

# Introduction to Evidence Based Practice at National University of Health Sciences

## Evidence Based Practice at NUHS

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What is “Evidence-based Practice?”

The Benefits of Evidence Based Practice

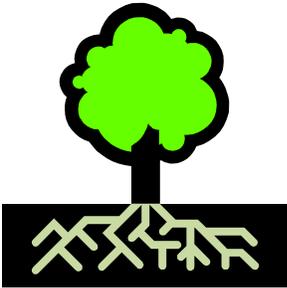
Evidence Based Practice in Action at NUHS

### What is “Evidence-based Practice?”

Evidence based practice (EBP) can be defined generally as “using research information and documented, supported facts (evidence) to support or determine a critical decision or judgment.” EBP encompasses professional practice of all kinds:

- law,
- education,
- journalism,
- health care...

### The Roots of Evidence Based Health Care



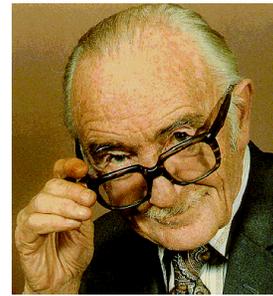
For the health care professions, evidence based practice (EBP), is not a new fad. In fact, the roots of evidence based health care philosophically reach back to the mid-19th century to the “Age of Enlightenment” and the use of scientific method when physicians and scientists applied scientific inquiry and research methodology to medical issues. In fact, some advocates of using strong evidence to support health care decisions argue that evidence based practice dates back to the European Renaissance, centuries old Oriental medicine and even the early Greek civilization when scientists used observation, experience, experimentation and documentation to diagnose, treat and determine causes of disease and illness.

Evidence-based medicine (EBM) became a movement unto its own in the 1970s when Dr. Archie Cochrane<sup>1</sup> led a global movement to use substantiated epidemiological information and well-designed research studies, in particular, the randomized controlled trial (RCT) design, to develop effective and efficient diagnostic tools and therapy plans.<sup>2</sup>

Cochrane reasoned that because resources – time, people, money -- would always be constrained and limited, the health care profession should provide health services shown to be effective, in turn, proven to be reliable, efficient and economical. He emphasized relying on properly designed, solid, scientific evaluations and research studies as sources of information and evidence, and promoted the use of randomized controlled trials (RCT) because standardized, highly structured RCTs were likely to provide much more reliable, solid information than other sources of evidence.<sup>1</sup>

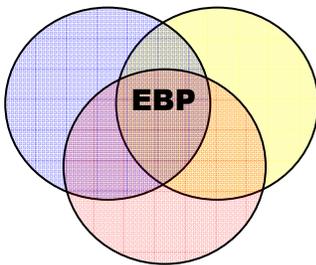
1970's: Dr. Archie Cochrane <sup>3</sup>

- Resources are always limited
- Use resources wisely
- Provide health care shown to be effective using:
  - substantiated epidemiological information
  - research studies representing properly designed evaluations
  - well designed randomized controlled trials (RCT)



www.cochrane.org

In the 1980s and 90s, a team of medical professionals from Oxford, McMaster University, Duke and other medical universities, led by David Sackett defined evidence based medicine (EBM), also known as evidence based health care (EBHC) and evidence based practice (EBP) as having **three essential components**.<sup>4,6</sup>



1. The best available evidence supported by research

“... the conscientious, explicit, and judicious use of the best evidence in making decisions about the care of individual patients.”

2. Patient values

“... “thoughtful identification and compassionate use of individual patients' predicaments, rights, and preferences.”

