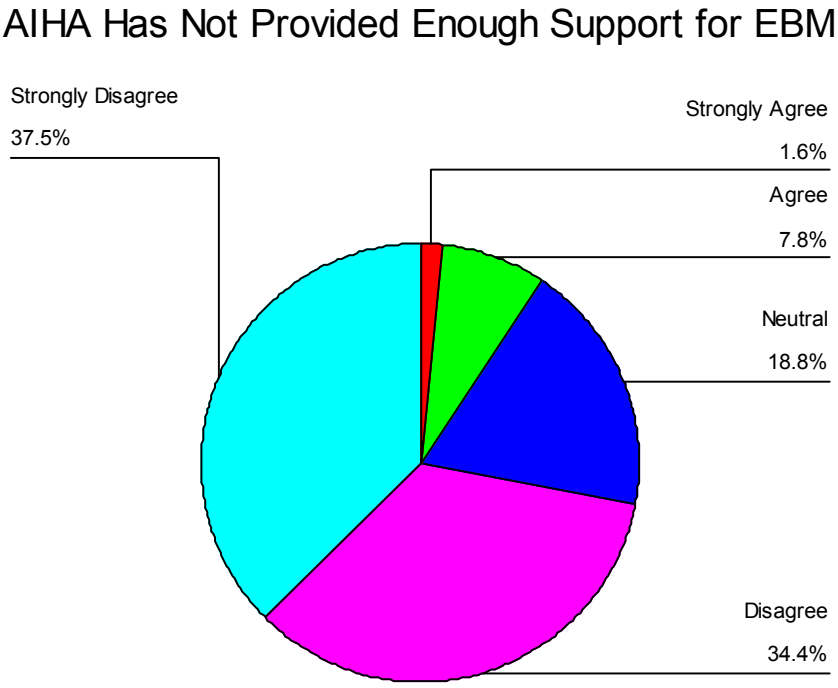
> If the government gives you money for this procedure...send the patient to the CAT scan, because they will pay me for it. Why should I think about is it good practice to send him or not to send him?...If you are in a position that you must organize your hospital that it operates on minimal or the lowest expenditures, you will try to find ways how to treat people and how to make good medicine, but with not an incredible amount of money. I think if the policy changes in this direction...many doctors and physicians will be interested in EBP, trying to find resources, good articles, and good practice that will help them to operate the hospital at the lowest possible expenditure.

"Success stories" generated by ICs also give some insight into the concerns that ICs believe EBP can address. One IC-generated success story, published in AIHA's *From Knowledge to Practice: The Impact of Information on Healthcare* (2002), describes how the institution used EBP to create a more effective protocol for diagnosis and treatment of acute bronchitis. The IC reported that implementation of this new protocol effectively reduced unnecessary antibiotic use, as well as those people hospitalized for acute bronchitis:

> These impressive results have demonstrated how the introduction of the principles of evidence-based medicine may increase the effectiveness of the work of a medical institution and have encouraged...physicians to work toward advances in the development of new protocols" (AIHA "Knowledge," 23).

Another IC concluded, "EBP...would save money and would make practice more rational."

Despite these widespread limitations in funding, the majority of the ICs surveyed believe that AIHA is providing good support for promoting EBP at their institutions (Figure 1). When asked to respond to the prompt, "AIHA has not provided enough support for EBP," 72% of ICs disagreed or strongly disagreed; only 9.2% of ICs agreed or strongly agreed.



Communication channels

Most ICs we spoke to cited language barriers as a major obstacle to the widespread adoption of EBP within their institutions. As many ICs pointed out, most of the knowledge resources with which AIHA is equipping the LRCs are in English, largely because very few resources are available in Russian or the other first languages of the institution. The AIHA does provide available Russian-language resources (e.g., *The International Journal of Medical Practice, Clinical Epidemiology: The Essentials*, and *Introduction to Evidence Based Medicine*); however, given that some percentage of healthcare providers at every partnership institution don't read English, this effectively prevents them from making use of knowledge resources not written in Russian. One IC noted that "when the Internet site appeared in Russian" the percentage of staff using EBP at his hospital "increased to 65%–75%."

Despite these language barriers, a number of ICs are taking steps to provide knowledge resources in languages accessible to the healthcare staff at their institutions. For example, one IC is translating full-text resources he downloads from Medline and the Cochrane Collaboration into Russian.

Institutional conditions

All the ICs we spoke with cited difficulties in adopting EBP that derive from their status of members of particular political and economic institutions. For example, many ICs are working in countries in which some medical decisions are restricted by official guidelines trickled down from a centralized Ministry of

Health, which exerts pressure on practitioners to use only "approved" methods for diagnosing and treating patients. The AIHA has generated an EBP questionnaire that includes questions designed to determine how the structure of these systems (e.g., practice standards at the national, local, and institutional level) that guide a clinician's practice and these systems' rigidity, and have requested a description of any monitoring program that exists to enforce these systems.

