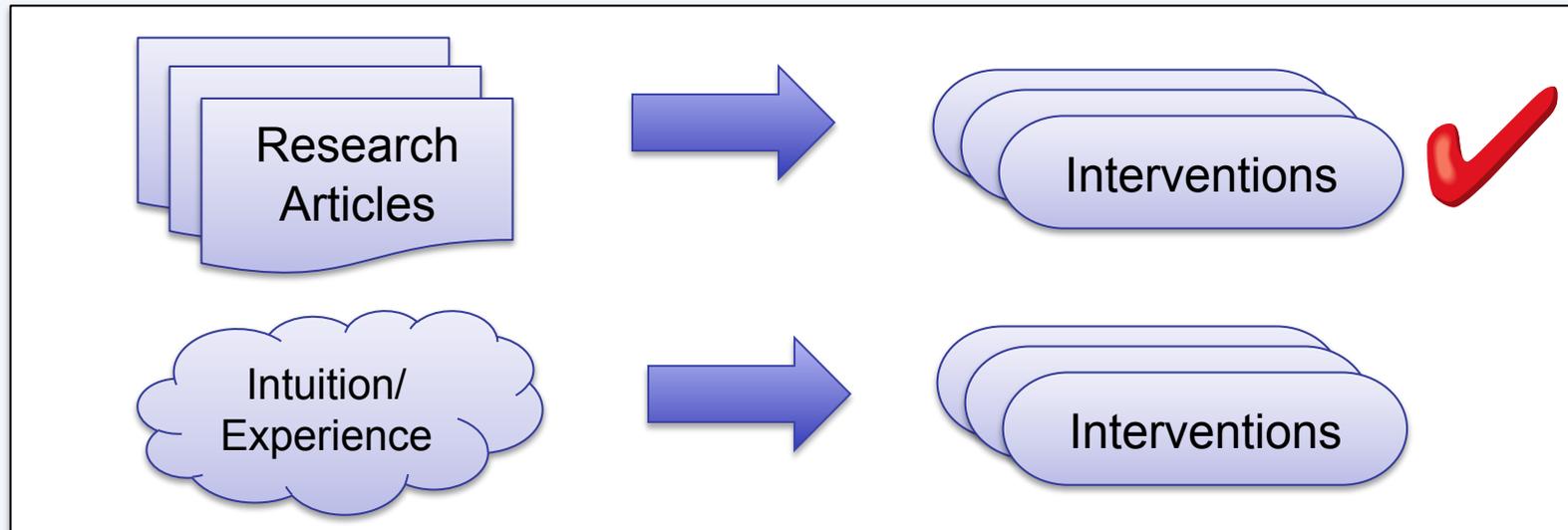


eEvidence: Information Seeking Support for Evidence-based Practice: An Implementation Case Study

**Jin Zhao, Min-Yen Kan, Paula M. Procter,
Siti Zubaidah, Wai Kin Yip, Goh Mien Li**

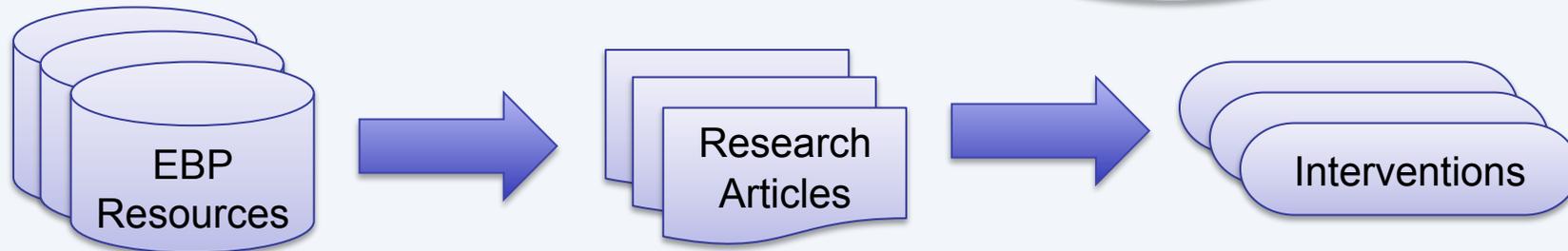
Evidence-based Practice (EBP)