3. Clinical expertise

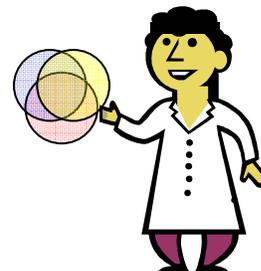
“...Without clinical expertise, practice risks becoming tyrannised by evidence, for even excellent external evidence may be inapplicable to or inappropriate for an individual patient.”<sup>4</sup>

“Evidence-based practice,” “evidence-based medicine,” “evidence-based healthcare,” evidence-informed practice (EIP), and similar terms all revolve around using the highest quality basic and clinical research information to make a well-formed decision regarding a patient's well being along with the experience and expertise of the health care provider and the patient's informed preferences. At the same time, evidence-based practitioners point out that being evidence-based does not mean “evidence-enchained” or evidence-restricted.<sup>7</sup>

**Evidence Based Practice is an important activity for medical practice, not just a definition.**

True evidence based practice involves more than just using research literature to determine or support a diagnosis or therapy. EBP “is an **approach** to [health care and] medical practice<sup>8</sup>

in which you (the clinician)  
are able to **evaluate**  
the strength of that evidence and  
**use** it in the best clinical practice  
for the **patient** sitting in your office.”  
(Mayer 2004)



## Why is evidence based practice important in the real world?

While academics and health care professionals argue nuances and weighting of the essential EBP components,<sup>9-11</sup> the benefits of evidence-based health care practice are clear: effective, efficient, and optimum care for a specific patient,<sup>12-16</sup> bridging and closing clinicians' knowledge gaps efficiently,<sup>17-21</sup> better provider-patient relationships including improved patient participation, adherence to instructions, and retention;<sup>22-24</sup> support of professional competency through efficient continuing education,<sup>25-28</sup> and more efficient reimbursement of costs based on effective diagnoses and treatments.<sup>6,29-31</sup>

### Benefits of Evidence Based Practice:

- Effective, efficient, and optimum care for a specific patient<sup>12-16</sup>
- Bridging and closing clinicians' knowledge gaps efficiently<sup>17-21</sup>
- Enhanced provider-patient relationships including improved patient participation, adherence to instructions, and patient retention<sup>22-24</sup>
- Supports professional competency through efficient continuing education, managing the need to “keep up” and the increasing volume of medical information<sup>25-28</sup>
- More efficient reimbursement of costs based on effective diagnoses and treatments, answering challenges to clinical decisions with strong research evidence<sup>6,29-31</sup>
- Supports patients with well-researched health care questions and the desire to participate in their own health management

### EBP is a necessity, not just a “nice-to-do”

“Passion, enthusiasm, and philosophy are great. However, the need for *evidence-based* clinical decision making is growing stronger.”

Dr. Christopher Wolcott  
Instructor, Evidence Based Practice,  
National University of Health Sciences  
Southport Grace Wellness Center, Chicago, IL  
2003 NUHS graduate

Professional health care practitioners encounter:

- “Scientific uncertainty”
- Increase in medical information
- The need to “keep up” efficiently and continuing education
- Patients with well-researched questions
- Doctor-patient relationship needs
- Challenges to support clinical decisions with strong research evidence



## Evidence-based health care decisions support effective, efficient patient centered care

The use of evidence while relying on the health care professional to integrate and implement decisions and therapies for their patients in clinical settings leads to more effective, efficient and patient centered care. Lockwood, et al. demonstrated that integrating evidence-based decision making into routine hospital based practice resulted in utilizing and following treatment guidelines based on published evidence. Health care providers documented improved patient care and appropriate changes in practice.<sup>32</sup>

Similarly, Straus and others measuring the effect of an EBM educational program in a community hospital found that after health care providers received training in evidence-based practice and when resources were provided to support evidence-based decision-making, patients were more likely to receive therapies proven to be beneficial through strong research studies, particularly randomized, controlled trials (RCTs).<sup>24</sup>

## EBP skills help close the knowledge gap and bridge “scientific uncertainty.”

In a study to determine the information needs of doctors, experienced clinicians encountered some aspect of scientific uncertainty three times for every two patients.<sup>22,33-36</sup> Interns & residents encountered uncertainty up to five times per patient in a similar studies.<sup>6,37</sup>

Questions generated by patient encounters included<sup>34,36</sup>:

- What is the best therapy for this particular patient?
- What is the patient specific diagnosis?
- Is a specific diagnostic test useful or more useful than...?
- What is the prognosis for this patient?
- What is the etiology of this disorder?
- Will this help or harm?
- Is this therapy efficacious and cost effective?