It is unclear whether many of these centralized practice guidelines are generated according to rigorous principles of EBP. Even in cases in which Health Ministries appear to be making thorough, systematic, and critical use of the scientific literature in formulating these policies, however, a number of ICs expressed frustration at the slowness with which these policies can be changed. One healthcare policy commentator noted how guidelines can result in less rational medical practice:

> Soundly based guidelines may in the short term give the good average outcomes that preoccupy health-care purveyors. In the long term they may prevent advance by fossilizing clinical practice. More importantly, some patients may be harmed by mandatory guidelines....there is a fear that in the absence of evidence clearly applicable to the case in hand a clinician may be forced by guidelines to make use of evidence which is only doubtfully relevant, generated perhaps in a different grouping of patients in another country at some other time and using a similar but not identical treatment. This is evidence-biased medicine...(Evans 461).

To conform to Brown's model of rationality, decision making must be a dynamic, flexible process that permits frequent re-assessment of the most current evidence, which is then customized to the individual patient. Centralized health policies can fall short of full rationality if they are ponderous and impervious to rapid change when new evidence compels a reassessment of current practice or when the specific situation of a patient demands their modification.

There is also the question of the knowledge support offered by medical schools in these countries. Obviously, the curriculum of medical schools greatly influences the ideologies, expertise, and standard practice approach of healthcare professionals. Several ICs, however, mentioned that their medical school curriculums don't include training in EBP. The question then becomes whether AIHA should attempt to compensate for this lack by providing training in the principles of EBP to ICs and, via ICs, clinical staff at partnership institutions. Everett Rogers claims that

> Change agents [who, in AIHA organization, are the ICs] could perhaps play their most distinctive and important role in the innovation decision process if they concentrated on how-to knowledge, which is probably the most essential to clients in their trial of an innovation (at the decision stage in the innovation-decision process). Most change agents perceive the creation of principles-knowledge as outside the purview of their responsibilities and as a more appropriate task for formal schooling. It is often too complex a task for change agents to teach basic understanding of principles. But when such understanding is lacking, the change agent's task is often more difficult (Rogers 166).

If Rogers is correct, then it is unlikely that EBP will be widely implemented at partnership institutions unless the staff at those institutions obtain principles-knowledge; at the same time, however, it might be too much to expect the ICs to be the ones responsible for providing their colleagues with that knowledge. It seems likely that if and when medical schools begin to include EBP training in their curricula, the rate of adoption of EBP will increase dramatically. Although promoting change in the curriculum of medical schools is clearly beyond the purview of the LRC project staff, AIHA personnel at higher levels in the administration can and should use their influence with the medical infrastructures of these countries to continue to promote instruction in rational methods of medical practice in medical schools. Until then, AIHA may need to provide training in EBP principles if it wishes to see EBP widely implemented at partnership institutions.

Identification with EBP objectives

In addition to the obstacles described in the above sections, we observed a number of ideological/attitudinal obstacles which appear to hamper the diffusion of EBP among ICs and staff at some partnership institutions. Given that some of the ICs at institutions with severe logistic and/or institutional barriers have nonetheless been able to successfully adopt and diffuse EBP, we suspect that these ideological barriers might be a more significant factor in diffusion failures than any infrastructural and institutional obstacles that may exist.

Many ICs, for example, mentioned that a number of staff and administrators at their institutions fail to perceive a need for the EBP innovation. As one IC stated,

> there are physicians not interested in implementing new methods into their practice. They are satisfied with the old-fashioned practices...If he has been successful in, let's say surgical procedures, and he has been doing it for 20 years, there is no motivation to search for a new one.

Given the number of ICs who reported similar experiences with the clinical staff at their institutions, it would seem that one of the major obstacles to the widespread diffusion of EBP among partnership institutions is the failure on the part of many potential adopters to see the need for the innovation. Nor do these partnership staff appear to be an anomaly in this regard; in a study performed by David Sackett:

> ...a group of general physicians responded to a questionnaire by stating that they needed new and clinically important information just once or twice a week, and met these needs by consulting their textbooks and journals. However, the direct questioning of these same clinicians as they saw patients identified up to 16 needs for new, clinically important information in just half a day, at a rate of about two questions for every three patients they saw...As a net result, in a typical half-day of practice, four clinical decisions would have been altered if clinically useful information about them had been available and employed (Sackett & Rosenberg, 1995; 620).

The widespread attitude reported by ICs among clinical staff at their institutions that EBP is not really needed is exacerbated by anxiety about this innovation. Fear of risk was evident in many of the ICs descriptions of their colleagues' responses to EBP:

> Any kind of doctor...he read an article about the new update version of surgical intervention. So he...came to work the next day and performed the same surgery intervention on his patient. The next day after the surgery, the patient died. This doctor will get in a lot of trouble...So that is the reason that physicians would not implement EBP into their clinical practice, because they are afraid of this trouble that can come. They don't need it. This is something that they don't really need.