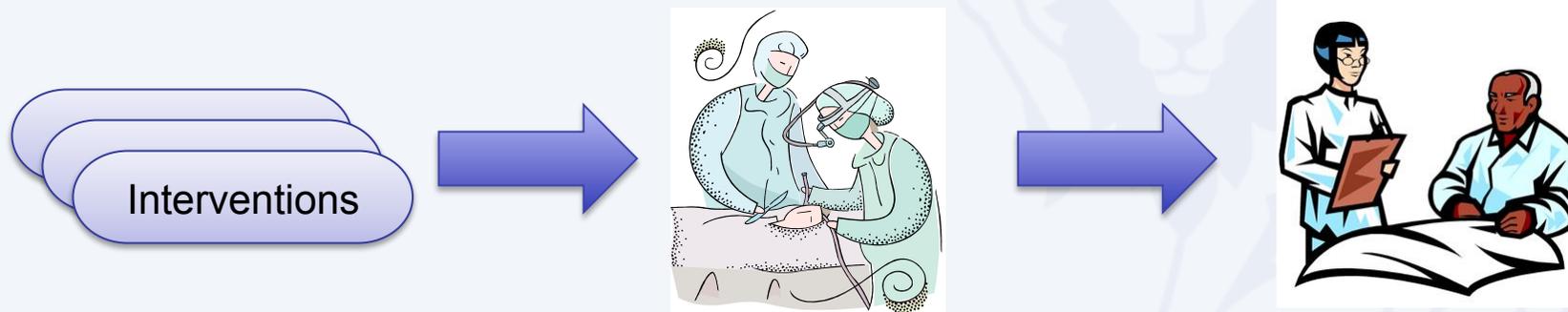
- **Advantages**
 - Reliable
 - Efficient
 - Updated

Two Stages of EBP

- Stage 1: Search and Appraise

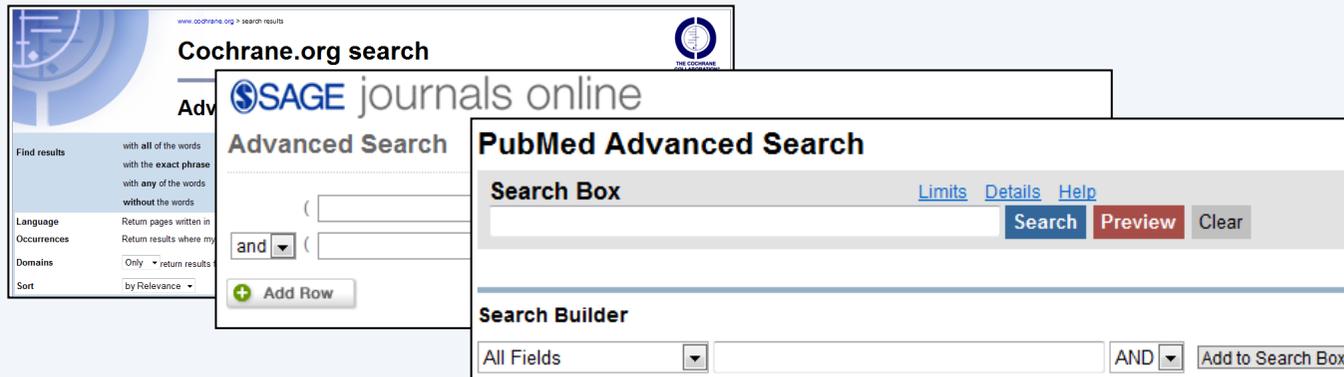


- Stage 2: Apply and Evaluate



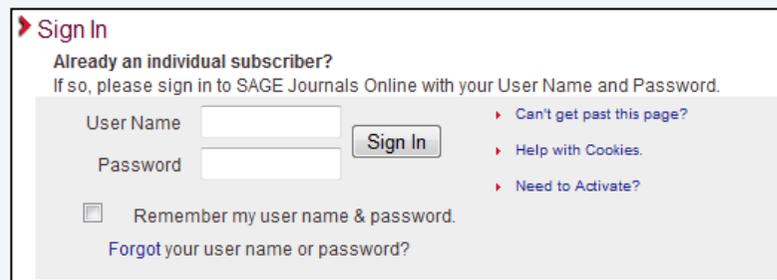
Problems in the Search & Appraise Stage

- **Accessibility issues**
 - Collection-specific specialized search engines



The image shows three overlapping search engine interfaces. On the left is the Cochrane.org search page with a sidebar for refining results. In the middle is the SAGE journals online Advanced Search page with a search box and an 'Add Row' button. On the right is the PubMed Advanced Search page with a search box and a 'Search Builder' section.

