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Research to Practice:
Finding Evidence-Based Information on the Web to Answer Your Clinical Questions

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Objectives

- Define evidence-based nursing practice
- Recognize a model to formulate a well-built searchable clinical question
- Describe web resources to use for evidence-based nursing practice to improve patient care
- Identify strategies to improve searching skills to find appropriate evidence on the web to improve patient care

What is evidence-based practice?

- Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.
- The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

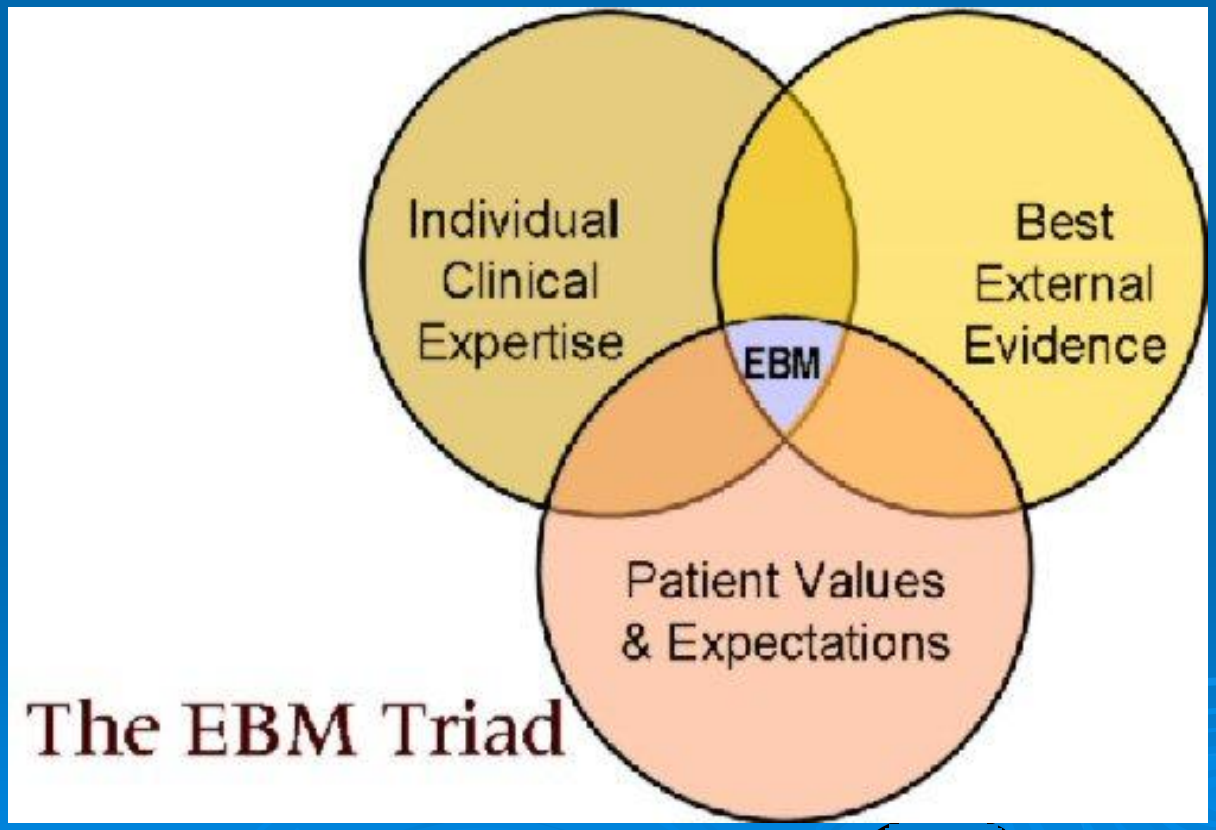
Sackett DL et al. Evidence based medicine: what it is and what it isn't. *BMJ* 1996 Jan 13; 312 (7023): 71-2.

What is evidence-based *nursing* practice?

"Evidence-based nursing (EBN) means using the best available evidence from research, along with patient preferences and clinical experience, when making nursing decisions."

Cullum N. Users' guides to the nursing literature: an introduction. *Evid Based Nurs* 2000 Jul;3(3):71-2. doi:10.1136/ebn.3.3.71

Evidence-Based Practice



What makes good evidence?

Good

- Based on scientific research
- RCT
- Systematic review
- Meta-analysis
- Clinical guidelines

Shoddy

- Opinion
- Consensus
- Because it's been done this way for 100 years

Why do nurses need to do EBP?

- Results in better patient outcomes
  - Failure to use evidence results in lower quality, less effective, more expensive care

    Berwick DM. Disseminating innovations in health care. *JAMA* 2003 Apr 16;289(15):1969-75
- Keeps practice current and relevant
- Increases confidence in decision making
- Experience greater autonomy in practice
- Increases level of job satisfaction

Barriers to Nurses using EBP

- Lack of TIME
- Lack of value of research in practice
- Lack of understanding of electronic databases to find evidence
- Lack of computer skills
- Lack of EBP mentors at point of care
- Difficulty understanding research articles

Fact: Research gap… 17 years for research result to make it into practice

Pravikoff DS, Tanner AB, Pierce ST. Readiness of U.S. nurses for evidence-based practice. *Amer J Nurs* 2005 Sep;105(9): 40-52.

5 (7) Steps for EBN Practice

1. Convert your information into an answerable question (PICO)
2. Search the literature for the best available evidence
3. Critically appraise the evidence for validity and usefulness
4. Apply the findings to your clinical practice along with clinical expertise and patient's perspective to plan care
5. Evaluate the outcomes of your practice decisions or changes based on evidence.

2 Additional Steps for EBP=7 Steps

Step 0: Cultivate a spirit of inquiry

Step 6: Disseminate EBP results

Melnyk BM, Fineout-Overholt E, Stillwell SB, Williamson KM. Evidence-based practice: step by step: the seven steps of evidence-based practice. *Am J Nurs* 2010 Jan;110(1):51-3. PMID: 20032669.

Step 1: Refine Your Question

Create an answerable question using the PICO framework

- **P** Patient, Population, or Problem
- **I** Intervention, prognostic factor, exposure
- **C** Comparison
- **O** Outcome

PICO Example

- **Initial question**:

  Do all persons entering the ICU need to wash their hands?

- **Reformulated question**:

  Do nurses in the ICU need to rub their hands with a waterless, alcohol based solution or hand wash with soap and water to reduce nosocomial infections?

PICO

PATIENT/POP/PROBLEM – nurses in the ICU

INTERVENTION – rub hands with a waterless, alcohol based solution

COMPARISON, IF ANY – hand wash with soap and water

OUTCOME – reduce nosocomial infections

HANDWASHING PROGRAM FOR THE PREVENTION OF NOSOCOMIAL INFECTIONS IN A NEONATAL INTENSIVE CARE UNIT

Sau-Pin Won, MD; Hung-Chieh Chou, MD; Wu-Shiun Hsieh, MD; Chien-Yi Chen, MD; Shio-Min Huang, HN; Kuo-Inn Tsou, MD; Po-Nien Tsao, MD, PhD

ABSTRACT

OBJECTIVE: To evaluate the effects of a hand hygiene program on compliance with hand hygiene and the rate of nosocomial infections in a neonatal intensive care unit (NICU).

DESIGN: Open trial.

SETTING: A level-III NICU in a teaching hospital.

PARTICIPANTS: Nurses, physicians, and other healthcare workers in the NICU.

INTERVENTIONS: A multimodal campaign for hand hygiene promotion was conducted beginning in September 1998. This program consisted of formal lectures, written instructions and posted reminders regarding hand hygiene and proper handwashing techniques, covert observation, financial incentives, and regular group feedback on compliance. Surveillance of handwashing compliance and nosocomial infections before and during the program was analyzed.

RESULTS: Overall compliance with hand hygiene improved from 43% at baseline to 80% during the promotion program. The rate of nosocomial infections decreased from 15.13 to 10.69 per 1,000 patient-days ($P = .003$) with improved handwashing compliance. In particular, respiratory tract infections decreased from 3.35 to 1.06 per 1,000 patient-days during the handwashing campaign ($P = .002$). Furthermore, the correlation between nosocomial infection of the respiratory tract and handwashing compliance also reached statistical significance ($r = -0.385$; $P = .014$).

CONCLUSIONS: Improved compliance with handwashing was associated with a significant decrease in overall rates of nosocomial infection and respiratory infections in particular. Washing hands is a simple, economical, and effective method for preventing nosocomial infections in the NICU (*Infect Control Hosp Epidemiol* 2004;25:742-746).

Nosocomial infections constitute a major source of morbidity and mortality for patients in neonatal intensive care units (NICUs).[1,2] Prior surveillance studies have shown that the rates of nosocomial infection in NICUs range from 11% to 22%.[3-5] Despite the use of prophylactic antibiotics, immunoglobulins, and physical barriers, the neonatal nosocomial infections.[10-12] However, there has been no direct evidence showing a relationship between handwashing and nosocomial infections in the NICU. This study evaluated the impact of improved hand hygiene on the endemic rate of hospital-acquired infections.

Critical Care Medicine

Society of Critical Care Medicine
The Intensive Care Professionals

Specific Infection Control Topics

Hand hygiene in the intensive care unit

Sarah Tschudin-Sutter, MD; Hans Pargger, MD; Andreas F. Widmer, MD, MS

Healthcare-associated infections affect 1.4 million patients at any time worldwide, as estimated by the World Health Organization. In intensive care units, the burden of healthcare-associated infections is greatly increased, causing additional morbidity and mortality. Multidrug-resistant pathogens are commonly involved in such infections and render effective treatment challenging. Proper hand hygiene is the single most important, simplest, and least expensive means of preventing healthcare-associated infections. In addition, it is equally important to stop transmission of multidrug-resistant pathogens. According to the Centers for Disease Control and Prevention and World Health Organization guidelines on hand hygiene in health care, alcohol-based handrub should be used as the preferred means for routine hand antisepsis. Alcohols have excellent *in vitro* activity against Gram-positive and Gram-negative bacteria, including multidrug-resistant pathogens, such as methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococci, *Mycobacterium tuberculosis*, a variety of fungi, and most viruses. Some pathogens, however, such as *Clostridium difficile, Bacillus anthracis*, and noroviruses, may require special hand hygiene measures. Failure to provide user friendliness of hand hygiene equipment and shortage of staff are predictors for noncompliance, especially in the intensive care unit setting. Therefore, practical approaches to promote hand hygiene in the intensive care unit include provision of a minimal number of handrub dispensers per bed, monitoring of compliance, and choice of the most attractive product. Lack of knowledge of guidelines for hand hygiene, lack of recognition of hand hygiene opportunities during patient care, and lack of awareness of the risk of cross-transmission of pathogens are barriers to good hand hygiene practices. Multidisciplinary programs to promote increased use of alcoholic handrub lead to an increased compliance of healthcare workers with the recommended hand hygiene practices and a reduced prevalence of nosocomial infections. (Crit Care Med 2010; 38[Suppl.]:S299–S305)

KEY WORDS: healthcare-associated infections; hand hygiene; hand rubs; nosocomial infections

Understand Your Question

Is this a background or foreground question?

- **Background**: General knowledge
  - Ex: What causes hypertension?
  - Ex: What therapies are commonly used to treat hypertension?
- **Foreground**: Specific knowledge that could directly inform clinical decisions
  - Ex. In critically ill patients, does human albumin administered for hypovolemia reduce mortality when compared with cheaper alternatives such as saline?

[Intervention Review]

Human albumin solution for resuscitation and volume expansion in critically ill patients

The Albumin Reviewers (Alderson P, Bunn F, Li Wan Po A, Li L, Pearson M, Roberts I, Schierhout G)[1]

[1]Cochrane Injuries Group, London School of Hygiene & Tropical Medicine, London, UK

Authors' conclusions

For patients with hypovolaemia, there is no evidence that albumin reduces mortality when compared with cheaper alternatives such as saline. There is no evidence that albumin reduces mortality in critically ill patients with burns and hypoalbuminaemia. The possibility that there may be highly selected populations of critically ill patients in which albumin may be indicated remains open to question. However, in view of the absence of evidence of a mortality benefit from albumin and the increased cost of albumin compared to alternatives such as saline, it would seem reasonable that albumin should only be used within the context of well concealed and adequately powered randomised controlled trials.