As Rogers observes, any innovation represents a risk and uncertainty, so there is always innate resistance to an innovation until it has been proved, usually by early adapters, to produce tangible benefits. And because EBP is a knowledge technology, and scientific and medical knowledge is subject to constant change and improvement, EBP is in some senses a "slippery" technology, the benefit of which can vary dramatically from situation to situation. For example, in a "success story," an IC from Armenia reported on the treatment of a patient with pneumonia in an AIHA publication:

> Given the severe condition of that rare form of pneumonia complication and the lack of experience in treating such patients, the EMSC information coordinator performed a search for any useful information in various search engines and specialty online databases such as Ovid and Medline. Based on the data gathered, the treatment procedures were then adjusted. Nevertheless, the condition of the patient was worsening, and 20 days later, he had to be connected to an artificial respirator (AIHA "Knowledge" 9).

Not all ICs, then, report their experiences with EBP as successful. However, other ICs report much more positive experiences with EBP in their success stories. For example, another IC reported in a success story that she and a general practitioner at her institution successfully used the knowledge resources made available through the LRC to find a conservative/nonsurgical treatment for a severe gastric ulcer:

> The gastric hemorrhage was soon stopped with hemostatic preparations and the lost blood replenished by transfusion and blood substitutes. The drug treatment was provided according to modern clinical standards using echogastroscopic monitoring...Six months later, the gastroscopic examination showed the Albert's ulcer had completely healed (AIHA "Knowledge," 11).

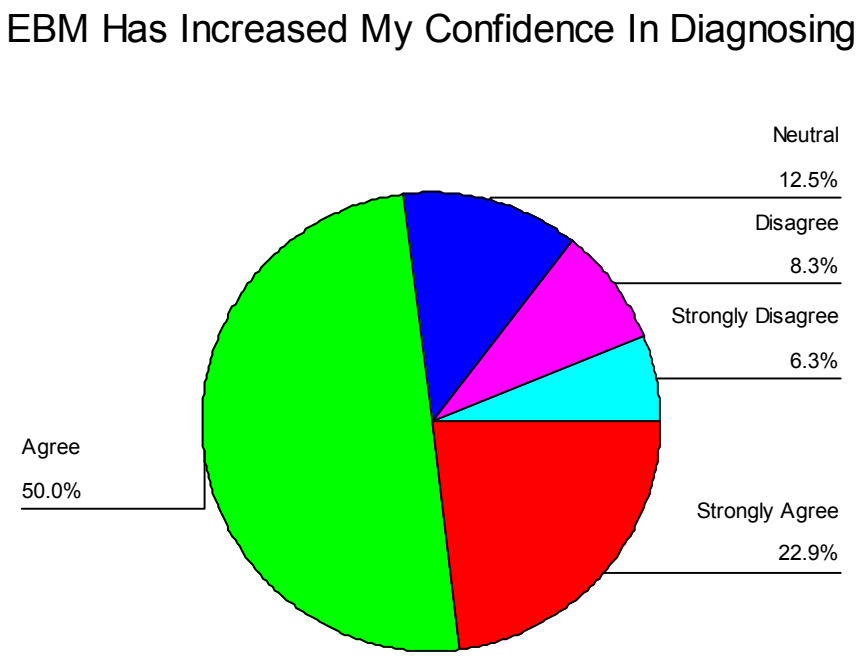
Another IC's success story reports how EBP helped successfully treat a case of *Chlamydia*-induced infertility:

> ...a decision was made to find a more advanced approach to treat the disease. The staff of the Learning Resource Center (LRC) at AAWC began searching for useful information on various medical Web sites. The information found on these Web sites included an article on the Consilium Medicum Web site about the successful application of a new-generation antibiotic called Rovamycin...Three months later,

> when Irina visited the center with complaints of menstrual cycle deviation and general weakness and nausea, doctors...discovered she was pregnant" (AIHA "Knowledge," 13).

In these success stories, many ICs report their appreciation for these technologies once they become fully adopted at an institution, and represent the staff of institutions as using them on a routine basis: "Day after day, the PCRH's staff members realize the importance of the Internet as a useful training and treatment medium" (AIHA "Knowledge," 12). Of the success stories that reported using EBP to manage patient healthcare in *From Knowledge to Practice*, all but one reported a positive outcome.