- Subscription barrier



The image shows a sign-in form for SAGE Journals Online. It asks if the user is an individual subscriber and provides fields for User Name and Password, along with a 'Sign In' button. There are also options to remember the user name and password, and a link for users who forgot their credentials. On the right side of the form, there are three links: 'Can't get past this page?', 'Help with Cookies.', and 'Need to Activate?'.

Problems in the Search & Appraise Stage

- **Usability gap in search engines**
 - Key information not displayed or usable in searching

Effects of Intermittent Electrical Stimulation on Superficial Pressure, Tissue Oxygenation, and Discomfort Levels for the Prevention of Deep Tissue Injury.

Solis LR, Gyawali S, Seres P, Curtis CA, Chong SL, Thompson RB, Mushahwar VK.

Rehabilitation Science Program, Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, AB, Canada.

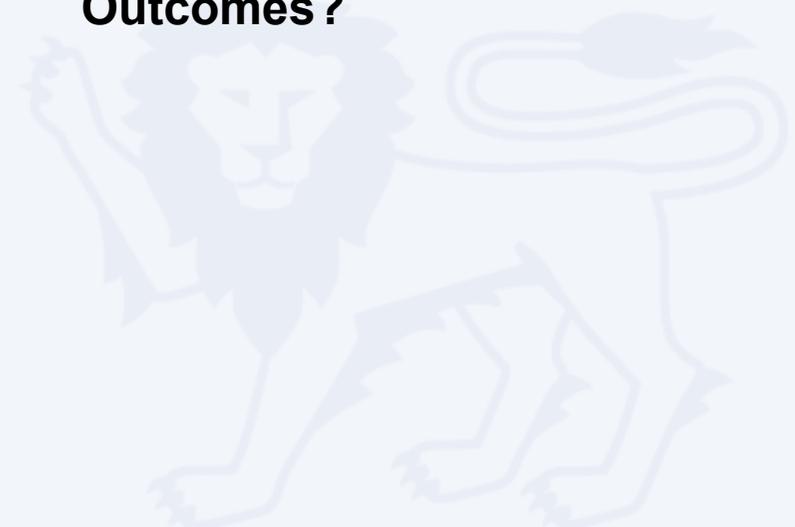
Abstract

The overall goal of this project is to develop effective methods for the prevention of deep tissue injury (DTI). DTI is a severe type of pressure ulcer that originates at deep bone-muscle interfaces as a result of the prolonged compression of tissue. It afflicts individuals with reduced mobility and sensation, particularly those with spinal cord injury. We previously proposed using a novel electrical stimulation paradigm called intermittent electrical stimulation (IES) for the prophylactic prevention of DTI. IES-induced contractions mimic the natural repositioning performed by intact individuals, who subconsciously reposition themselves as a result of discomfort due to prolonged sitting. In this study, we investigated the effectiveness of various IES paradigms in reducing pressure around the ischial tuberosities, increasing tissue oxygenation throughout the gluteus muscles, and reducing sitting discomfort in able-bodied volunteers. The results were compared to the effects of voluntary muscle contractions and conventional pressure relief maneuvers (wheelchair push-ups). IES significantly reduced pressure around the tuberosities, produced significant and long-lasting elevations in tissue oxygenation, and significantly reduced discomfort produced by prolonged sitting. IES performed as well or better than both voluntary contractions and chair push-ups. The results suggest that IES may be an effective means for the prevention of DTI.

Patient details?

Interventions considered?

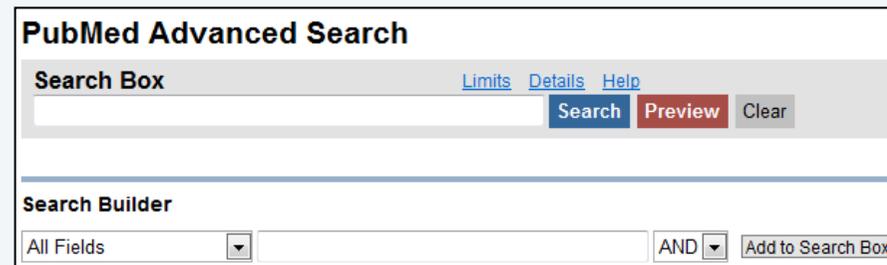
Outcomes?