To answer patient generated clinical questions, 30% of physicians typically turned to<sup>22</sup>



- Textbooks
- Colleague
- Computer application/Internet
- Medical records or
- Hospital information system
- “Refrigerator notes”

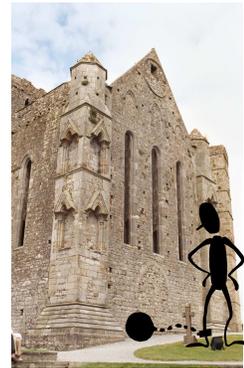
Sackett et al. found that 60% of the clinical questions generated on grand rounds at McMaster needed a structured search for information & evidence.<sup>5</sup> Ely's results were similar.<sup>22,35,36</sup>

Despite significant benefits to the health care provider, consumers, and overall health care system, there remains a “chasm between real evidence-based health care practice and what has proven to be most effective and efficient”<sup>38</sup> (see also<sup>29,30</sup>). Several studies found that only about 55% of the clinical questions that needed a formal search were followed up.

Health care providers have cited significant obstacles to the practice of evidence-based health care: the lack of essential EBP skills;<sup>22,30,35,39-46</sup> doubt that relevant or complete answers exist;<sup>47</sup> the increasing volume of published evidence and lack of access to the evidence;<sup>47-49</sup> the lack of time to pursue answers;<sup>22</sup> and the lack of institutional or environmental support.<sup>28,50</sup> In addition, while EBP begins and ends with a patient<sup>4,8</sup> not all patient visits elicit clinical questions requiring a search of the literature or critical appraisal.<sup>22,47,51</sup>

The reasons cited by professionals regarding why they did not follow up on questions were:<sup>22,35</sup>

- Doubt that the answers existed
- Lack of time to pursue answers
- Lack of confidence in skills to find answers
- Lack of access to good journals, resources
- Cost (subscriptions, literature access, time)
- Lack of applicability or reliability of information
- Too much information (not enough time to sift through information)



However, Michaud, Straus and others researching professionals’ use of medical literature and research studies found that.<sup>28,52,53</sup>

- Of **145 cases** and clinical decisions analyzed, **only 22 cases could not be supported** with a published research study from the medical literature

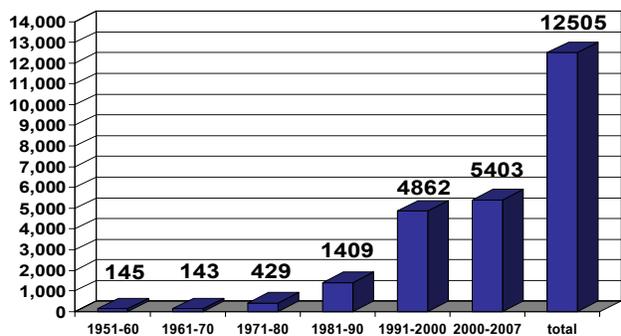
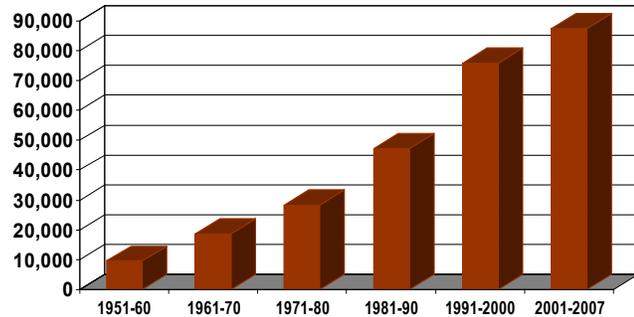
Addressing the concerns that when research could be found, it may not be applicable to the patient situation, researchers found

- Of 520 clinical questions for which answers were sought in the medical literature:
  - 53% confirmed the clinical decision
  - 47% changed the clinical decision.<sup>54</sup>
- In 71 information searches to answer clinical questions generated on medical rounds:
  - 37 (52%) confirmed the management decision
  - 18 (25%) lead to a new therapy or diagnostic test
  - 16 (23%) corrected a previous plan.<sup>28</sup>
- And the target time range for finding these answers was 15 seconds to 30 minutes.<sup>6</sup>