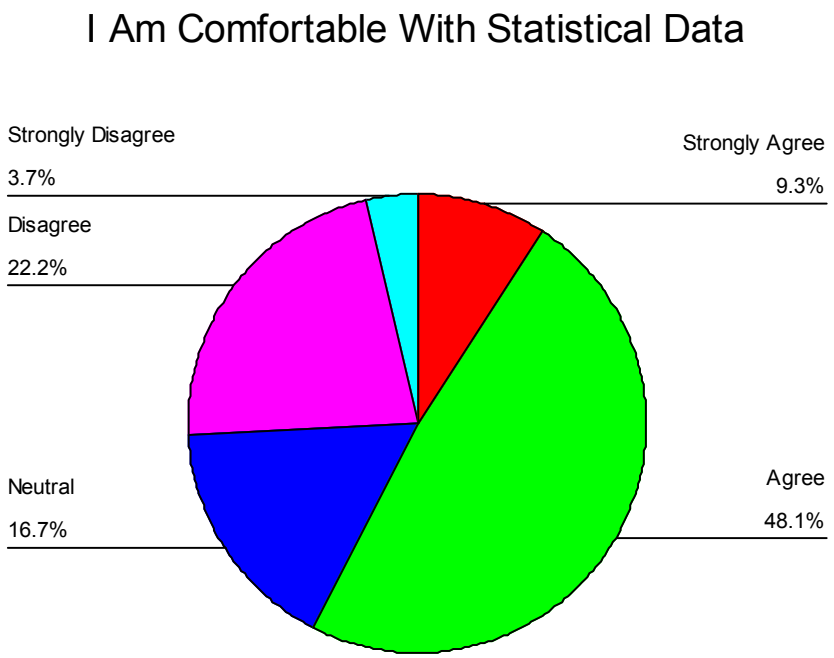
The surveys provide further evidence that AIHA has been successful in generating a felt need for EBP among some of its ICs: 73% of ICs either agree or strongly agree that their training in EBP increases their confidence in their diagnosis and treatment decisions (Figure 2); and only 18% agree or strongly agree that they are comfortable diagnosing and treating patients if EBP resources aren't available.



Another possible obstacle to the successful diffusion of EBP among partnership institutions is the somewhat widespread belief among ICs that EBP doesn't really represent an innovation. "We have been practicing EBP for 20 years," claimed one IC. In fact, about half of the ICs we interviewed indicated that they didn't believe there was anything fundamentally new about EBP, because "medicine has always been based on science." These comments suggest to us that the importance of the thorough, systematic integration of carefully evaluated evidence is not fully understood or accepted by some of the ICs we spoke to, or by

the clinical staff at their institutions.

This interpretation is further supported by evidence from the survey. For example, 20% of ICs do not believe statistical reasoning can be validly applied to individual patients; and 24% of ICs agreed or strongly agreed that it is poor reasoning to generalize from large populations to individuals. About 25% of ICs also declared themselves to be uncomfortable with statistical concepts (Figure 3). We observed a significant association between an IC seeing statistical research as invalid and that IC believing that most patients fall outside the norm ($p < .005$).



However, at least half of the ICs report themselves to understand and accept the biostatistical principles of EBP. Seventy-one percent of ICs believe that statistical reasoning can be validly applied to individual patients, and 57% of ICs disagreed or strongly disagreed that it is poor reasoning to generalize from large populations to individuals. More than 50% of ICs say that they feel comfortable with statistical data.

Many ICs, however, do not appear to be sure how much confidence to place in the evidence found in the scientific literature, and are not fully comfortable evaluating the validity of that evidence. For example, only 43% of ICs believe that it is crucial to the value of a study that it be peer reviewed. Yet, many ICs expressed skepticism regarding the validity of published knowledge resources. More than half of the ICs surveyed (53%) do not believe medical journals screen out invalid research. About 35% of ICs choose to use information they find in widely recognized journals, even if the information was not the result of a double-blinded study procedure.

The success stories produced by ICs might also reveal a possible lack of understanding of the principles-knowledge of EBP. These texts are short summaries, and perhaps for this reason none of the ICs provided the details of their search procedures, including the number and source of knowledge resources they found. Only one IC mentioned in a success story that critical appraisal of these resources was performed (AIHA "Knowledge"). In these short texts, then, it is not possible to determine whether the consultation of the literature performed in these cases genuinely conformed to the rigorous principles of EBP. However, the conspicuous absence of details about the search and appraisal process, necessary to allow the reader to assess whether EBP methods were being used rigorously, leaves open the possibility many ICs and clinical staff are using LRC-provided knowledge resources without fully understanding the principles of EBP.