Next >

Abstract

Background

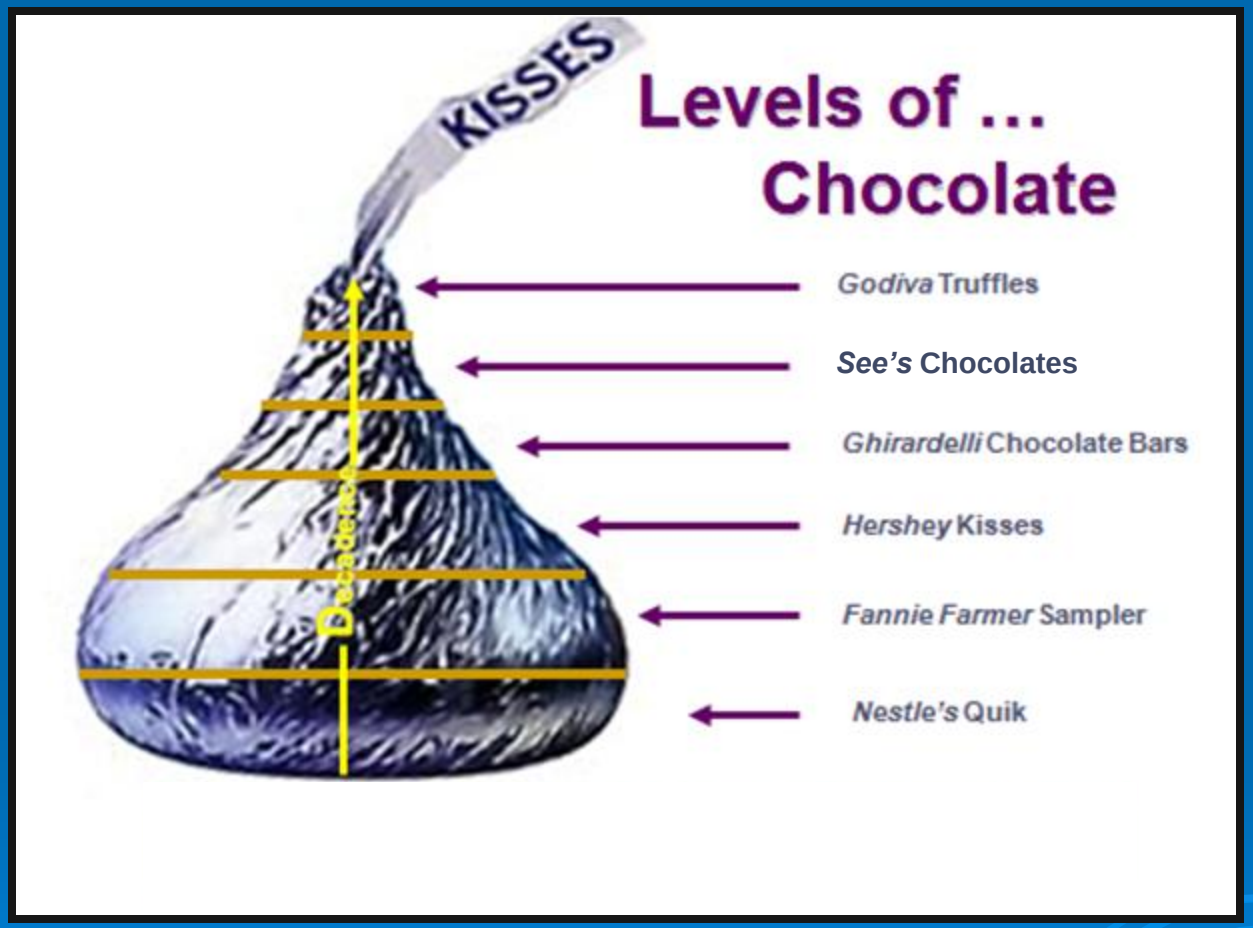
Human albumin solutions are used in a range of medical and surgical problems. Licensed indications are the emergency treatment of shock and other conditions where restoration of blood volume is urgent, burns, and hypoproteinaemia. Human albumin solutions are more expensive than other colloids and crystalloids.

Objectives

To quantify the effect on mortality of human albumin and plasma protein fraction (PPF) administration in the management of critically

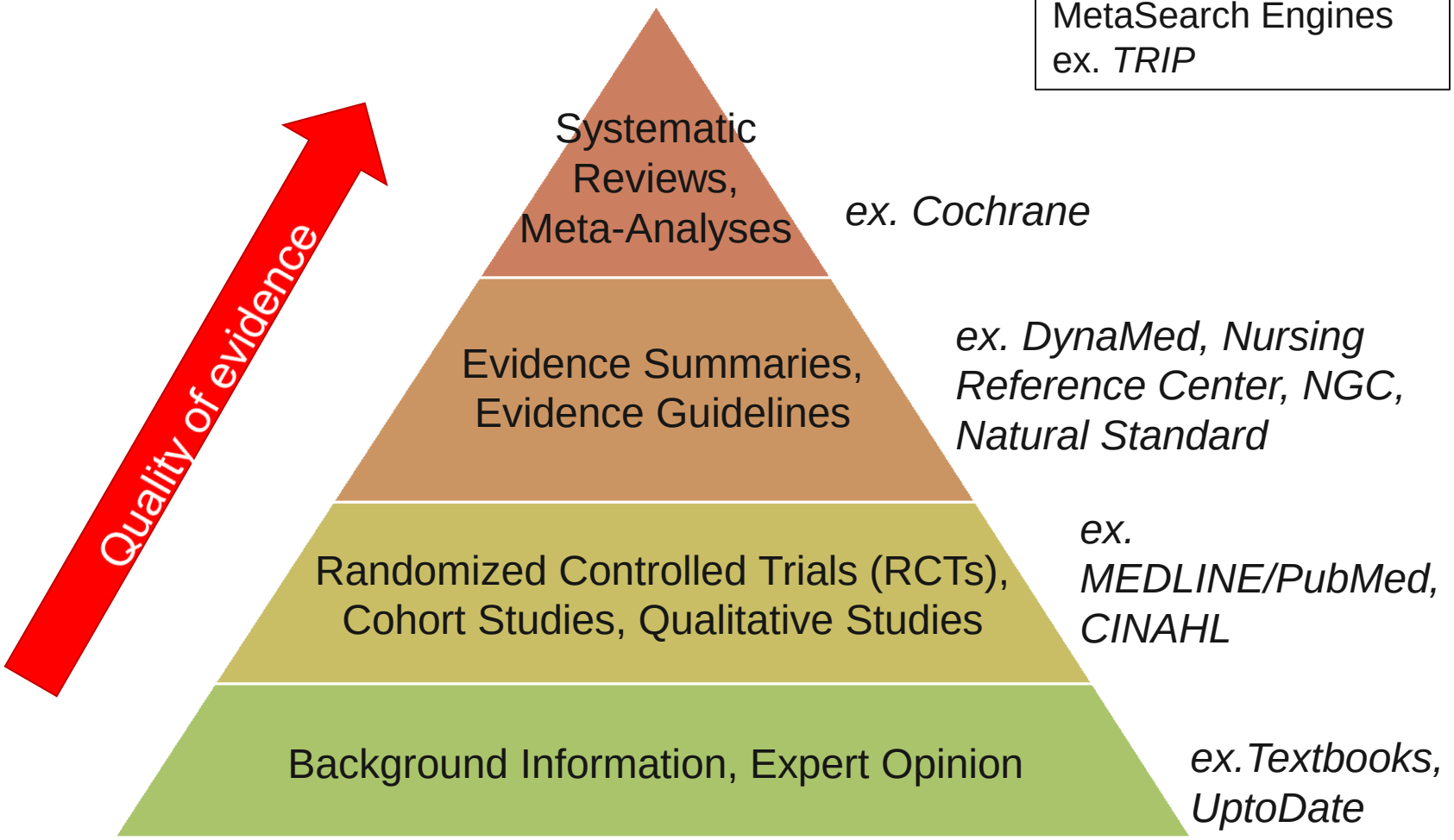
Step 2:
Search for the Best Evidence to Answer the Question

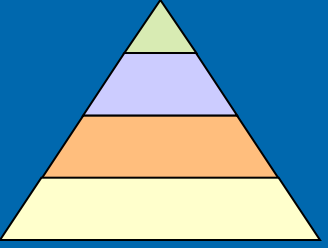
Chocolate Decadence Pyramid



Slide adapted from Edward G. Miner Library, University of Rochester School of Medicine and Dentistry

Searching for Evidence Pyramid





Search Databases Efficiently for Research Journal Articles

- PubMed *pubmed.gov*
- CINAHL/CINAHL Plus **$$** *cinahl.com*
  - Also available to members on AACN site

aacn.org/DM/Practice/cinahl.aspxmenu=Practice&lastmenu=

CINAHL or CINAHL Plus

cinahl.com

- Cumulative Index to Nursing and Allied Health Literature
- Provides coverage from 1982 [1937] to date, of nursing and 17 allied health disciplines literature
- 1700+ [3800+] journals indexed including virtually all English-language nursing journals
- Can easily search for Research articles

Searching: **CINAHL Plus with Full Text**

Suggest Subject Terms

Enter search terms

glucose control or hyperglycemia

a Field (optional)

Search Clear

AND intensive care units Select a Field (optional)

AND in Select a Field (optional)

Add Row

Basic Search | Advanced Search | Visual Search | Search History

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- Find any of my search terms
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Apply related words

Also search within the full text of the articles

Limit your results

References Available

Abstract Available

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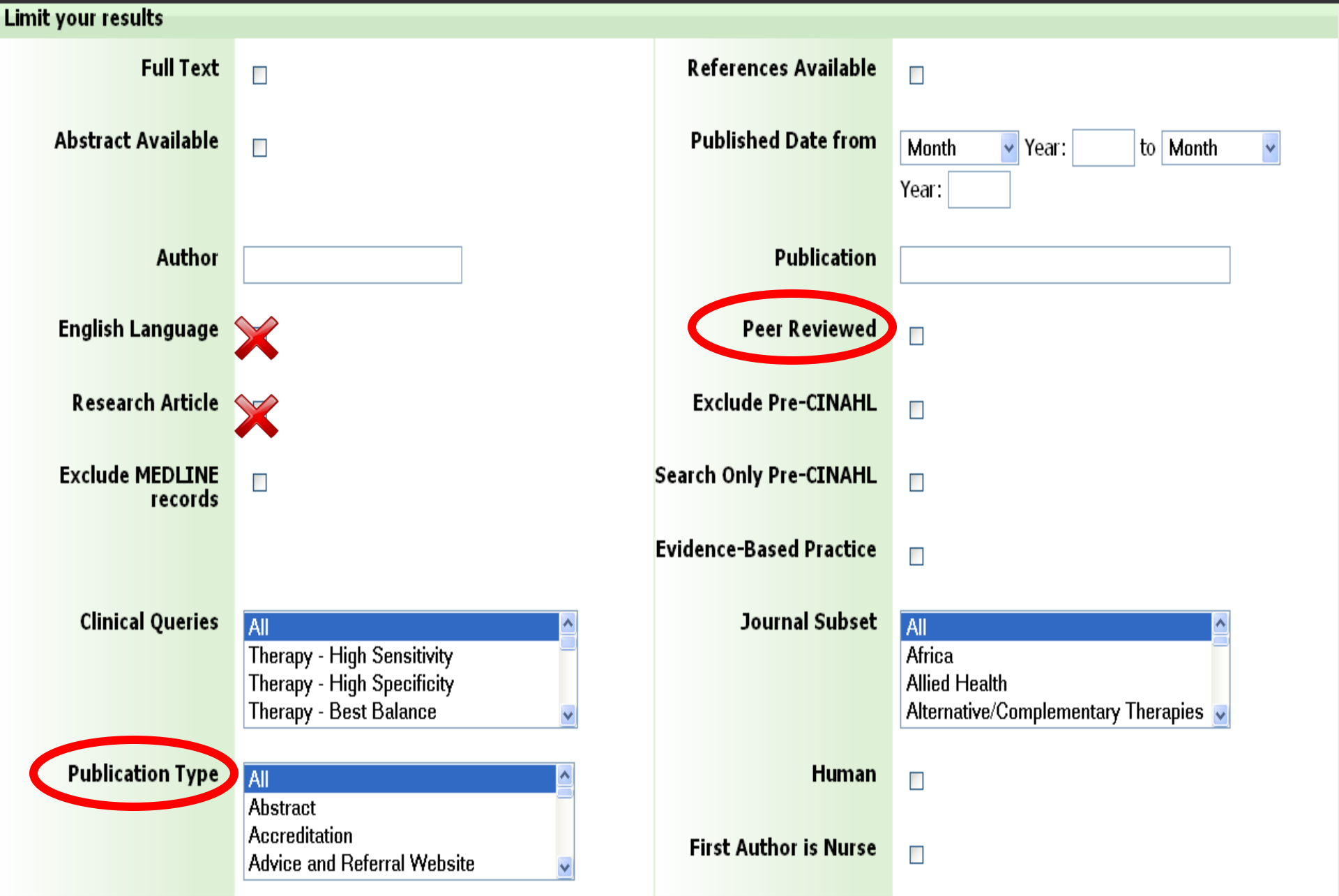

CINAHL Publication Type Limits

- Clinical trial
- Critical path
- Practice guidelines
- Research
- Standards
- Systematic review

Hospital glucose control: safe and reliable glycemic control using enhanced model predictive control algorithm in medical intensive care unit patients.