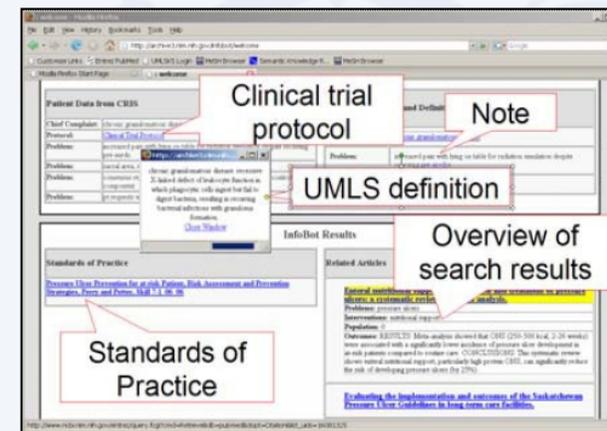
Problems in the Search & Appraise Stage

- Different search patterns

- Active search
 - Search engine



- Passive search
 - Decision-support system

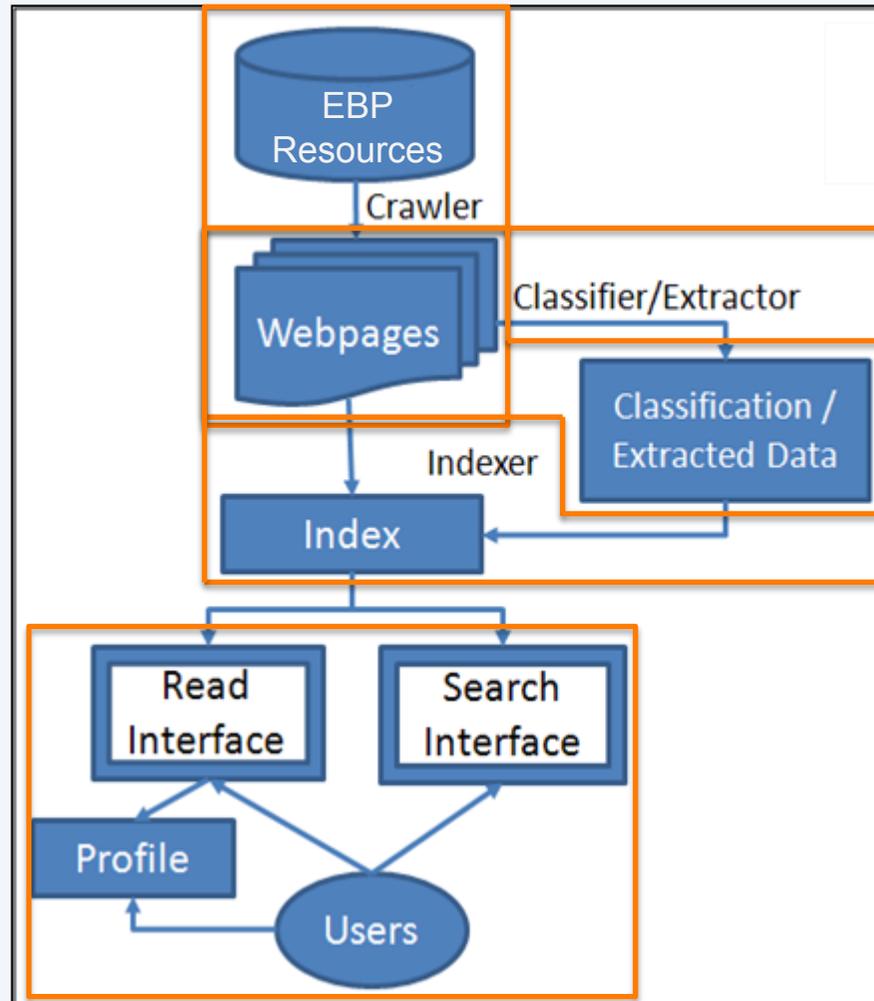


eEvidence System for EBP

- **Key features**

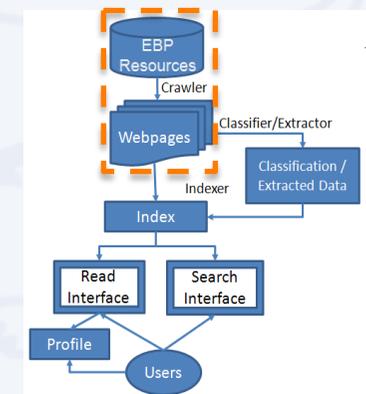
- Harvesting EBP resources by periodic crawling
 - Ensures up-to-date coverage
- Automated article classification and key information extraction
 - Provides crucial information to assist search and appraisal
- Dual active/passive user interface
 - Caters for different search patterns