Perhaps in part because they may not fully understand what sorts of scientific procedures—both at the experimental phase and during peer review—make evidence valid, a number of the ICs we spoke with do not seem to regard EBP as a fundamental paradigm shift, one which could have an impact how medicine is practiced with every patient. Several ICs reported that they and many of their colleagues regard EBP as just another tool, to be used primarily in baffling or rare cases. Several of the success stories reported in *From Knowledge to Practice* also mention that the clinical staff resorted to EBP because they were presented with a rare case or because standard practice had proved ineffective, implying that EBP might not be being used as a standard practice at their institutions. In the survey, nearly 40% of ICs responded that they do not use EBP for routine cases; this is consistent with the 44% of ICs who indicated that they were more likely to use EBP when confronted with rare or unusual cases. This suggests that many ICs do not see the benefit of using EBP with every patient.

Rogers suggests that adoption of an innovation is unlikely until potential adopters feel a need for it. It seems unlikely, then, that EBP will be widely diffused at partnership institutions until most of the clinical staff (including, and perhaps most particularly, ICs) both recognize EBP as a genuine innovation and feel a more acute need to base their entire practice on systematic, thorough, and ongoing consultation of the most current and most rigorous scientific information. Further, it seems unlikely that this recognition of and felt need for the innovation EBP represents will occur until both ICs and clinical staff at partnership institutions attain the **principles-knowledge** of what makes EBP a more rational way to practice medicine.

Role of the information coordinator

The role the IC plays at the partnership institution was another factor that seemed to influence the rate of adoption of EBP at AIHA partnership institutions. Information Coordinators may be either clinical staff, or they may be information technology specialists. Those ICs without clinical responsibilities may be intrinsically less interested in EBP, and therefore less likely to be actively working to promote it within their institutions. As one IC confessed: "It is my big minus as IC, because I didn't organize LRC to be such. From one point of view, for me,

it's so hard to talk it with doctors because...the initiative...should come from their point of view." Although this hypothesis requires further empirical verification, it seems likely that EBP will be adopted more quickly and widely at institutions where there is one individual committed specifically to working with EBP to serve as the change agent to help diffuse this innovation among the clinical staff.

Partnership with US Medical Institution

Although we had little systematic opportunity to learn about the influence of the US partners on EBP adoption among partnership institutions in CEE and NIS, our preliminary data strongly suggest that personnel at the US partner institution can play a decisive role in helping to promote EBP at AIHA institutions. We spoke, for example, with an American family practitioner affiliated with a US hospital who is attempting to explain the principles of EBP by giving presentations to staff at a partnership institution in Ukraine. We also met a US physician who has implemented a program to train staff at a Croatian partnership institution to comply with the guidelines of the Institutional Review Board on the use of human subjects in research, so that they can begin a full-scale project to collect evidence of the effectiveness of campaigns to combat drug and alcohol abuse. Another staff member at a US partnership institution told us that perhaps the most effective way US healthcare providers can promote EBP is by showing staff at NIS and CEE partnership institutions through actual examples how EBP can be successfully employed in routine medical practice.

These preliminary glimpses at the roles US partners can play suggest that it would be promising to further investigate how widely EBP is being implemented within US partnership institutions, what steps US partners are taking to help specifically promote EBP, and how those initiatives currently underway are succeeding at NIS/CEE partnership institutions.

Sustainability

Because EBP is an innovation that is an **idea** and **practice** more than an **object**, sustainability of EBP must be thought of in more than merely material or economic terms. Certainly, however, without the material and infrastructural knowledge resources made available by AIHA in their LRCs, the adoption of fully rational EBP at partnership institutions would be impossible.

To promote the full sustainability of EBP, it must come to be regarded as essential—as the "proper" way to practice medicine—by the ICs, the clinical staff, and administrators at partnership institutions. Until most of these people recognize both the innovativeness of and need for EBP, it may be difficult for EBP to be institutionalized at a partnership institution. At the same time, a commitment to EBP will likely ensure sustainability of the LRC project as a whole, since the successful deployment of EBP relies so completely upon the material and infrastructural resources the LRCs provide. If Ministry of Health officials and hospital administrators can be brought to a realization of the benefits of EBP, they will come to regard the LRC as a crucial department in their institutions and will make its funding a priority.

Based on some of the reports of resistance to EBP we've related herein, it would seem that staff and administrators at partnership institutions may need evidence that EBP can provide clear benefits for EBP to become a significant factor in helping LRCs develop financial sustainability. As one IC observed, "we need good example, one good example, one big example, for application of EBP, and this example have big success." Amassing the sort of data that would make a convincing case of the need for EBP, however, in some senses requires a commitment to basing decisions on evidence—in other words, it would require people to have already accepted the paradigm that governs the principles of EBP! Unless they are already committed to basing their decisions on evidence, people are unlikely to be willing to take the time to cooperate in data collection and management that can provide this "one big example." As one frustrated IC said,

> First we must analyze what's going on in the unit. So we must...do some sort of analysis and see what is the position within the unit. Then...compare our results, and analyze our results...and do it in a database. I have a functioning database. I have computers. I receive money from the foundation to work with computers. I have no people to input data. Nobody is interested in input data because we have no time to do it. And 50% of our staff is able to use email, is able to use Internet, but...if they are discharging the patient from the unit, they did not write it into the computer, they write it to the normal typewriter.