(includes abstract); Amrein K; Ellmerer M; Hovorka R; Kachel N; Parcz D; Korsatko S; Smolle K; Perl S; Bock G; Doll W; et ...5): 405-12 (journal article - clinical trial, **research**) ISSN: 1520-9156 PMID: 20388051

CINAHL Results

BACKGROUND: The aim of this study was to investigate the performance of the enhanced Model Predictive Control (eMPC) algorithm for glycemic control in medical critically ill patients for the whol...

Subjects: Blood Glucose; Hyperglycemia; Insulin; Intensive Care Units; Aged: 65+ years; Aged, 80 and over; Middle Aged: 45-64 years; Female; Male

Database: CINAHL with Full Text

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Differences in complexity of glycemic profile in survivors and nonsurvivors in an intensive care unit: A pilot study.

(includes abstract); Lundelin K; Vigil L; Bua S; Gomez-Mestre I; Honrubia T; Varela M; Critical Care Medicine, 2010 Mar; 38 (3): 849-54 (journal article - **research**) ISSN: 0090-3493 PMID: 20068460

OBJECTIVE:: To investigate glycemic dynamics and its relation with mortality in critically ill patients. We searched for differences in complexity of the glycemic profile between survivors and no...

Subjects: Blood Glucose; Diabetes Mellitus; Hyperglycemia; Intensive Care Units; Adult: 19-44 years; Aged: 65+ years; Aged, 80 and over; Middle Aged: 45-64 years; Female; Male

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Glucose control in the intensive care unit.

(includes abstract); Fahy BG; Sheehy AM; Coursin DB; Critical Care Medicine, 2009 May; 37 (5): 1769-76 (journal article - **research**) ISSN: 0090-3493 PMID: 19325461

OBJECTIVE:: Hyperglycemia, be it secondary to diabetes, impaired glucose tolerance, impaired fasting glucose, or stress-induced is common in the critically ill. Hyperglycemia and glucose variabil...

Subjects: Algorithms; Blood Glucose; Hyperglycemia; Insulin; Intensive Care Units; Female; Male

Database: CINAHL with Full Text

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Abstracts

Management of hyperglycemia in the pediatric intensive care unit; implementation of a glucose control protocol.

Authors: Verhoeven JJ; Brand JB; van de Polder MM; Joosten KFM

Affiliation: Intensive Care, Erasmu

Source: Pediatric Critical Care M

Publication Type: journal article - CEU, ex

Language: **English**

Major Subjects: Blood Glucose
Hyperglycemia -- In Infa
Intensive Care Units, Pe
Protocols -- Evaluation

Minor Subjects: Child; Child, Preschool;
Therapeutic Use; Male;
Syndrome; Netherlands

Abstract: OBJECTIVE: To evaluat
in critically ill pediatric p
observational study. PA
>8 mmol/L (>145 mg/d
MEASUREMENTS AND M
different steps in the pr
Fifty children (28 boys),
multiple organ failure. E
hyperglycemia was doc
176-264 mg/dL]). Blood
47 (94%) of 50 children
insulin dose ranged bet

Glucose control in the intensive care unit.

Authors: Fahy BG; Sheehy AM; Coursin DB

Affiliation: From the Department of Anesthesiology (BGF), University of Kentucky Chandler Medical Center, Lexington, KY

Source: Critical Care Medicine (CRIT CARE MED), 2009 May; 37(5): 1769-76

Publication Type: journal article - **research**

Language: **English**

Major Subjects: Algorithms
Blood Glucose -- Analysis
Hyperglycemia -- Blood
Insulin -- Administration and Dosage
Intensive Care Units

Minor Subjects: Clinical Trials; Critical Care -- Methods; Critical Illness -- Mortality; Critical Illness -- Therapy; Female; Glucose Intolerance; Hyperglycemia -- Drug Therapy; Hyperglycemia -- Mortality; Hypoglycemia -- Blood; Hypoglycemia -- Drug Therapy; Hypoglycemia -- Mortality; Insulin Resistance; Male; Monitoring, Physiologic -- Methods; Risk Assessment; Sensitivity and Specificity; Survival Analysis; Treatment Outcomes; Human

Abstract: OBJECTIVE:: Hyperglycemia, be it secondary to diabetes, impaired glucose tolerance, impaired fasting glucose, or stress-induced is common in the critically ill. Hyperglycemia and glucose variability in intensive care unit (ICU) patients has some experts calling for routine administration of intensive insulin therapy to normalize glucose levels in hyperglycemic patients. Others, however, have raised concerns over the optimal glucose level, the accuracy of measurements, the resources required to attain tight glycemic control (TGC), and the impact of TGC across the heterogeneous ICU population in patients with diabetes, previously undiagnosed diabetes or stress-induced hyperglycemia. Increased variability in glucose levels during critical illness and the therapeutic intervention thereof have recently been reported to have a deleterious impact on survival, particularly in nondiabetic hyperglycemic patients. The incidence of hypoglycemia (<40 mg/dL or 2.2 mmol) associated with TGC is reported to be as high as 18.7%, by Van den Berghe in a medical ICU, although application of various approaches and computer-based algorithms may improve this. The impact of

Full text article

Concise Definitive Review

Glucose control in the intensive care unit

Brenda G. Fahy, MD; Ann M. Sheehy, MD; Douglas B. Coursin, MD

Objective: Hyperglycemia, be it secondary to diabetes, impaired glucose tolerance, impaired fasting glucose, or stress-induced is common in the critically ill. Hyperglycemia and glucose variability in intensive care unit (ICU) patients has some experts calling for routine administration of intensive insulin therapy to normalize glucose levels in hyperglycemic patients. Others, however, have raised concerns over the optimal glucose level, the accuracy of measurements, the resources required to attain tight glycemic control (TGC), and the impact of TGC across the heterogeneous ICU population in patients with diabetes, previously undiagnosed diabetes or stress-induced hyperglycemia. Increased variability in glucose levels during critical illness and the therapeutic intervention thereof have recently been reported to have a deleterious impact on survival, particularly in nondiabetic hyperglycemic patients. The incidence of hypoglycemia (<40 mg/dL or 2.2 mmol) associated with TGC is reported to be as high as 18.7%, by Van den Berghe in a medical ICU, although application of various approaches and computer-based algorithms may improve this. The impact of hypoglycemia, particularly in patients with septic shock and those with neurologic compromise, warrants further evaluation. This review briefly discusses the epidemiology of hyperglycemia in the acutely ill and glucose metabolism in the critically ill. It comments on present limitations in glucose monitoring, outlines current glucose management approaches in the critically ill, and the transition from the ICU to the intermediate care unit or ward. It closes with comment on future developments in glycemic care of the critically ill.

Methods: The awareness of the potential deleterious impact of hyperglycemia was heightened after Van den Berghe et al presented their prospective trial in 2001. Therefore, source data were obtained from PubMed and Cochrane Analysis searches of the medical literature, with emphasis on the time period after 2000. Recent meta-analyses were reviewed, expert editorial opinion collated, and the Web site of the Normoglycemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation Trial investigated.

Summary and Conclusions: Hyperglycemia develops commonly in the critically ill and impacts outcome in patients with diabetes but, even more so, in patients with stress-induced hyperglycemia. Despite calls for TGC by various experts and regulatory agencies, supporting data remain somewhat incomplete and conflicting. A recently completed large international study, Normoglycemia in Intensive Care Evaluation and Survival Using Glucose Algorithm Regulation, should provide information to further guide best practice. This concise review interprets the current state of adult glycemic management guidelines to provide a template for care as new information becomes available. (Crit Care Med 2009; 37:1769–1776)

Key Words: intensive care unit; tight glucose control; hypoglycemia; hyperglycemia; intensive insulin therapy; glucose intolerance; diabetes mellitus; stress response; insulin; critical illness; mortality; morbidity

The prevalence of diabetes mellitus in adults has reached epidemic proportions in the United States with approximately 12.9% of the population with diabetes, almost 40% of which is unrecognized or undiagnosed (1). A much larger population has one or both (29.5% in total) of the prediabetic states: impaired fasting glucose (25.7%) and impaired glucose tolerance (13.8%) (Table 1) (1, 2), with the life-long rate of progression from prediabetes to diabetes as great as 60% to 70% (1–4) The prevalence of diabetes in hospitalized patients is thought to be higher, possibly 12.4% to 25%, with a significant proportion unrecognized (5). However, because blood–glucose values obtained from inpatients should not routinely be used to make a diagnosis of diabetes (6), ascertaining the true prevalence of diabetes and prediabetes in hospitalized patients is difficult.

Patients in the intensive care unit (ICU) commonly develop hyperglycemia (7–9). Therefore, during the past two decades, clinicians have increasingly appreciated the impact of hyperglycemia in patients not only with diabetes, but also with stress-induced hyperglycemia (SIH) or hospital-related hyperglycemia (Table 1) (10–12) and have debated the issue of glucose control in ICU patients (13–16).

Experts have increasingly called for tight glycemic control (TGC) in critically ill adults, but there is a relative lack of multicenter studies that have been able to establish uniform benefit of glucose normalization. Although Henderson et al (17) developed an intensive insulin treatment and TGC protocol for a Cochrane review, the final analysis has not been published.

Several important issues contribute to the complexity of existing prospective randomized control trial (PRCT) data and have precluded consensus regarding universal TGC. Randomized studies to date have focused on heterogeneous patient populations, and most have included both SIH and diabetic hyperglycemia in the same analysis, even though recent data has suggested these are two different phenomena (18–20). Importantly, glucose-monitoring techniques also vary by study protocol and may affect results significantly. In addition, the data on the long-term health and neuropsychological function of aggressively treated patients who develop hypoglycemia

From the Department of Anesthesiology (BGF), University of Kentucky Chandler Medical Center, Lexington, KY; and Departments of Medicine (AMS, DBC) and Anesthesiology (DBC), University of Wisconsin School of Medicine and Public Health, Madison, WI.

The authors have not disclosed any potential conflicts of interest.

For information regarding this article, E-mail: emily.bgmiller@uky.edu

DOI: 10.1097/CCM.0b013e3181a190eb

Fahy BG, Sheehy AM, Coursin DB. Glucose control in the intensive care unit. *Crit Care Med.* 2009 May;37(5):1769-76.