System Architecture



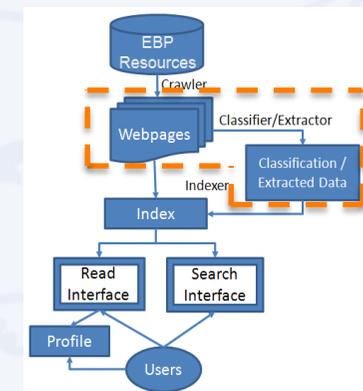
Harvesting EBP Resources by Periodic Crawling

- **Two stages**
 - Selection of EBP resources by experts
 - Periodic crawling using Nutch
- **Advantages**
 - Able to harvest from any type of EBP resources
 - Always up-to-date



Automated Article Classification and Key Information Extraction

- **Supervised machine learning pipeline**
 - Three categories: abstract / full text / others
 - Maximum entropy classifier
 - Text, webpage and formatting features
- **Advantages**
 - Filters out useless webpages
 - Allows users to zoom to subsets of articles



Automated Article Classification and Key Information Extraction

- Year of publication, time added, URL

[Impact of Invasive and Noninvasive Quantitative Culture Sampling on Outcome of Ventilator-Associated Pneumonia . A Pilot Study](#) -- SANCHEZ-NIETO et al. 157 (2): 371 -- American Journal of Respiratory and Critical Care Medicine

Year of Publication: 1998. Full text, Added 2 days ago

... not given for pneumonia. In all cases ... specifically given for pneumonia. Twenty (83%) patients belonged to ... of late-onset (7 d) pneumonia. Late-onset pneumonia was considered in 14 ... directly attributable to pneumonia. This occurred in three ... mechanically ventilated patients with nosocomial pneumonia. In addition, quantitative ... mortality of ventilator-associated pneumonia (VAP) ranges from 20 to ... a poor outcome from nosocomial ...

<http://ajrccm.atsjournals.org/cgi/content/full/157/2/371>

- Key sentences / keywords

Intervention, Patient, Research Goal, Study Design	We performed an open, prospective, randomized clinical trial in 51 patients receiving mechanical ventilation for more than 72 h, in order to evaluate the impact of using noninvasive (quantitative endotracheal aspirates [QEA]) diagnostic method on the morbidity and mortality of ventilator-associated pneumonia (VAP) .	Sex
		Condition
		Race
		Age
		Intervention
		Study Design

- Advantages

- Provides crucial information to assist search and appraisal

Dual Interface (Read)

- Recommend relevant articles based on user profile

Filter Settings for Current Results:

Read/Unread: All

Resource Type: All

Time Added: Since last login

Year of Publication: Any time

Sort by: Time Added

Hits 1-3 (out of about 3 total matching pages):

[Save marked results](#) [Mark as read](#) [Mark as unread](#)

[Impact of Invasive and Noninvasive Quantitative Culture Sampling on Outcome of Ventilator-Associated Pneumonia - A Pilot Study](#) -- SANCHEZ-NIETO et al. 157 (2): 371 -- American Journal of Respiratory and Critical Care Medicine

Year of Publication: 2008, Full text, Added 2 days ago

... not given for pneumonia. In all cases ... specifically given for pneumonia. Twenty (83%) patients belonged to ... of late-onset (7 d) pneumonia. Late-onset pneumonia was considered in 14 ... directly attributable to pneumonia. This occurred in three ... mechanically ventilated patients with nosocomial pneumonia. In addition, quantitative ... mortality of ventilator-associated pneumonia (VAP) ranges from 20 to ... a poor outcome from nosocomial ...

<http://ajrccm.atsjournals.org/cgi/content/full/157/2/371> (cached) (key text)

[Prediction of Clinical Severity and Outcome of Ventilator-associated Pneumonia - Comparison of Simplified Acute Physiology Score with Systemic Inflammatory Mediators](#) -- FROON et al. 158 (4): 1026 -- American Journal of Respiratory and Critical Care

Year of Publication: 2008, Full text, Added 5 days ago

... Outcome of Ventilator-associated Pneumonia . Comparison of Simplified ... Outcome of Ventilator-associated Pneumonia Comparison of Simplified ... development of ventilator-associated pneumonia (VAP) (n = 42), diagnosed on ... RESULTS DISCUSSION REFERENCES Ventilator-associated pneumonia (VAP) is a frequently ... Definition of Ventilator-associated Pneumonia VAP was considered ICU-acquired ... the criteria for pneumonia developed after the patient ... clinical suspicion of pneumonia, bronchoscopy with bronchoalveolar lavage (BAL ...