## Managing the increase in medical information, research and evidence can be efficiently accomplished using evidence based practice skills

The increasing volume of medical literature affects every person aiming to find medical information or to keep up with the latest information. A simple search of the term “diabetes” on PubMed by decade from 1950 to the present illustrates the phenomenal increase in the number of peer reviewed scientific items regarding current health issues. Peer-reviewed scientific literature regarding diabetes more than doubled each decade, up to and including the present decade with no signs of slowing down.



Results from a simple search of the terms “low back pain” in PubMed by decade from 1950 to the present show the number of peer reviewed scientific items associated with “low back pain” as a search term generates currently over 1,000 items per year. Searching specific chiropractic literature that is not included in PubMed using CAM databases increase the number of high quality, peer-reviewed articles.

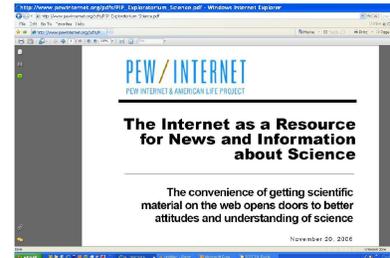
## Effective learning and efficient continued education can be accomplished using evidence based practice skills.

- Medical professionals skilled in EBP followed by Sackett and McMaster University researchers were up-to-date for 10 to 15 years post-grad versus for “control cohort” given no EBP training.<sup>6,55,56</sup>
- The time allocation for continuing education and question follow-up was 30 - 60 min per week.<sup>6</sup>



## Evidence based practice supports the doctor patient relationship.

With access to the internet, patients do their own research. Forty million Americans use the Internet as their “primary source of news and information about science”, according to the Pew Internet and American Life Project.<sup>57</sup>



Not only do health care professionals need to keep up with the professional literature, but they also need to keep up with the information, substantial or not, that their patients are finding, reading and questioning.



Patients have expectations and ask specific questions. If you want your patients to follow your recommendations for care, you will need to back them up with more than your opinion.”  
-C. Wolcott, DC

## Evidence Based Practice Retains Patients<sup>22</sup>

- Self-reported “non-expert” physicians randomly selected for the study pursued 55% of clinical questions, citing “obstacles” & “needs”
- Non-pursued clinical questions led to consultation and referral
- 40% to 92% of referred patients did not return to the referring practice

## Challenges to clinical decisions require efficient and effective evidence based practice skills effectively answered.

Third party payors increasingly are requiring demonstration of support for clinical decisions using solid medical research literature.

Following are examples of clinical decisions recently challenged for substantiation:

- Research reporting the clinical efficacy of electrotherapy (interferential currents [IFC] and transcutaneous electrical nerve stimulation [TENS]) was requested by a large, well-known insurance company.
- A 75 YO BM with osteoarthritis of the knee wanted to know if acupuncture therapy is effective and/or better than NSAIDs in treating knee pain secondary to osteoarthritis. His insurance company challenged payment for acupuncture therapy provided in a Chicago chiropractic practice.
- Research supporting the use of spinal decompression procedures: *“Our health care management organization periodically contacts representatives of our provider network or health care provider organizations to obtain feedback on medical policy development for specific topic areas. Our company is seeking input from you and your organization on the current peer reviewed evidence for spinal decompression therapies and mechanical traction.”* (from a request sent to NUHS Evidence Based Practice researchers, 2007)

## Evidence Based Practice in Action at NUHS

Experts allow that not all health care providers need to use all the EBP steps to deliver high-quality evidence-based health care for each patient visit.<sup>58-60</sup> However, studies show that medical professionals trained in EBP skills could keep up with most new advances in the literature in one-half to one hour per week while in clinical practice; significantly more efficiently and effectively than medical school cohorts not trained in EBP.<sup>6,37,61</sup> Ely<sup>22</sup> found that primary health care providers who had some previous training in accessing and appraising the biomedical literature were more likely to pursue evidence when needed. Thus, exposure to and training in EBP skills has an impact on clinical decisions, making the process more efficient and effective.