CINAHL Basic and Advanced Searching

Tutorial

aacn.org/WD/Practice/Docs/EN_CINAHL_searching_Tut.pdf

Search PubMed *pubmed.gov*

- PubMed includes MEDLINE (1940's+)
- Indexes 5,000 biomedical journals
- Covers all aspects of biosciences and healthcare
- 75%-80% of citations have abstracts
- Updated 5x/week
- Search with text words or MeSH (thesaurus) terms

2 PubMed Strategies for Finding Evidence-Based Citations

1. Use Limits: Publication Type of Article
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   - Consensus Development Conference
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(glucose control OR hyperglycemia) AND intensive care units

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glucose control OR hyperglycemia) AND intensive care units

PubMed Strategy #1:
Limit to RCTs under Type of Article

Limits

Dates

Published in the Last: Any date

Type of Article

- [ ] Meta-Analysis
- [ ] Practice Guideline
- [x] Randomized Controlled Trial
- [ ] Review

Languages

- [x] English
- [ ] French
- [ ] German
- [ ] Italian
- [ ] Japanese

Species

- [x] Humans
- [ ] Animals

Gender

- [ ] Male
- [ ] Female

Subsets

Journal Groups

- [ ] Core clinical journals
- [ ] Dental journals
- [ ] Nursing journals

Ages

- [ ] All Infant: birth-23 months
- [ ] All Child: 0-18 years
- [ ] All Adult: 19+ years
- [ ] Newborn: birth-1 month

PubMed RCT Results

A comparison study of continuous insulin infusion protocols in the medical intensive care unit: computer-guided vs. standard column-based algorithms.

Newton CA, Smiley D, Bode BW, Kitabchi AE, Davidson PC, Jacobs S, Steed RD, Stentz F, Peng L, Mulligan P, Freire AX, Temponi A, Umpierrez GE.

J Hosp Med. 2010 Oct;5(8):432-7.

PMID: 20945468 [PubMed - indexed for MEDLINE]

Related citations

Newly diagnosed hyperglycemia and stress hyperglycemia in a coronary intensive care unit.

Ertorer ME, Haydardedeoglu FE, Erol T, Anaforoglu I, Binici S, Tutuncu NB, Sezgin A, Demirag NG.

Diabetes Res Clin Pract. 2010 Oct;90(1):8-14. Epub 2010 Jul 31.

PMID: 20674059 [PubMed - indexed for MEDLINE]

Related citations

Hospital glucose control: safe and reliable glycemic control using enhanced model predictive control algorithm in medical intensive care unit patients.

Amrein K, Ellmerer M, Hovorka R, Kachel N, Parcz D, Korsatko S, Smolle K, Perl S, Bock G, Doll W, Köhler G, Pieber TR, Plank J.

Diabetes Technol Ther. 2010 May;12(5):405-12.

PMID: 20388051 [PubMed - indexed for MEDLINE]

Related citations

Control of hyperglycaemia in paediatric intensive care (CHiP): study protocol.

Macrae D, Pappachan J, Grieve R, Parslow R, Nadel S, Schindler M, Baines P, Fortune PM, Slavik Z, Goldman A, Truesdale A, Betts H, Allen E, Snowdon C, Percy D, Broadhead M, Quick T, Peters M, Morris K, Tasker R, Elbourne D.

BMC Pediatr. 2010 Feb 5;10:5.

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BMC Pediatr. 2010 Feb 5;10:5.

Control of hyperglycaemia in paediatric intensive care (CHiP): study protocol.

Macrae D, Pappachan J, Grieve R, Parslow R, Nadel S, Schindler M, Baines P, Fortune PM, Slavik Z, Goldman A, Truesdale A, Betts H, Allen E, Snowdon C, Percy D, Broadhead M, Quick T, Peters M, Morris K, Tasker R, Elbourne D.

Paediatric Intensive Care Unit, Royal Brompton Hospital, Sydney Street, London SW3 6NP, UK. D.macrae@rbht.nhs.uk

Abstract

BACKGROUND: There is increasing evidence that tight blood glucose (BG) control improves outcomes in critically ill adults. Children show similar hyperglycaemic responses to surgery or critical illness. However it is not known whether tight control will benefit children given maturational differences and different disease spectrum.

METHODS/DESIGN: The study is an randomised open trial with two parallel groups to assess whether, for children undergoing intensive care in the UK aged <or= 16 years who are ventilated, have an arterial line in-situ and are receiving vasoactive support following injury, major surgery or in association with critical illness in whom it is anticipated such treatment will be required to continue for at least 12 hours, tight control will increase the numbers of days alive and free of mechanical ventilation at 30 days, and lead to improvement in a range of complications associated with intensive care treatment and be cost effective. Children in the tight control group will receive insulin by intravenous infusion titrated to maintain BG between 4 and 7.0 mmol/l. Children in the control group will be treated according to a standard current approach to BG management. Children will be followed up to determine vital status and healthcare resources usage between discharge and 12 months post-randomisation. Information regarding overall health status, global neurological outcome, attention and behavioural status will be sought from a subgroup with traumatic brain injury (TBI). A difference of 2 days in the number of ventilator-free days within the first 30 days post-randomisation is considered clinically important. Conservatively assuming a standard deviation of a week across both trial arms, a type I error of 1% (2-sided test), and allowing for non-compliance, a total sample size of 1000 patients would have 90% power to detect this difference. To detect effect differences between cardiac and non-cardiac patients, a target sample size of 1500 is required. An economic evaluation will assess whether the costs of achieving tight BG control are justified by subsequent reductions in hospitalisation costs.

DISCUSSION: The relevance of tight glycaemic control in this population needs to be assessed formally before being accepted into standard practice.

PMID: 20137090 [PubMed - indexed for MEDLINE] PMCID: PMC2830203 Free PMC Article

Full text Article

Macrae et al. BMC Pediatrics 2010, 10:5
http://www.biomedcentral.com/1471-2431/10/5

BMC Pediatrics

STUDY PROTOCOL Open Access

Control of hyperglycaemia in paediatric intensive care (CHiP): study protocol

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Abstract

Background: There is increasing evidence that tight blood glucose (BG) control improves outcomes in critically ill adults. Children show similar hyperglycaemic responses to surgery or critical illness. However it is not known whether tight control will benefit children given maturational differences and different disease spectrum.

Methods/Design: The study is an randomised open trial with two parallel groups to assess whether, for children undergoing intensive care in the UK aged ≤ 16 years who are ventilated, have an arterial line in-situ and are receiving vasoactive support following injury, major surgery or in association with critical illness in whom it is antidpated such treatment will be required to continue for at least 12 hours, tight control will increase the numbers of days alive and free of mechanical ventilation at 30 days, and lead to improvement in a range of complications associated with intensive care treatment and be cost effective.

Children in the tight control group will receive insulin by intravenous infusion titrated to maintain BG between 4 and 7.0 mmol/l. Children in the control group will be treated according to a standard current approach to BG management. Children will be followed up to determine vital status and healthcare resources usage between discharge and 12 months post-randomisation. Information regarding overall health status, global neurological outcome, attention and behavioural status will be sought from a subgroup with traumatic brain injury (TBI).

A difference of 2 days in the number of ventilator-free days within the first 30 days post-randomisation is considered clinically important. Conservatively assuming a standard deviation of a week across both trial arms, a type I error of 1% (2-sided test), and allowing for non-compliance, a total sample size of 1000 patients would have 90% power to detect this difference. To detect effect differences between cardiac and non-cardiac patients, a target sample size of 1500 is required. An economic evaluation will assess whether the costs of achieving tight BG control are justified by subsequent reductions in hospitalisation costs.

Discussion: The relevance of tight glycaemic control in this population needs to be assessed formally before being accepted into standard practice.

Trial Registration: Current Controlled Trials ISRCTN61735247

Background

The ability to control blood sugar is known to be impaired in patients subjected to the stress of major surgery or critical illness resulting in high blood sugar levels (hyperglycaemia)[1]. This may in part result from insulin resistance, as insulin-dependent glucose uptake has been shown to be reduced in various organs and tissues during critical illness. Glucose uptake is however increased in non-insulin dependent tissues such as brain, red blood cells and wounds. This imbalance of glucose metabolism has previously been interpreted as the body's plea for tolerating moderately high levels of glucose during critical illness and injury and treatment of 'stress-induced' hyperglycaemia has typically only

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PubMed Clinical Queries

Strategy #2: Clinical Queries – Link on Advanced Search or Home page

Search (glucose control OR hyperglycemia) AND intensive care units

Results of searches on this page are limited to specific clinical research areas. For comprehensive searches,

Clinical Study Categories

Category: Therapy

Scope: Narrow

Results: 5 of 16

A comparison study of continuous insulin infusion protocols in the medical intensive care unit: computer-guided vs. standard column-based algorithms. [J Hosp Med. 2010]

Control of hyp… study protoco…

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Key performa… retrospective matched cohort study. [J Int Med Res. 2009]

A prospective randomised multi-centre controlled trial on tight glucose control by intensive insulin therapy in adult intensive care units: the Glucontrol study. [Intensive Care Med. 2009]

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Systematic Reviews

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An overview of glycemic control in the coronary care unit with recommendations for clinical management. [J Diabetes Sci Technol. 2009]

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…ICU: a … hest. 2010]

…coaster ride or a swinging pendulum? [Ann Intern Med. 2009]

Clinical impact of early hyperglycemia during acute phase of traumatic brain injury. [Neurocrit Care. 2009]

See all (13)

Control of hyperglycaemia in paediatric intensive care (CHiP): study protocol.
Macrae D, Pappachan J, Grieve R, Parslow R, Nadel S, Schindler M, Baines P, Fortune PM, Slavik Z, Goldman A, Truesdale A, Betts H, Allen E, Snowdon C, Percy D, Broadhead M, Quick T, Peters M, Morris K, Tasker R, Elbourne D.
BMC Pediatr. 2010 Feb 5;10:5.
PMID: 20137090 [PubMed - indexed for MEDLINE] **Free PMC Article**

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- **Literature searching**: your librarian can work with you to create a focused search
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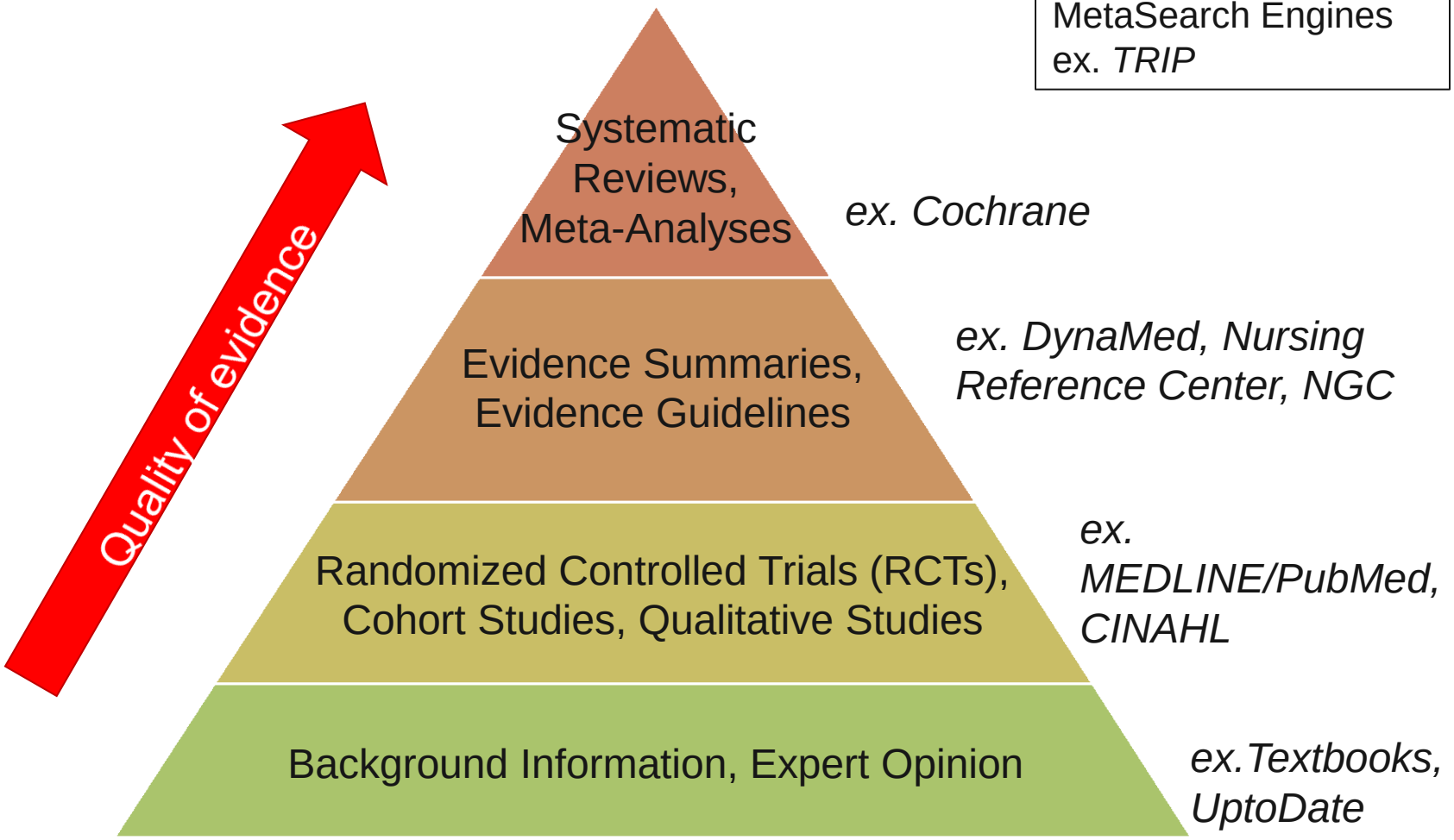