<http://ajrccm.atsjournals.org/cgi/content/full/158/4/1026> (cached)

Profile:

adult [blood transfusion]

cancer [quality of life]

pressure ulcer [fall,time]

ventilator-associated pneumonia

[cultural sampling]

>> [Click to manage profile keywords](#)

Saved results:

>> [Click to see saved results](#)

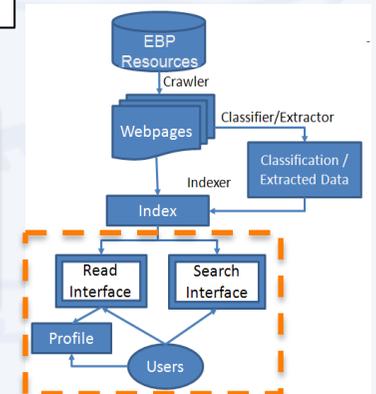
Current Profile Keywords:

Primary	Secondary
cancer Remove	quality of life Remove
	<input type="text"/> Add
pressure ulcer Remove	fall Remove
	time Remove
	<input type="text"/> Add
<input type="text"/> Add Primary Keyword	

Intervention, Patient, Research Goal, Study Design

We performed an **open, prospective, randomized clinical trial** in 51 patients receiving mechanical ventilation for more than 72 h, in order to evaluate the impact of using **noninvasive (quantitative endotracheal aspirates [QEA])** diagnostic method on the morbidity and mortality of **ventilator-associated pneumonia (VAP)**.

- Sex
- Condition
- Race
- Age
- Intervention
- Study Design



Dual Interface (Search)

- Allow users to search with complex query and filters

Enter your query here:
 Format: Primary keyword 1, Primary keyword 2 ... [Secondary Keyword 1, Secondary Keyword 2 ...]

pressure ulcer [treatment]

Sort by: Relevance Time Added Year of Publication

Additional Clauses: Connected using

pressure sore [diagnosis]

Filter Settings:

Read/Unread:

File Type:

Date Added:

Publication:

Year:

Sort by:

- Search history in place of profile

Search History:
[pressure ulcer \[treatment\]](#)
 (12), 18-08-2010
 >> [Click to see detailed history](#)

18 Aug

[pressure ulcer \[treatment\]](#) (12), 18-08-2010

[Quality Improvement Program to Reduce the Prevalence of Pressure Ulcers in an Intensive Care Unit](#) -- Elliott et al. 17 (4): 328 -- American Journal of Critical Care
 Year of Publication: 2008, Full text, Added 4 days ago, Already Saved
 ... the Netherlands reveal that pressure ulcer treat ei accounts for 1 ... mechanical causes of pressure ulcer: pressure, shear, and friction ... 10, 2008. Victorian Quality Council. Pressure ulcer point prevalence surveys: state-wide ... 10, 2008. Victorian Quality Council. Pressure ulcer point prevalence surveys (PUPFS): state ... P. Risk factors associated with pressure ulcer development at a major ... P. Carvalho MA, Bukvich J. Pressure ulcer risk factors in an ...
<http://ajcc.aacnjournals.org/cgi/content/full/17/4/328> (cached)

[Arginine Metabolites in Wound Fluids From Pressure Ulcers: A Pilot Study](#) -- Childress et al. 10 (2): 87 -- Biological Research For Nursing
 Year of Publication: 2008, Abstract, Added 5 days ago
 ... in Wound Fluids From Pressure Ulcers: A Pilot . in Wound Fluids From Pressure Ulcers: A Pilot ... with Stage III or IV pressure ulcers receiving negative pressure wound therapy (NPWT). Wound fluids ... 7 of NPWT treatment. Furthermore, we detected a ... 72 hr of treatment, and the arginase ... with Stage III or IV pressure ulcers on NPWT. Further studies ... longer period of ...
<http://brn.sagepub.com/cgi/content/abstract/10/2/87> (cached)

Discussion

- **Iterative development methodology**
 - Interview users for requirements
 - Design and implement features
 - Gather user feedbacks of the system
- **Current feedbacks**
 - Able to focus on full text articles and the latest additions
 - Able to find freely available full text articles
 - Search history useful for writing of search methodology
- **Future work**
 - Extend collection and perform full-fledged evaluation

Conclusion

- **eEvidence: an information seeking support system with three key features to facilitate EBP**
 - Harvesting EBP resources by periodic crawling
 - Automated article classification and key information extraction
 - Dual active/passive user interface