### Why the difference in behavior & success?



**Pursuers:**  
Specific training in EBP skills  
Self-reported competency

**Non-pursuers**  
No specific EBP training  
Self-reported lack of skills  
Self-reported non-experts



### Essential Evidence Based Practice Skills<sup>62</sup>

Key skills and behaviors associated with effective and efficient EBP include asking a focused, structured clinical question that facilitates searching and finding literature; accessing (searching) the biomedical research databases and compiled evidence websites for relevant, high-quality information and evidence; critical appraisal of research; applying the evidence to a patient or practice; and assessing the clinical and professional outcomes and impact of the use of the evidence.<sup>6,8,14,18,22,24,24,26,31,55,61,63,63-74</sup> Strong EBP skills and knowledge from effective training ensures comfort with and practice of EBP skills.<sup>15,24,56,75-80</sup>



- Asking a focused, “searchable,” clinical question
- Accessing the medical literature through a structured search and understanding available resources
- Appraising -- critically evaluating the evidence to determine if it is robust, reliable and valid.
- Applying the evidence to the particular patient situation
- Assessing the outcome of using (or not using) particular information its impact on clinical practice

## Asking

Evidence based practice starts and ends with the patient.<sup>68,74,81-83</sup> The clinician determines what information is needed using their expertise, skills and knowledge.<sup>34,65</sup> Patient expectations focus the clinical relevance of the question.

When a clinical question necessitates a search for high-quality evidence, the professional poses a “structured” clinical question to lead the search, using key concepts for patient characteristics, issues, expectations and values along with concepts for the intervention, diagnosis or exposure and additional concepts for comparison interventions or therapies and the desired outcomes.<sup>82,84-86</sup>

The “PICO” format for a clinical question provides structure for an efficient literature search. PICO stand for Patient – Intervention – Comparison – Outcome.<sup>81-86</sup> The skill to develop a “PICO-format” question leading to a structured search is discussed in “*Asking* Constructing the Patient Focused, Searchable Clinical Question” (section 2).<sup>87</sup>

**P**atient  
**I**ntervention  
**C**omparison  
**O**utcome

## Accessing high quality biomedical literature: NUHS Evidence Based Practice Resources

As many as 60% of the questions, generated in a clinical practice, may require a structured search for information and evidence that will support a clinical decision or plan.<sup>6,17,22,65,67,85,88</sup> EBP happens in real time with real patients under real circumstances. Searches for information and evidence take place in real time, under real conditions and for real patients.<sup>14,22,28,34,36</sup>



At National University of Health Sciences, research scientists, practicing clinicians, clinical instructors, academic professors, the medical librarians in the NUHS Learning Resource Center (LRC), and information technology professionals work closely to integrate evidence based practice skills, knowledge and behaviors into the curriculum and clinical practice. Using real patients and patient scenarios to initiate evidence-based practices such as searching and accessing high quality evidence to support clinical decisions, appraisal of resources and research articles supporting course

content and clinical decisions, discussions of applying evidence through journal clubs and on-line forums, and assessment of the process and the impact on education and health care under real circumstances, students, faculty and clinicians hone the skills of evidence based practice.<sup>87,89</sup>



The NUHS LRC provides collections of biomedical resources which include high quality informational sources, journal subscriptions and electronic access to high quality databases of the biomedical literature. The NUHS website [www.nuhs.edu](http://www.nuhs.edu) provides access to the LRC catalogue as well as specific databases through the LRC web pages ([www.NUHS.edu](http://www.NUHS.edu) >> [About Us](#) >> [Learning Resource Center](#) <http://www.nuhs.edu/show.asp?durki=134>).