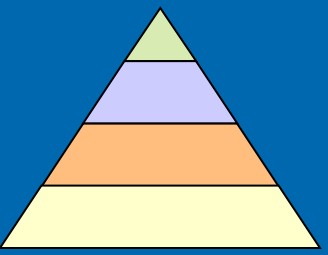

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Clinical Practice Guidelines

- Systematically developed statements of appropriate care designed to assist the practitioner and patient make decisions about appropriate health care for specific clinical circumstances
- Usually based on the most current available research if from reputable, authoritative organizations
- Developed using widely varying standards
  - *Cost* may be considered as well as *health outcomes* or *politics*

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'ventilator associated pneumonia'

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1. **Clinical practice guidelines for hospital-acquired pneumonia and ventilator-associated pneumonia in adults.** 2008 Jan. NGC:007473
   Association of Medical Microbiology and Infectious Disease Canada - Medical Specialty Society; Canadian Thoracic Society - Medical Specialty Society. *View all guidelines by the developer(s)*

2. **Strategies to prevent ventilator-associated pneumonia in acute care hospitals.** 2008 Oct. NGC:006807
   Infectious Diseases Society of America - Medical Specialty Society; Society for Healthcare Epidemiology of America - Professional Association. *View all guidelines by the developer(s)*

3. **Prevention of ventilator-associated pneumonia. In: Prevention and control of healthcare-associated infections in Massachusetts.** 2008 Jan 31. NGC:006634
   Betsy Lehman Center for Patient Safety and Medical Error Reduction - State/Local Government Agency [U.S.]; Massachusetts Department of Public Health - State/Local Government Agency [U.S.]. *View all guidelines by the developer(s)*

Guideline Comparison

Guideline Title	Clinical practice guidelines for hospital-acquired pneumonia and ventilator-associated pneumonia in adults.	Strategies to prevent ventilator-associated pneumonia in acute care hospitals.	Prevention of ventilator-associated pneumonia. In: Prevention and control of healthcare-associated infections in Massachusetts.
Date Released	2008 Jan	2008 Oct	2008 Jan 31
Guideline Developer (s)	Association of Medical Microbiology and Infectious Disease Canada - Medical Specialty Society Canadian Thoracic Society - Medical Specialty Society	Infectious Diseases Society of America - Medical Specialty Society Society for Healthcare Epidemiology of America - Professional Association	Betsy Lehman Center for Patient Safety and Medical Error Reduction - State/Local Government Agency [U.S.] Massachusetts Department of Public Health - State/Local Government Agency [U.S.]
Intended Users	Advanced Practice Nurses Hospitals Nurses Pharmacists Physician Assistants Physicians Respiratory Care Practitioners	Advanced Practice Nurses Allied Health Personnel Hospitals Nurses Physician Assistants Physicians Respiratory Care Practitioners Utilization Management	Advanced Practice Nurses Hospitals Nurses Physician Assistants Physicians Respiratory Care Practitioners
Methods Used to Collect/Select the Evidence	Hand-searches of Published Literature (Primary Sources) Hand-searches of Published Literature (Secondary Sources) Searches of Electronic Databases	Searches of Electronic Databases	Hand-searches of Published Literature (Primary Sources) Hand-searches of Published Literature (Secondary Sources) Searches of Electronic Databases
Major Recommendations	View Major Recommendations	View Major Recommendations	View Major Recommendations
Availability of Original Guideline	View original (full-text) guideline	View original (full-text) guideline	View original (full-text) guideline

Guideline Summary

Guideline Title

Clinical practice guidelines for hospital-acquired pneumonia and ventilator-associated pneumonia in adults.

Bibliographic Source(s)

Rotstein C, Evans G, Born A, Grossman R, Light RB, Magder S, McTaggart B, Weiss K, Zhanel GG. Clinical practice guidelines for hospital-acquired pneumonia and ventilator-associated pneumonia in adults. Can J Infect Dis Med Microbiol 2008 Jan;19(1):19-53. [381 references] PubMed

Guideline Status

This is the current release of this guideline.

Jump To | Guideline Classification | Related Content

- Scope
- Methodology
- Recommendations
- Evidence Supporting the Recommendations
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- Qualifying Statements
- Implementation of the Guideline
- Institute of Medicine (IOM) National Healthcare Quality Report Categories
- Identifying Information and Availability
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Recommendations

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Major Recommendations

The levels of evidence (1-3) and strength of recommendation (A-E) are defined at the end of the "Major Recommendations" field.

Prevention and Risk Reduction

Major Points and Recommendations

1. To control the spread of antibiotic-resistant organisms (AROs), an effective infection control program must be implemented in all institutions (**A-1**).
2. Oral intubation should be the preferred way for invasive mechanical ventilation (**B-2**).
3. Patients should be nursed in a semirecumbent position (30° to 45° angle) (**A-2**).
4. Kinetic beds may be useful in some carefully selected groups of patients.
5. Circuit changes should be performed not more than once a week, except if visibly soiled (**A-1**).
6. If not contraindicated, a heat and moisture exchanger (HME) should be used and changed on a weekly basis (**B-2**).
7. The regular use of subglottic secretion drainage should be encouraged in intubated patients (**A-2**).
8. A closed suction catheter should be used for each new patient (**B-2**).
9. Routine prophylaxis of HAP with oral antibiotics (selective decontamination of the digestive tract [SDD]), with or without systemic antibiotics, reduces the incidence of ICU-acquired VAP, has helped

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Best Practice
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Management of peripheral intravascular devices

Recommendations

- Healthcare professionals will need ongoing education, training and assessment regarding the insertion and management of peripheral intravascular devices; preferably, designate trained personnel to insert and maintain intravascular devices **(Grade A)**
- Vigilance in handwashing and aseptic technique is vital, particularly for palpating, inserting, replacing or dressing an intravascular device **(Grade A)**
- Choose catheters based on intended purpose and duration of use, known complications and experience – Teflon, silicone elastomer or polyurethane catheters are safer than polyethylene, polyvinyl chloride or steel needles, which may cause necrosis if extravasation occurs **(Grade A)**

Information Source

This *Best Practice* information sheet, which updates and supersedes the JBI information sheet of the same title published in 1998,[1] has been derived from updated guidelines developed by the Centres for Disease Control (2002)[2,3] and two systematic reviews published in 2005-2006,[4,5] and an economic evaluation published in 2007.[6]

Background

Intravenous devices are an important and common aspect of hospital practice for the administration of medications, nutrients, fluid, blood products and to monitor the haemodynamic status of a person.[2-5] However, intravascular devices such as

This scenario leads to increased patient illness, length of stay and care costs. Empirical evidence suggests that >50% of such infections are preventable.

While peripheral venous catheters (PICs) are rarely associated with bloodstream infections (BSI) they are commonly associated with phlebitis, a condition that is mainly a physiochemical or mechanical phenomenon rather than infectious.[2] A number of factors influence the risk of contracting phlebitis: type of catheter material; catheter size; type of infusate; and patient's own risk. When phlebitis does occur the risk of developing a local catheter-related infection may increase.[3]

Association/Society Guidelines: AACN

- Practice Alerts
  aacn.org/wd/practice/content/practicealerts.pcms?menu=practice
- Protocols for Practice
- Procedure Manual for Critical Care, 6th ed. 2011

AACN PRACTICE ALERT

ORAL CARE FOR PATIENTS AT RISK FOR VENTILATOR-ASSOCIATED PNEUMONIA

Expected Practice:

☑ Develop and implement a comprehensive oral hygiene program for patients in critical care and acute care settings who are at high risk for ventilator-associated pneumonia (VAP).

- Brush teeth, gums and tongue at least twice a day using a soft pediatric or adult toothbrush. [Level E]
- Provide oral moisturizing to oral mucosa and lips every 2 to 4 hours
- Use an oral chlorhexidine gluconate (0.12%) rinse twice a day during the perioperative period for adult patients who undergo cardiac surgery. [Level D]
- Routine use of oral chlorhexidine gluconate (0.12%) in other populations is not recommended at this time.

Scope and Impact of the Problem:

The prevalence of hospital acquired infection is a significant concern in acutely and critically ill patients. VAP contributes to mortality in these patients. Oral hygiene is considered to be an important intervention, in combination with other strategies, for the prevention of ventilator-associated pneumonia.

Supporting Evidence:

- Colonization of the oropharynx is a critical factor in the development of nosocomial pneumonia.[1-3] Growth of potentially pathogenic bacteria in dental plaque provides a nidus of infection for microorganisms that have been shown to be responsible for the development of ventilator-associated pneumonia.[2-4] Dental plaques provides a microhabitat for organisms and provides opportunity for adherence either to the tooth surface or to other microorganisms. These microorganisms in the mouth translocate and colonize the lung, which can result in VAP.[3,5] Dental plaque can be removed by brushing.
  - There are no data associated with critically ill patients, however, the American Dental Association recommends that healthy people brush teeth twice daily to remove plaque from all tooth surfaces.[6]
  - The use of an oral care protocol (brushing with a pediatric toothbrush, mouthwash, and moisturizing gel) reduces oral inflammation and improves oral health.[7]
- Chlorhexidine oral rinse reduced respiratory infections in cardiac surgery patients who received chlorhexidine before intubation as well as postoperatively[8] and reduced nosocomial pneumonia in patients who were intubated for more than 24 hours.[9] However, when chlorhexidine was tested in a more varied ICU population, no difference was observed in VAP mortality, or length of stay. Although oropharyngeal colonization by VAP pathogens was reduced with chlorhexidine, its efficacy was insufficient to reduce the incidence of respiratory infections.[10,11] A 2005 meta-analysis of chlorhexidine trials found that use of chlorhexidine did not result in significant reduction in the incidence of nosocomial pneumonia, nor in alteration of the mortality rate.[12] The CDC [Center for Disease Control and Prevention] guidelines recommend use of chlorhexidine only during the perioperative period for adult patients undergoing cardiac surgery; routine use in other critically ill populations is not recommended.[13]
- Several studies tested intervention bundles that included oral care as one of the interventions.[14-19] The studies demonstrate that bundled interventions decreased nosocomial respiratory infections, however, the contribution of oral care to the results could not be determined.

- In addition to brushing, providing oral moisturizing to oral mucosa and lips every 2 to 4 hours is often a component of the oral care protocols.[20]
- To date, data have not been published from large, well-controlled clinical trials of oral care interventions in at-risk patients other than chlorhexidine studies. There are clinical reports of infection rates before and after changes in oral care procedures but few have been published in refereed journals. Some reports show a positive effect, however, the role of oral care in reducing nosocomial pneumonia is not clearly established by such projects, and it is possible that other changes in care occurred in the units and affected the results.[21-22]

AACN Evidence Leveling System

Level A	Meta-analysis of quantitative studies or metasynthesis of qualitative studies with results that consistently support a specific action, intervention or treatment.
Level B	Well-designed, controlled studies with results that consistently support a specific action, intervention or treatment.
Level C	Qualitative studies, descriptive or correlational studies, integrative review, systematic reviews, or randomized controlled trials with inconsistent results.
Level D	Peer-reviewed professional organizational standards with clinical studies to support recommendations.
Level E	Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations.
Level M	Manufacturer's recommendations only.

Actions for Nursing Practice:

- Ensure that your unit has written practice documents such as a policy, procedure or standard of care that describes the oral care procedure.
- Document frequency of oral care differentiating between comprehensive oral care (including brushing) and oral cavity moisturizing.
- Include the oral care procedure as part of unit orientation to ensure consistency of care.