At the same time, it seems clear that AIHA resources have motivated staff at some partnership institutions to begin to implement the sort of data-gathering activities that can provide evidence of the improvements that a systematic search and appraisal of evidence can make in healthcare. Several ICs reported in their success stories efforts underway at their institutions to collect data to verify the positive impact of the use of EBP on patient outcomes.

Until most staff and administrators are committed to the principles of EBP, and are willing to make the effort necessary to gather data to locally support rational medical decisions, it seems unlikely that EBP will be sustainable—logistically, financially, or ideologically—at their partnership institutions.

Conclusions

Overall, AIHA's efforts to provide the material conditions necessary for the successful adoption of EBP are an overwhelming success. Most of the infrastructural/material pieces are in place for the widespread successful adoption of EBP. As one IC put it,

> If you would like to use EBP, you must be in a connection with EBP every day, or every week, to see what's going new...For our job, it's very, very simple, because the Cochrane Collaboration, giving the...data free on the Internet—it's always free. So it is enough to sit near the computer and once a week to search the engines, and we have the access, we have everything.

Ideologically, AIHA's efforts to promote an awareness of EBP among ICs is also a success. Most ICs and (to the extent we were able to assess this) other staff at partnership institutions are aware of EBP and aware of its growing importance in

Western medical practice. AIHA also has successfully implemented training mechanisms that are providing ICs (and, by extension, staff at the partnership institutions whom ICs will in turn train) with the **how-to knowledge** to successfully execute EBP at the searching level. While language barriers will continue to be an issue until more resources are available in languages other than English, at this time the material support that would enable AIHA partnerships to implement EBP are in place.

However, it is less clear that most ICs and other staff at their partnership institutions have gained the principles-knowledge that would enable them to perform critical appraisals of the literature and to implement EBP in a way that fully exploits its rational potential. To achieve a fully rational practice of EBP, it will be necessary for ICs and other partnership institution staff to master this **principles-knowledge**, which no more than half of ICs appear to have done thus far.

The extent to which actual health outcomes are dependent upon fully rational implementation of EBP remains an open, empirically verifiable question. It is quite possible that uncritical perusals of the literature that are less systematic and thorough than what is required by the most rigorous modes of EBP can enable healthcare providers to hit upon diagnostic, prognostic, and treatment decisions that will improve the outcome of their patients' conditions. However, if the fundamental epistemic principles of EBP are correct, it is unlikely that healthcare outcomes will be optimized across a majority of patients over the long term unless most practitioners are practicing a fully rational version of EBP every day, requiring **both** thorough and effective searching and a careful and informed critical appraisal of the sources found.

Recommendations

Focus AIHA's Priorities

At the moment, ICs at partnership institutions have a wide and challenging variety of potential roles to play. In addition to maintaining and promoting the LRC as a place for institution staff to access knowledge resources, many ICs are integrally involved in important efforts to design and implement hospital information systems and to conduct research. While these other activities are certainly uses of LRC resources and IC time that are consistent with AIHA objectives, and while they also can provide the sort of local/specific data that can ultimately support EBP efforts at an institution, they are sufficiently challenging and time consuming to deflect IC attention away from searching and critically appraising the medical literature.

AIHA has recently initiated the designation of an "EBP point person" within each institution, whose role will be mostly or exclusively to promote, facilitate, and train in EBP at his/her institution. This new delegate is likely to accelerate the diffusion of EBP within partnership institutions. In some cases, this "EBP point person" will be the IC who has a particular interest in/commitment to EBP; it is unlikely, however, that someone whose time and energy is mostly consumed by

duties not directly related to the promotion of EBP will make an optimal EBP point person. In addition, this EBP point person will work with those individuals at partnership institutions who are conducting research and/or designing hospital information systems to coordinate with these important evidence-gathering activities, but will have enough time to devote him/herself more exclusively to diffusing EBP among clinical staff.

Instill principles knowledge

Perhaps the most important step AIHA can take in successfully promoting EBP among partnership institutions is to implement a multi-modal training program to more effectively and thoroughly diffuse **principles-knowledge** of EBP to each IC or the designated "EBP point person." It is also more likely that EBP will become a practice standard at partnership institutions if the clinical staff also receive direct continuing education in the principles-knowledge of this innovation.