The [LRC Services and Features page](#) highlights the NUHS journal holdings, physical and virtual access to the LRC and holdings, information regarding access to “A to Z,” a subscription database linking to the electronic full text of over 10,000 journals, links to numerous biomedical literature databases which include literature for complementary and alternative medicine (CAM), health care and research such as EBSCOhost, Ovid, and PubMed, links to professional journal subscriptions, and the Interlibrary Loan Request Form (ILL) ([http://www.nuhs.edu/student\\_services/AllLoanRequestForm.aspx](http://www.nuhs.edu/student_services/AllLoanRequestForm.aspx)) with which students, faculty, alumni and other LRC users can request books, journal articles and other resources not immediately available through the electronic access resources.

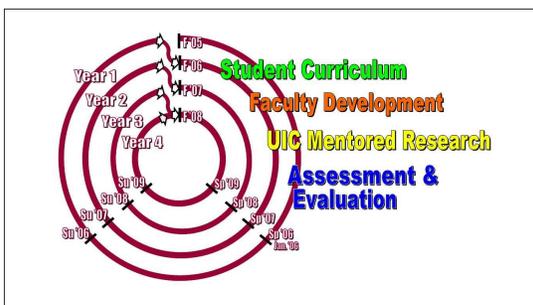
Additional LRC and EBP electronic resources are available through the NUHS on-line learning platform, CygNET (<http://cygnet.nuhs.edu>). Faculty, staff, students and registered users can link to numerous on-line journal subscriptions, databases and compiled evidence websites in the on-line resource EBP @ NUHS. Also in the CygNET EBP @ NUHS e-LRC Resources pages are information and evidence resource webliographies, summaries, critical appraisals, and journal club presentations.

Students in all programs are introduced to high quality resources and databases. Students learn how to access the best evidence early in their education in courses such as Fundamentals of Natural Medicine. In Public Health, students perform a guided, structured search of recommended websites, compiled evidence databases, and databases of the biomedical literature based on PICO questions formed from patient scenarios based on current, “hot” public health topics. Students document and evaluate their search strategy and results, then recommend resources and articles as evidence for specific public health topics. Topics are based on patient scenarios and assess the general state and impact of the available evidence on that particular public health topic.



Students also learn the finer points of study designs utilized in clinical research in stand-alone on-line (EBP 1) and face-to-face classes, along with critical appraisal skills (EBP 2). In other courses, EBP skills and knowledge are integrated into the courses through discussions and appraisal of literature, using evidence, access and appraisal to augment course content as well as projects that encompass the “A-team” EBP skills gamut.

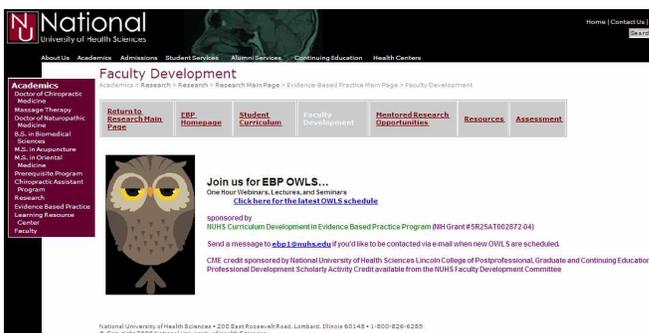
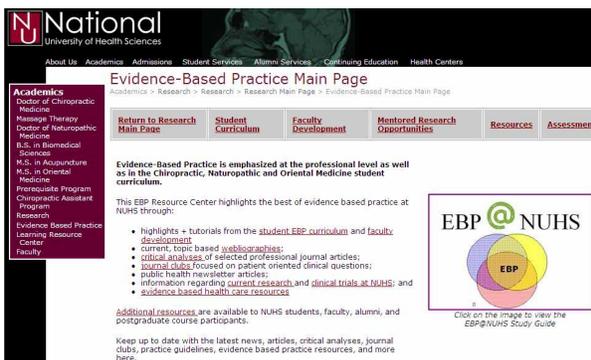
**Appraising -- critically evaluating the evidence to determine if it is robust, reliable and valid.**



The NUHS Curriculum Development in Evidence Based Practice project is supported by a grant from the National Institutes of Health (NIH) National Center for Complementary and Alternative Medicine (NCCAM), grant 1R25AT002872.<sup>90</sup> The multifaceted program focuses on developing an integrated student curriculum, faculty development program, student and faculty mentored research opportunities at the University of Illinois Chicago, and an outcomes assessment component.