Need More Information or Help?

- Go to www.aacn.org and select Practice Resource Network.

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AACN PRACTICE ALERT

PREVENTING CATHETER RELATED BLOODSTREAM INFECTION

Expected Practice:

- ☑ Cleanse hands with waterless cleaning solution or, if visibly soiled, with soap and water before and after patient contact.
- ☑ Disinfect clean skin utilizing friction with an appropriate antiseptic (preferably 2% chlorhexadine) before catheter insertion and during site care.
- ☑ Utilize full barrier precautions when inserting central venous access devices.
- ☑ Educate all staff inserting and caring for intravascular catheters, assess competency of same at regular intervals, advocate adherence to standards of care.
- ☑ Replace peripheral IV sites in the adult patient population at least every 96 hours but no more frequently than every 72 hours. Leave peripheral venous catheters in children until IV therapy is completed, unless complications (e.g., phlebitis and infiltration) occur.
- ☑ Replace IV tubing at least every 96 hours but no more frequently than every 72 hours.
- ☑ When adherence to aseptic technique during intravascular catheter insertion cannot be ensured (i.e. prehospital, code situation), replace the catheter soon as possible, but within 48 hours.

Supporting Evidence:

- A substantial proportion of hospital-acquired infections result from cross-contamination from the hands of healthcare workers. Alcohol-based hand rub, compared with traditional handwashing with unmedicated soap and water or medicated hand antiseptic agents, may offer better results because it requires less time, acts faster, and is less likely to irritate skin. Thus, the CDC recommends the use of alcohol-based hand rubs between patient contacts as an adjunct to traditional handwashing alone.[1,2,3]
- Chlorhexidine gluconate solutions utilized for vascular catheter site care reduce catheter related bloodstream infections and catheter colonization more effectively than povidone-iodine solutions. Moreover, 80% of resident and transient skin flora are found in the first five epidermal layers of the skin. There is clinical evidence to support the efficacy of applying antiseptics with sufficient friction to assure that the solution reaches into the cracks and fissures of the skin. There is no evidence that supports use of traditional concentric prepping technique. Although a 2% chlorhexidine-based preparation is preferred, tincture of iodine, an iodophor, or 70% alcohol can be used. Allow any solution used to dry before the catheter is inserted.[1,4,5]
- Compared with peripheral venous catheters, CVCs carry a substantially greater risk for infection; therefore, the level of barrier precautions needed to prevent infection during insertion of CVCs should be more stringent. Maximal sterile barrier precautions (e.g., cap, mask, sterile gown, sterile gloves, and full body sterile drapes) during the insertion of CVCs substantially reduce the incidence of CRBSI compared with standard precautions (e.g., sterile gloves and small drapes).[1,3,7,10] There are some studies that demonstrate infection rates are lower when the subclavian site is used. Selection of central line insertion site, however, is based on patient risk factors.
- Healthcare workers who insert and care for intravascular devices should receive formalized education and training in indications for intravascular catheterization, proper placement, maintenance, and infection control. Educational programs focusing on central venous catheter insertion and care have lead to a substantial decrease in cost, morbidity, and mortality attributable to central venous catheterization. Ongoing education and reinforcement of appropriate technique serve as a reminder of current best practices, and studies demonstrate that consistent reinforcement of aseptic technique leads to decreased CRBSI.[1,6,8,10,11]
- Studies of peripheral intravenous catheters show that there is not a substantial difference in phlebitis rates between catheters left in place 72 hours and those left in place 96 hours. There is no evidence to support that routine replacement of central venous catheters is more effective in decreasing blood stream infections than replacing central venous catheters as needed.[1,12]

- Studies show that IV tubing containing crystalloids can be replaced every 72 – 96 hours. If monitoring using a transducer system, replace the transducer, tubing, flush device and flush solution every 96 hours.[1,13]

What You Should Do:

- Ensure that your units have written practice documents such as a policy, procedure or standard of care that include use sterile technique with full barrier precautions when central venous access devices are inserted.
- Ensure that your units have written practice documents such as policy, procedure or standard of care that address frequency of peripheral IV site rotation and tubing change.
- Establish a process for education and routine evaluation of all staff inserting and caring for intravascular devices.
- Review your unit's rate of catheter related blood stream infection rate and if needed establish an interdisciplinary team, including but not limited to staff nurse, advance practice nurse, infection control nurse (officer), and a physician.
- Develop a process for *daily evaluation for need* of any central venous catheters.

Need More Information or Help?

- Talk with a clinical practice specialist for additional information / assistance at www.aacn.org then select PRN.

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Other Articles of Interest:

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CINAHL

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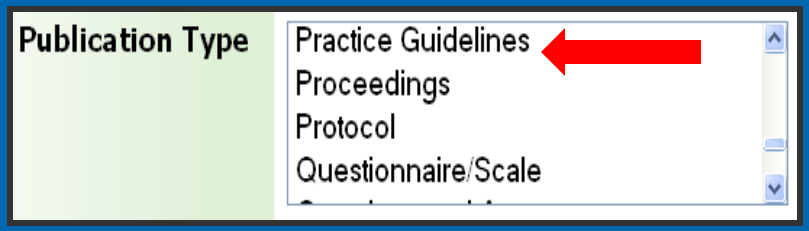

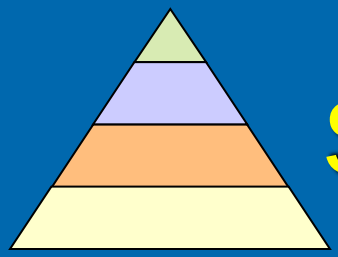

Search for Evidence Summaries

- DynaMed **$$**
  - Evidence-based clinical resource providing summaries of 3,500+ diseases and conditions
- Nursing Reference Center **$$**
  - Comprehensive point-of-care resource for nurses, including Evidence-based Care Sheets
- Natural Standard **$$**
  - High quality, evidence-based information about complementary and alternative therapies
- Evidence-Based Nursing **$$**
  - Quarterly journal that assesses clinical relevance of research studies from international journals

DynaMed

- Provides summaries of the best evidence for over 3,500 clinical topics
- Can quickly browse and find key recommendations
- Updated daily
- Monitors content of over 500 journals and systematic review databases
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Start Calculators Weekly Update Hel

Find: glucose control intensive care

Search

A B C D E F G H I J K L M N O P Q R S T

U V W X Y Z

Browse by Category

Intensive glucose control in critical care | Search within text | Expand All | Collapse All

Intensive glucose control in critical care

- Updated 2011 Mar 15 02:42:00 PM: American College of Physicians recommendations for the use of intensive insulin therapy in hospitalized patients with and without diabetes (Ann Intern Med 2011 Feb 15) view update
- ACP clinical practice guideline on use of intensive insulin therapy for management of glycemic control in hospitalized patients (Ann Intern Med 2011 Feb 15) view update
- exenatide may reduce daily insulin requirements to maintain glucose control compared to intensive insulin treatment in children with severe burns (Crit Care 2010) view update

Related Summaries:

- Sepsis treatment in adults
- Sepsis treatment in children
- Coronary artery bypass graft (CABG)

Overview:

- intensive glucose control associated with
  - increased risk for hypoglycemia in all intensive care unit (ICU) patients (level 2 [mid-level] evidence)
  - reduced risk for septicemia (level 2 [mid-level] evidence)
- effect of intensive glucose control on mortality has been inconsistent (increased, decreased or no significant effect) across randomized trials and systematic reviews
- perioperative considerations
  - perioperative insulin infusion may reduce mortality but associated with increased hypoglycemia (level 2 [mid-level] evidence), based on systematic review in which most

Recommendations

- **American College of Physicians recommendations for the use of intensive insulin therapy in hospitalized patients with and without diabetes**
  - intensive insulin therapy not recommended to strictly control blood glucose in non-surgical intensive care unit (SICU)/medical intensive care unit (MICU) patients with or without diabetes mellitus (ACP Strong recommendation, Moderate-quality evidence)
  - intensive insulin therapy not recommended to normalize blood glucose in intensive care patients with or without diabetes mellitus (ACP Strong recommendation, High-quality evidence)
  - target blood glucose level of 7.8 to 11.1 mmol/L (140-200 mg/dL) if insulin therapy used in [illegible] patients (ACP Weak recommendation, Moderate-quality evidence)
  - Reference - Ann Intern Med 2011 Feb 15;154(4):260 **EBSCO*host* Full Text**
  - supporting systematic review can be found in Ann Intern Med 2011 Feb 15;154(4):268 **EBSCO*host* Full Text**

Full-text

Level of evidence

Systematic Reviews

- **intensive glucose control associated with increased risk for hypoglycemia in all intensive care unit (ICU) patients but reduction in mortality in only surgical ICU patients (level 2 [mid-level] evidence)**
  - based on systematic review of trials with heterogeneity
  - systematic review of 26 randomized trials in intensive care units (ICU) comparing intensive insulin therapy with conventional glucose management in 13,567 patients
  - prevalence of diabetes not reported
  - comparing intensive insulin therapy vs. conventional glucose management
    - death in 24.7% vs. 24.9% overall (not significant) in 26 trials with 13,567 patients, limited by significant heterogeneity
    - death in 7.4% vs. 11.8% surgical ICU patients ($p < 0.05$, NNT 23) in 5 trials with 1,972 patients
    - death in 34.9% vs. 36.7% medical ICU patients (not significant) in 6 trials with 1,460 patients
    - death in 26.7% vs. 25.6% mixed ICU patients (not significant) in 15 trials with 10,140 patients, limited by

DynaMed: Reviews and Guidelines

Reviews:

- review of glucose control in hospitalized patients can be found in Am Fam Physician 2010 May 1;81(9):1121
- review of glucose control in ICU can be found in Crit Care Med 2009 May;37(5):1769
- editorial discussion of strict glucose control in the critically ill can be found in BMJ 2006 Apr 15;332(7546):865 full-text
- review of insulin protocols can be found in Crit Care 2006 Feb;10(1):R19 full-text
- review of stress hyperglycemia can be found in Lancet 2009 May 23;373(9677):1798

Guidelines:

- American College of Physicians (ACP) clinical practice guideline on use of intensive insulin therapy for management of glycemic control in hospitalized patients can be found in Ann Intern Med 2011 Feb 15;154(4):260 **EBSCO*host* Full Text**
- French Society of Anesthesia and Intensive Care/French Society of Intensive Care (Societe francaise d'anesthesie et de reanimation/Societe de reanimation de langue francaise [SFAR/SRLF]) recommendations on glycemic control during anesthesia can be found in Ann Fr Anesth Reanim 2009 Apr;28(4):410 [French]
- French expert's (le Groupe d'Experts) recommendations on glycemic control in ICU and during anaesthesia can be found in Ann Fr Anesth Reanim 2009 Jul-Aug;28(7-8):717 [French]

Nosocomial pneumonia

- Updated 2011 Apr 25 06:39:00 AM: adherence to ATS/IDSA guidelines may be associated with increased mortality in patients at risk for multidrug-resistant pneumonia (Lancet Infect Dis 2011 Mar) view update
- stress dose hydrocortisone prevents hospital-acquired pneumonia in patients with multiple trauma on mechanical ventilation (JAMA 2011 Mar 23) view update
- addition of nebulized colistimethate sodium to systemic antibiotics for Gram-negative ventilator-associated pneumonia not associated with additional clinical benefit (J Antimicrob Chemother 2010 Dec) view update

Related Summaries:

- Pneumonia in adults or Pneumonia in children for community-acquired pneumonia
- Nursing home-acquired pneumonia
- Aspiration pneumonia
- Pneumonia severity assessment
- Nosocomial methicillin-resistant Staphylococcus aureus (MRSA) infection

Antibiotics:

- antibiotic prophylaxis
  - **antibiotic prophylaxis with systemic and topical antibiotics may reduce both respiratory tract infections and overall mortality in intensive care unit (ICU) patients (level 2 [mid-level] evidence)**
    - based on Cochrane review with methodologic limitations
    - systematic review of 36 randomized trials evaluating antibiotic prophylaxis for respiratory tract infections and deaths in 6,922 adult ICU patients
    - respiratory tract infection outcome limited by uncertainty in how outcomes were defined across trials
    - mortality outcome limited by insufficient evidence from double-blind trials with adequate allocation concealment
    - 17 trials with 4,295 patients tested combination of topical and systemic antibiotics vs. no prophylaxis
      - significantly reduced respiratory tract infections with antibiotics (odds ratio 0.28, 95% CI 0.2-0.38, NNT 4-5 assuming 40% infection rate in controls), results limited by significant heterogeneity (p = 0.004)
      - significantly reduced mortality with antibiotics (odds ratio 0.75, 95% CI 0.65-0.87, NNT 13-36 assuming 30% mortality in controls)
    - 19 trials with 3,016 patients compared topical antibiotics vs. control
      - significantly reduced respiratory tract infections with topical antibiotics (odds ra
      - 6-12 assuming 31% infection rate in controls), results limited by significant hete
      - no significant difference in mortality
    - Reference - Cochrane Database Syst Rev 2009 Oct 7;(4):CD000022
  - **prophylactic antibiotics via respiratory tract may reduce incidence of ICU-acquired pneumonia (level 2 [mid-level] evidence)**
    - based on systematic review of controlled trials
    - meta-analysis of 5 randomized and 3 non-randomized controlled trials evaluating gentamicin (3 trials), polymyxins (3 trials), tobramycin (1 trial) and ceftazidime (1 trial) vs. placebo or no drug in 1,877 patients
    - only 2 trials met criteria for high quality
    - use of systemic antibiotics reported in 5 studies, most patients appear to have received systemic antibiotics
    - no significant difference in mortality in meta-analysis of 5 randomized trials (27% vs. 30%) or meta-analysis of 8 controlled trials (15.7% vs. 17.3%)
    - no significant difference in pneumonia-related mortality (5.6% vs. 9.8%) in 2 randomized trials
    - prophylactic antibiotics associated with reduced incidence of ICU-acquired pneumonia (22.4% vs. 37.3%, NNT 7) in meta-analysis of 5 randomized trials with 414 patients
    - Reference - Crit Care 2006;10(4):R123 full-text

Level of evidence

DynaMed: Reviews and Guidelines

Reviews:

- review of ventilator-associated pneumonia can be found in Arch Intern Med 2000 Jul 10;160(13):1926
- review of ventilator-associated lung injury can be found in Lancet 2003 Jan 25;361(9354):332, commentary can be found in Lancet 2003 May 10;361(9369):1654
- review of hospital-acquired infections due to gram-negative bacteria can be found in N Engl J Med 2010 May 13;362(19):1804
- review of diagnosis and prevention of nosocomial pneumonia in intensive care units can be found in Crit Care Med 2010 Aug;38(8 Suppl):S352
- review of nosocomial infections in intensive care units can be found in Lancet 2003 Jun 14;361(9374):2068 **EBSCO*host* Full Text**, commentary can be found in Lancet 2003 Aug 9;362(9382):493 **EBSCO*host* Full Text**
- review of acinetobacter infection can be found in N Engl J Med 2008 Mar 20;358(12):1271

Guidelines:

United States guidelines:

Full text

- Centers for Disease Control and Prevention (CDC) guideline on prevention of healthcare-associated pneumonia can be found in MMWR Recomm Rep 2004 Mar 26;53(RR-3):1 **EBSCO*host* Full Text** full-text, summary can be found in Am Fam Physician 2004 Aug 1;70(3):596
- American Thoracic Society (ATS) guideline on management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia can be found in Am J Respir Crit Care Med 2005 Feb 15;171(4):388 full-text, commentary can be found in Am J Respir Crit Care Med 2006 Jan 1;173(1):131 full-text
- American College of Physicians (ACP) guideline on risk assessment for and strategies to reduce perioperative pulmonary complications for patients undergoing noncardiothoracic surgery can be found in Ann Intern Med 2006 Apr 18;144(8):575 **EBSCO*host* Full Text** or at National Guideline Clearinghouse 2006 Jun 26:9181
  - supporting systematic review for risk assessment can be found in Ann Intern Med 2006 Apr 18;144(8):581 **EBSCO*host* Full Text**, commentary can be found in ACP J Club 2006 Sep-Oct;145(2):37 **EBSCO*host* Full Text**, 38 **EBSCO*host* Full Text**
  - supporting systematic review for risk reduction can be found in Ann Intern Med 2006 Apr 18;144(8):596 **EBSCO*host* Full Text**, commentary can be found in Ann Intern Med 2006 Oct 3;145(7):553 **EBSCO*host* Full Text**

Levels and Grades of Evidence

Levels of Evidence and Grades of Recommendations

Grade of recommendation	Level of evidence	Interventions
A	1a	Systematic review of randomized controlled trials
	1b	Individual randomized controlled trial
B	2a	Systematic review of cohort studies
	2b	Individual cohort study
	3a	Systematic review of case-control studies
	3b	Individual case-control study
C	4	Case series
D	5	Expert opinion without explicit critical appraisal or based on physiology or bench research

REPROLINE, Johns Hopkins University *www.reproline.jhu.edu*

AACN Evidence Leveling System

Level A: meta-analyses with consistent evidence

Level B: well-designed, controlled studies with consistent evidence

Level C: qualitative studies, descriptive studies, integrative review, systematic reviews, or RCTs with inconsistent results.

Level D: peer-reviewed professional organization standards with supporting clinical studies

Level E: case reports, professional organization standards, etc., without supporting clinical studies

Level M: manufacturer's recommendations

Nursing Reference Center

- Evidence-based Care Sheets
  - Evidence-based summaries on key topics incorporating the best available evidence through vigorous systematic surveillance
- Diseases & Conditions
- Quick Lessons
- Drug information
- Skills & Procedures
- Practice Guidelines
- Patient Education materials
- CE modules

Browse for: pneumonia, ventilator in All

Browse

Alphabetical Relevancy Ranked

Page: Previous | Next A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

- Pneumonia, Ventilator-Associated
- Pneumonia, Ventilator-Associated, in Children
- Pneumonia, Ventilator-Associated: Health Care Costs EB
- Pneumonia, Ventilator-Associated: Prevention EB
- Pneumonia, Viral
- Pneumoniae, Chlamydia: Role in Cardiovascular Disease EB
- Pneumonias, Chlamydial
- Pneumonitis in Children
- Pneumonitis in Pregnancy

Key Content

Diseases & Conditions includes:

- **Quick Lessons**
  Clinically-organized nursing overviews that are designed to map the nursing work flow
- **Evidence-Based Care Sheets** EB
  Evidence-based summaries on key topics incorporating the best available evidence through rigorous systematic surveillance

Nursing Reference Center Evidence-Based Care Sheet

EVIDENCE-BASED
CARE SHEET

Pneumonia, Ventilator-Associated: Prevention

What We Know

- In the United States, pneumonia is the sixth leading cause of death and the leading cause of death due to infectious disease[1] (see the series of *Quick Lessons* on various types of pneumonia)
- While community-acquired pneumonia (CAP) refers to pneumonia acquired outside of hospitals or extended care facilities, healthcare-associated pneumonia (HAP; previously called hospital-acquired or nosocomial pneumonia) is contracted within acute or long-term healthcare settings[1, 2, 12]
  - HAP occurs 48 or more hours after admission to an acute care or long-term healthcare facility. HAP is particularly common among patients who require mechanical ventilation
- Ventilator-associated pneumonia (VAP) is a life-threatening infection of the lower airways that may develop in patients who are intubated and receiving mechanical ventilation.[1, 2, 8, 9, 12, 13] (For more information on VAP, see *Quick Lesson About... Pneumonia, Ventilator-Associated*)
  - VAP is a leading cause of morbidity and mortality in the ICU. VAP frequently develops from the aspiration of pathogenic oropharyngeal secretions
  - The incidence of VAP varies greatly, ranging from 6% to 52% in intubated patients depending on existing complications
  - VAP is responsible for 90% of healthcare-associated infections in ventilated patients
  - Although VAP can occur in any mechanically ventilated patient, it is much more common in surgical ICU patients than in medical ICU patients, reaching highest incidence in trauma, neurosurgical, surgical, and burn ICUs
  - The single greatest risk factor for VAP is related to duration of ventilation. The estimated incidence of VAP is 3% per day during the first 5 days, 2% per day during days 6–10, and 1% per day after day 10. VAP is uncommon in patients on long-term (e.g., longer than 15 days) mechanical ventilation
- Prevention of VAP may include[3, 6, 7, 8, 10, 11]
  - elevating the head of the bed to 30–45° after enteral feedings to prevent aspiration
  - regular or continuous suctioning of oropharyngeal secretions
  - daily sedation breaks and spontaneous breathing trials as appropriate to wean from mechanical ventilation
  - prophylactic antibiotic treatment to reduce the incidence of VAP in areas where the incidence is unacceptably high
  - use of silver-impregnated endotracheal tubes, antiseptic-impregnated tubes, and endotracheal tubes that allow subglottic suctioning may reduce the risk of VAP
  - implementation of high-quality intensive oral hygiene, to include oral swabbing, thorough toothbrushing, use of antiseptic mouthwash such as chlorhexidine gluconate rinse 0.12%, and regular suctioning of oral secretions
    - Oral care has prevented VAP in skilled nursing facilities and medical/surgical ICU settings
    - Deep suctioning every 6 hours, oral cleansing every 4 hours, toothbrushing twice daily, and oral cavity assessment significantly reduce the incidence of VAP
  - Staff education, careful monitoring of respiratory status, and meticulous patient care using aseptic technique for invasive procedures and other infection-control strategies may offer the best solution to reducing VAP
- Tracheostomy has been associated with a lower incidence of VAP than endotracheal intubation among critically ill patients requiring intubation; however, the evidence is inconclusive, and some studies have reported that tracheostomy may even increase the risk of VAP by disrupting airway integrity or by increasing the risk of bacterial contamination[7]

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November 26, 2010

What We Can Do

- Learn more about VAP so you can accurately assess your patients' personal characteristics and health education needs; share this knowledge with your colleagues
- Avoid unnecessary intubation and reintubation[7]
- Implement strategies to prevent VAP (commonly termed "ventilator bundle") in your patients who are being mechanically ventilated[6, 8, 10, 11]
  - Elevate the head of the bed 30–45°, especially during and for 3 hours after enteral feedings, to reduce risk of aspiration
    - Frequently reposition and turn the patient from side to side since the patient may slide down in bed
  - Follow facility protocol for tracheal suctioning and airway clearance
    - If possible, advocate for use of a silver-impregnated endotracheal tube that allows continuous drainage of subglottic secretions and may prevent infection
  - Provide antiseptic oral care to prevent colonization of the upper airways
    - Perform comprehensive oral hygiene including daily oral assessment, toothbrushing every 12 hours, use of mouth swabs, use of mouthwash (e.g., chlorhexidine) every 12 hours, and frequent suctioning of oral secretions at least every 4 hours
  - Closely monitor cuff pressure, ensuring that it is 20–30 cm H_2O to prevent descent of microbes into the lower airway and aspiration
  - Follow facility protocol for breaks from sedation, spontaneous breathing trials, and assessment of readiness to wean from mechanical ventilation
  - Follow facility protocol for venous thromboembolism and pressure ulcer prophylaxis due to the patient's sedentary state
  - Change ventilator circuits weekly, when broken, or according to facility protocol to minimize introduction of contaminants to the circuit
  - Adhere to facility infection control protocols for hand hygiene, contact barrier precautions, and preventing contamination from respiratory therapy equipment to help prevent VAP

Coding Matrix

References are rated in order of strength:

- M Published meta-analysis
- SR Published systematic or integrative literature review
- RCT Published research (randomized controlled trial)
- R Published research (not randomized controlled trial)
- C Case histories, case studies
- G Published guidelines
- RV Published review of the literature
- RU Published research utilization report
- QI Published quality improvement report
- L Legislation
- PGR Published government report
- PFR Published funded report
- PP Policies, procedures, protocols
- X Practice exemplars, stories, opinions
- GI General or background information/texts/reports
- U Unpublished research, reviews, poster presentations or other such materials
- CP Conference proceedings, abstracts, presentations