The diffusion of principles knowledge can be accomplished in a variety of ways:

- **Training sessions:** AIHA can offer training sessions for the IC/EBP point person and additional institution staff, who can then diffuse this principles-knowledge to others at his/her institution. One central element of this curriculum must be rigorous training in the principles of the critical evaluation of the scientific literature, including an introduction to basic biostatistical theories and scientific reasoning processes. Trainees should have the opportunity to attempt the peer review of a scientific article and to discuss collectively the issues and problems they observed with the text. They should also be made aware of the promise and limitations of the peer-review process and how it influences the validity of the knowledge published in the literature.
- **Handbook:** AIHA should consider preparing a handbook to explain and reinforce principles-knowledge of EBP. This handbook could include the essential principles of biostatistics, a discussion of bias in experimental design and how they can be avoided or mitigated, and the principles of the peer-review process.
- **More EBP resources:** AIHA should also consider providing each LRC with a copy of the foundational texts (see Appendix D for a partial list) that explain, justify, and critique EBP. This will help practitioners enter the ongoing conversation in the Western medical literature regarding EBP and think more critically about its precepts, foundations, and practices.
- **Add a "checkup" component to the guidelines for Practice Standard Reviews:** There are unexploited opportunities for helping ICs and other clinical staff to practice their appraisal as well as searching skills in preparing their semi-annual Practice Standard Reviews. In the "Instructions for Completing a Practice Standard Review" guidelines distributed by the AIHA to all ICs, ICs are encouraged to "include a critical appraisal and assessment of published evidence" as part of the PSR process. However,

although the guidelines for Step 3 ("Literature searching and study retrieval") include some specific suggestions for conducting a comprehensive search, guidance for the initial appraisal level (Step 4) of EBP is relatively unspecific: ICs are told to "review the results of your search and select articles and materials that are relevant and based on sound study design" without any guidelines as to what might count as "sound study design." Similarly, for Step 5 of the process—"Assessment of information quality, data extraction and synthesis," ICs are told only to "perform in-depth appraisal of study validity" without any guidance in how to go about doing so.

If the AIHA agrees that the appraisal level of EBP is an important component of its full implementation, then it should use the PSR guidelines as another avenue to reinforce appraisal skills among ICs and the rest of the PSR team at partnership institutions. A thorough validity checklist could be included in the guidelines for PSRs that requires the team preparing the PSR to specifically and explicitly address validity issues in the review. For example, ICs could be asked to indicate whether the studies included in the PSR were double-blinded, whether they were properly randomized, whether there were proper controls for confounding variables, and whether the investigators had statistically adequate sample sizes, etc. These validity issues could be included in the "Summary of Search Results" section of the Template for Practice Standard Review so that ICs are explicitly prompted to attend to them and integrate them into their PSR literature-appraisal process.

Conduct on-line training in searching techniques

Training ICs in effective searching techniques should take place as often as possible in computer labs (perhaps AIHA can make use of the facilities at US institutions connected with universities) so that ICs do not just hear about, but can see and access, the various resources they have available to them for searching during training sessions.

Bring information closer to the patient

To the extent that these tools appropriately deploy EBP principles, AIHA could consider funding the purchase of Palm Pilots™, installed with EBP resources (many of which can be downloaded from the Internet), for hospital staff. This would both facilitate the collection of patient data and would reduce the time it takes practitioners to access knowledge resources, particularly for routine situations, and could reinforce the use of EBP for every patient.

Continue to promote relationship with US Partners

Although our data regarding the role of US partners in promoting EBP is limited and preliminary, AIHA should continue to exploit every opportunity to communicate to US partners its priority that EBP be actively promoted at partnership institutions. The AIHA should continue to send frequent updates about the LRC project that include discussion of our EBP goals and activities and encourage US partners to get involved, particularly with the production of PSRs. These periodic updates could be supplemented with presentations at the general

session of the AIHA Annual Meeting and other meetings at which US partners are present that reinforce the message that adoption of EBP at partnership institutions is an AIHA priority, and suggest ways that US partners can aid in promoting this innovation. In addition, the partnership workplan template (which each partnership develops annually) could be further modified to request that the partnership explicitly indicate ways in which both institutions would be working to promote EBP.

If US partners could actively encourage its adoption at partnership institutions, it could speed the diffusion of this innovation in NIS/CEE. AIHA may want to offer its training workshops and other EBP resources to US partner institutions as well. AIHA could also encourage the designation of a US EBP point person who could receive extensive training in principles-knowledge in EBP and be responsible for diffusing it within his/her own US institution as well as providing a connection with the NIS/CEE EBP point person to encourage its diffusion at those institutions.

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Appendix A. Survey instrument used to quantitatively evaluate the understanding, acceptance, and implementation of EBP among AIHA partnership institutions (English version).

Evidence-Based Practice Survey June 2002

What is your gender? M_____ F_____

What is your race?