The NUHS EBP student curriculum is featured in the [www.NUHS.edu](http://www.NUHS.edu) web pages. ([www.NUHS.edu](#) >> [About Us](#) >> [Research](#) >> [Evidence Based Practice](#)).

The student curriculum focuses on EBP essentials, asking clinical questions, searching for information, evidence and research regarding patient health care, critically appraising journal articles and compiled evidence for quality, relevance and validity, archiving synthesized, summarized evidence as critical appraisals, webliographies, journal clubs and Patient-oriented Evidence that Matters (POEM) summaries.<sup>87,91</sup> Links to student projects, RSS feeds to searches using patient generated clinical questions, critical appraisals, and journal club schedules are posted throughout the web pages and the CygNET EBP@NUHS learning and resource pages, serving as archived, evidence based CAM practice resources.



The NUHS EBP OWLS program (One hour Webinars, Lectures and Seminars) enhances the NUHS faculty development program as well as the University-wide EBP curricula. The OWLS program features webinars and lectures based on applying EBP skills to education, learning and clinical practice.

Experts in accessing evidence, appraising evidence, evidence-based education, and evidence-based clinical practice are invited to campus (physically and virtually) to interact with students and faculty. Faculty can participate in workshops, sponsored by the EBP R25 grant, focused on integrating EBP skills, knowledge and behaviors into courses as well as clinical practice. Schedules for Journal Club, OWLS and workshops are posted on the [EBP Faculty Development web pages](#).



In addition to learning new ways to effectively and efficiently incorporate current evidence and evidence based practice skills into courses, faculty and clinicians become role models for real time EBP skills and behaviors.<sup>28,56,89,92-101</sup> Faculty and other participants can earn continuing education credit as well as professional credit for providing service to the NUHS and professional community.

## Applying the evidence to the particular patient situation



Student and faculty evidence based practice programs meet in the faculty invited lecture series and in the student and faculty journal clubs.<sup>91,102-125</sup> Critically appraised professional journal articles are discussed in light of real patients and the applicability of current evidence to particular patient and clinical situations. Evidence based health care professionals are invited to speak to students, interns, faculty and other professionals throughout the year, focusing on applying evidence based practice skills in private practice, large clinical institutions and at other educational institutions.

Information about on-going research studies at NUHS can be found on the NUHS Research pages ([www.NUHS.edu](http://www.NUHS.edu) >> [About Us](#) >> [Research](#)). Faculty and students are encouraged to participate in research studies as investigators and research assistants. The numerous faculty publications can be found on the Research web pages as well as in the CygNET e-LRC.



Students are provided the opportunity to participate in a full-time, research intensive semester in partnership with the University of Illinois Chicago, School of Public Health through the NUHS UIC EBP Student Mentored Research Program (MRP).<sup>126</sup> Stepping away from the professional Doctor of Chiropractic program for one term, students engage in at least two graduate level courses in the Master's of Public Health program and participate in an active research project with a UIC faculty researcher. While designed to be a single term program, several students have elected to enroll in the UIC Masters of Public Health program or a Ph.D. program following their MRP experience.

## Assessing the outcome of using (or not using) particular information its impact on clinical practice

Armed with relevant, high quality evidence, the practitioner, using clinical expertise, can determine the applicability of research to the patient and the patient circumstances, values and expectations. The practitioner constantly assesses the outcomes of his or her critical appraisal and determines the impact of the literature and studies on his or her practice.



Students, faculty and clinicians at NUHS have the opportunity to assess the outcome of using (or not using) particular information and evidence for the care of patients. Particularly through the discussions of journal clubs which are recorded and archived, through one-on-one clinician – student mentoring and through faculty forums, EBP is a dynamic, integrated behavior at National University of Health Sciences.

Evidence based practice encompasses problem solving requiring clinical expertise and experience, using relevant and applicable research studies and always keeping the patient in the forefront of any clinical decision.

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