Caucasian _____

Hispanic? Yes _____ No_____

African _____

Asian _____

American Indian_____

Other (specify) _____

Year you graduated with your most advanced degree _____

For each of the following questions, please answer using following scale:

1	2	3	4	5
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

1 2 3 4 5	I find that a majority of my patients fall outside of the "normal" results provided through the scientific method.
1 2 3 4 5	I generally find evidence-based medicine a complex concept to teach to others.
1 2 3 4 5	I feel more confident in my diagnosis and treatment decisions after my training in evidence-based medicine than I did before the training.
1 2 3 4 5	My colleagues seem to feel that evidence-based medicine requires too much effort to use correctly.
1 2 3 4 5	Many of my colleagues have expressed frustration at the complexity of the evidence-based medicine program.
1 2 3 4 5	In feel evidence-based medicine has become an important part of my medical practice.
1 2 3 4 5	I generally trust my instincts when diagnosing

					and treating a patient.
1	2	3	4	5	In my opinion, peer review is not a crucial aspect of determining the value of research in a journal.
1	2	3	4	5	I believe that most statistical research does not apply in the real world of medicine.
1	2	3	4	5	I believe that medical journals screen out nearly all of the invalid research projects and print only those that have scientific merit.
1	2	3	4	5	I have encountered significant resistance from the hospital administration in implementing evidence-based medicine practices.

1	2	3	4	5	I am willing to give treatments that run contrary to the current literature based on my personal experiences with the treatments.
1	2	3	4	5	I think the concentration of power within central administration at my institution makes it difficult to implement evidence-based medicine.
1	2	3	4	5	Many of my colleagues feel that the evidence-based medicine program takes too long to implement to be useful.
1	2	3	4	5	I feel comfortable with terms such as standard deviation and confidence interval when diagnosing and treating patients.
1	2	3	4	5	I am surprised by the amount of outdated information my colleagues rely upon when practicing medicine.
1	2	3	4	5	There have been times where there is too much demand for the evidence-based medicine resources and not enough materials to provide to everyone who needs them.
1	2	3	4	5	I believe that a clinical study that ignores double-blind procedures is not valid research.
1	2	3	4	5	I believe each patient case is unique and cannot be easily explained using broader statistical evidence.
1	2	3	4	5	If I have to choose, I prefer to rely on research published in widely recognized journals even if the research does not use double-blind

					procedures.
1	2	3	4	5	I generally find that my colleagues are receptive to the concept of evidence-based medicine.
1	2	3	4	5	I do not feel the evidence-based medicine project is receiving proper support from the administrators in my hospital/clinic.
1	2	3	4	5	I do not feel the evidence-based medicine project is receiving proper support from the AIHA.
1	2	3	4	5	Some of my colleagues have stopped using evidence-based medicine because they have had negative reactions from their patients.
1	2	3	4	5	I do not normally use the evidence-based medicine resources when diagnosing or treating "routine" cases.
1	2	3	4	5	Whether or not a clinical project reaches statistical significance is of little relevance to me if the findings fit the case I am studying.
1	2	3	4	5	I generally feel that the more current the research is, the more likely it is that the research is accurate.

1	2	3	4	5	I have seen little patient resistance to our use of evidence-based medicine.
1	2	3	4	5	I feel that the evidence-based medicine resources are not being used by most of the medical staff at my institution.
1	2	3	4	5	I have found it difficult to help my colleagues to see the merits of evidence-based medicine.
1	2	3	4	5	I feel it is poor reasoning to generalize from large statistical populations to an individual case.
1	2	3	4	5	I feel comfortable diagnosing and treating patients if the evidence-based medicine resources are not available.
1	2	3	4	5	I will tend to discount research if I feel the sample size is too small to reach valid conclusions.

1 2 3 4 5	I am more likely to use the evidence-based medicine resources when looking at unusual cases.
1 2 3 4 5	While evidence-based medicine has been useful, I face other problems that far outweigh the problems EBP can solve.

On a scale of 1 to 10 with 10 being the **most** important, please rate the relative importance of evidence-based medicine compared to other concerns at your location.

1 2 3 4 5 6 7 8 9 10

What problems do you face at your location that receive higher priority than evidence-based medicine?_____

_____

_____

_____

_____

_____

_____

_____

If you have additional comments or concerns, please write them on the back of this survey.

Thank you for your time!

Appendix B. Survey instrument used to quantitatively evaluate the understanding, acceptance, and implementation of EBP among AIHA partnership institutions (Russian version).

Appendix C: Interview Schedule

Who, at your institution, is most enthusiastic about EBP, and how does this affect its adoption?

What is new about evidence-based medicine?

What are the major obstacles facing implementation of EBP at your institution?

What, in your opinion, should be the ideal relationship between science and medicine?

Do you feel your colleagues have adequate knowledge of statistical concepts to effectively assess the validity of a given study?

In general, how valid do you think the scientific literature is?

What are some common criteria you use for assessing the "quality" of an article?

How often do you feel CPGs should be updated?

Appendix D. Resources for further reading on EBP

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