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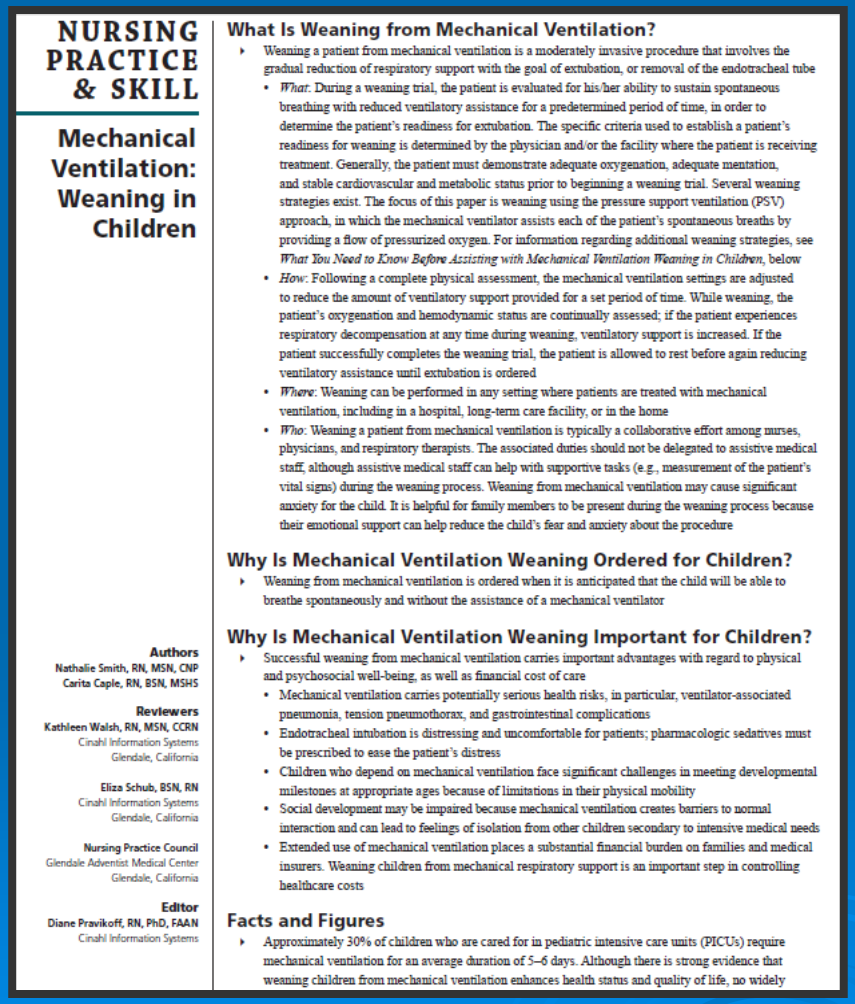
November 2010

Nursing Skills in NRC



NURSING PRACTICE & SKILL

Mechanical Ventilation: Weaning in Children

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What Is Weaning from Mechanical Ventilation?

- Weaning a patient from mechanical ventilation is a moderately invasive procedure that involves the gradual reduction of respiratory support with the goal of extubation, or removal of the endotracheal tube
  - *What*: During a weaning trial, the patient is evaluated for his/her ability to sustain spontaneous breathing with reduced ventilatory assistance for a predetermined period of time, in order to determine the patient's readiness for extubation. The specific criteria used to establish a patient's readiness for weaning is determined by the physician and/or the facility where the patient is receiving treatment. Generally, the patient must demonstrate adequate oxygenation, adequate mentation, and stable cardiovascular and metabolic status prior to beginning a weaning trial. Several weaning strategies exist. The focus of this paper is weaning using the pressure support ventilation (PSV) approach, in which the mechanical ventilator assists each of the patient's spontaneous breaths by providing a flow of pressurized oxygen. For information regarding additional weaning strategies, see *What You Need to Know Before Assisting with Mechanical Ventilation Weaning in Children*, below
  - *How*: Following a complete physical assessment, the mechanical ventilation settings are adjusted to reduce the amount of ventilatory support provided for a set period of time. While weaning, the patient's oxygenation and hemodynamic status are continually assessed; if the patient experiences respiratory decompensation at any time during weaning, ventilatory support is increased. If the patient successfully completes the weaning trial, the patient is allowed to rest before again reducing ventilatory assistance until extubation is ordered
  - *Where*: Weaning can be performed in any setting where patients are treated with mechanical ventilation, including in a hospital, long-term care facility, or in the home
  - *Who*: Weaning a patient from mechanical ventilation is typically a collaborative effort among nurses, physicians, and respiratory therapists. The associated duties should not be delegated to assistive medical staff, although assistive medical staff can help with supportive tasks (e.g., measurement of the patient's vital signs) during the weaning process. Weaning from mechanical ventilation may cause significant anxiety for the child. It is helpful for family members to be present during the weaning process because their emotional support can help reduce the child's fear and anxiety about the procedure

Why Is Mechanical Ventilation Weaning Ordered for Children?

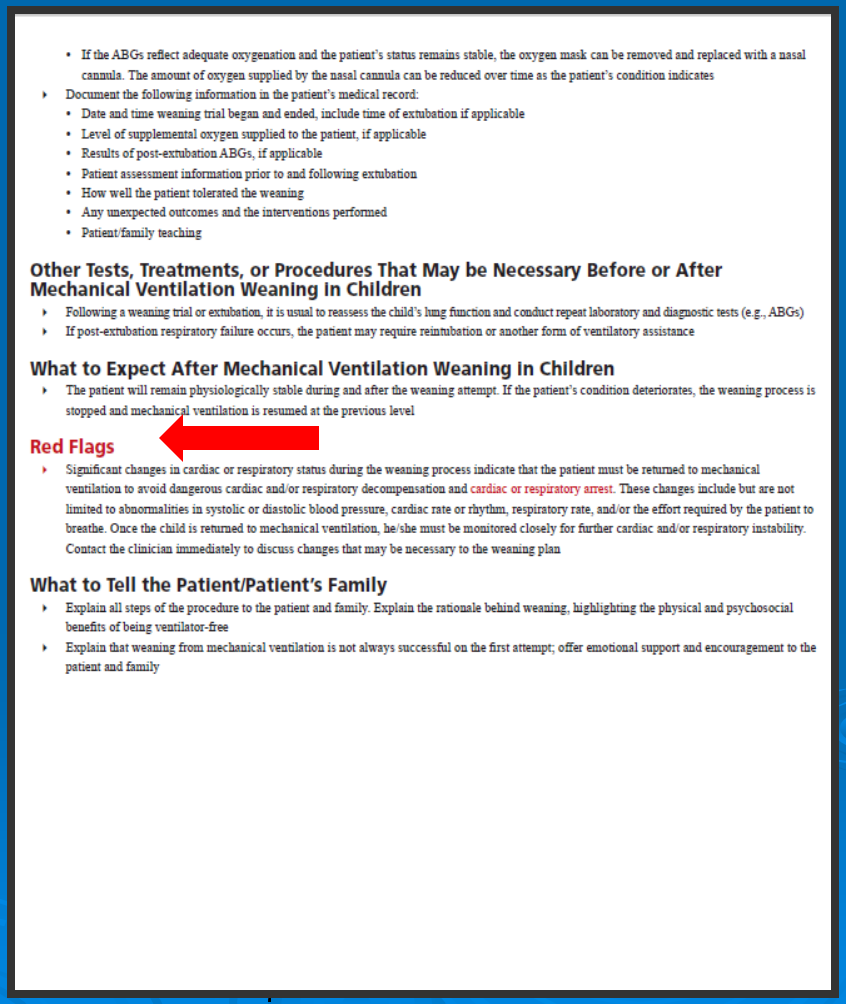
- Weaning from mechanical ventilation is ordered when it is anticipated that the child will be able to breathe spontaneously and without the assistance of a mechanical ventilator

Why Is Mechanical Ventilation Weaning Important for Children?

- Successful weaning from mechanical ventilation carries important advantages with regard to physical and psychosocial well-being, as well as financial cost of care
  - Mechanical ventilation carries potentially serious health risks, in particular, ventilator-associated pneumonia, tension pneumothorax, and gastrointestinal complications
  - Endotracheal intubation is distressing and uncomfortable for patients; pharmacologic sedatives must be prescribed to ease the patient's distress
  - Children who depend on mechanical ventilation face significant challenges in meeting developmental milestones at appropriate ages because of limitations in their physical mobility
  - Social development may be impaired because mechanical ventilation creates barriers to normal interaction and can lead to feelings of isolation from other children secondary to intensive medical needs
  - Extended use of mechanical ventilation places a substantial financial burden on families and medical insurers. Weaning children from mechanical respiratory support is an important step in controlling healthcare costs

Facts and Figures

- Approximately 30% of children who are cared for in pediatric intensive care units (PICUs) require mechanical ventilation for an average duration of 5–6 days. Although there is strong evidence that weaning children from mechanical ventilation enhances health status and quality of life, no widely



- If the ABGs reflect adequate oxygenation and the patient's status remains stable, the oxygen mask can be removed and replaced with a nasal cannula. The amount of oxygen supplied by the nasal cannula can be reduced over time as the patient's condition indicates
- Document the following information in the patient's medical record:
  - Date and time weaning trial began and ended, include time of extubation if applicable
  - Level of supplemental oxygen supplied to the patient, if applicable
  - Results of post-extubation ABGs, if applicable
  - Patient assessment information prior to and following extubation
  - How well the patient tolerated the weaning
  - Any unexpected outcomes and the interventions performed
  - Patient/family teaching

Other Tests, Treatments, or Procedures That May be Necessary Before or After Mechanical Ventilation Weaning in Children

- Following a weaning trial or extubation, it is usual to reassess the child's lung function and conduct repeat laboratory and diagnostic tests (e.g., ABGs)
- If post-extubation respiratory failure occurs, the patient may require reintubation or another form of ventilatory assistance

What to Expect After Mechanical Ventilation Weaning in Children

- The patient will remain physiologically stable during and after the weaning attempt. If the patient's condition deteriorates, the weaning process is stopped and mechanical ventilation is resumed at the previous level

Red Flags

- Significant changes in cardiac or respiratory status during the weaning process indicate that the patient must be returned to mechanical ventilation to avoid dangerous cardiac and/or respiratory decompensation and cardiac or respiratory arrest. These changes include but are not limited to abnormalities in systolic or diastolic blood pressure, cardiac rate or rhythm, respiratory rate, and/or the effort required by the patient to breathe. Once the child is returned to mechanical ventilation, he/she must be monitored closely for further cardiac and/or respiratory instability. Contact the clinician immediately to discuss changes that may be necessary to the weaning plan

What to Tell the Patient/Patient's Family

- Explain all steps of the procedure to the patient and family. Explain the rationale behind weaning, highlighting the physical and psychosocial benefits of being ventilator-free
- Explain that weaning from mechanical ventilation is not always successful on the first attempt; offer emotional support and encouragement to the patient and family

April 2011

Languages Available	Spanish

Patient Education

Title: *Intubation and Mechanical Ventilation* By: Martin JJ, Chwistek M, Health Library: Evidence-Based Information, September 1, 2010
Database: *Nursing Reference Center*

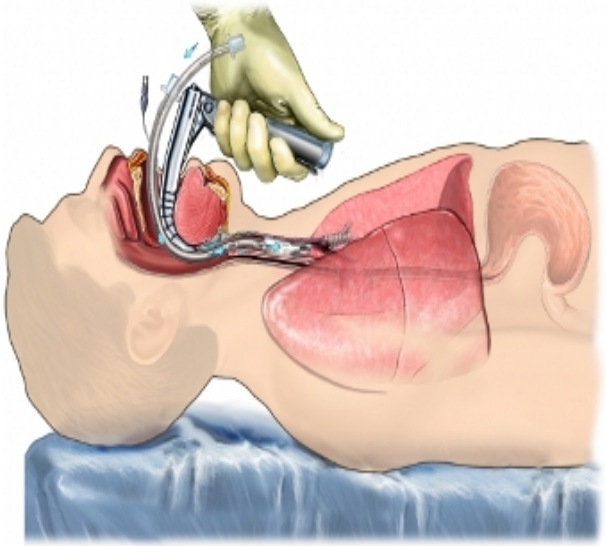
Intubation and Mechanical Ventilation

Contents

Definition

Intubation and mechanical ventilation is the use of a tube and a machine to help get air into and out of your lungs. This is often done in emergencies, but it can also be done when you are having surgery.

Endotracheal Intubation



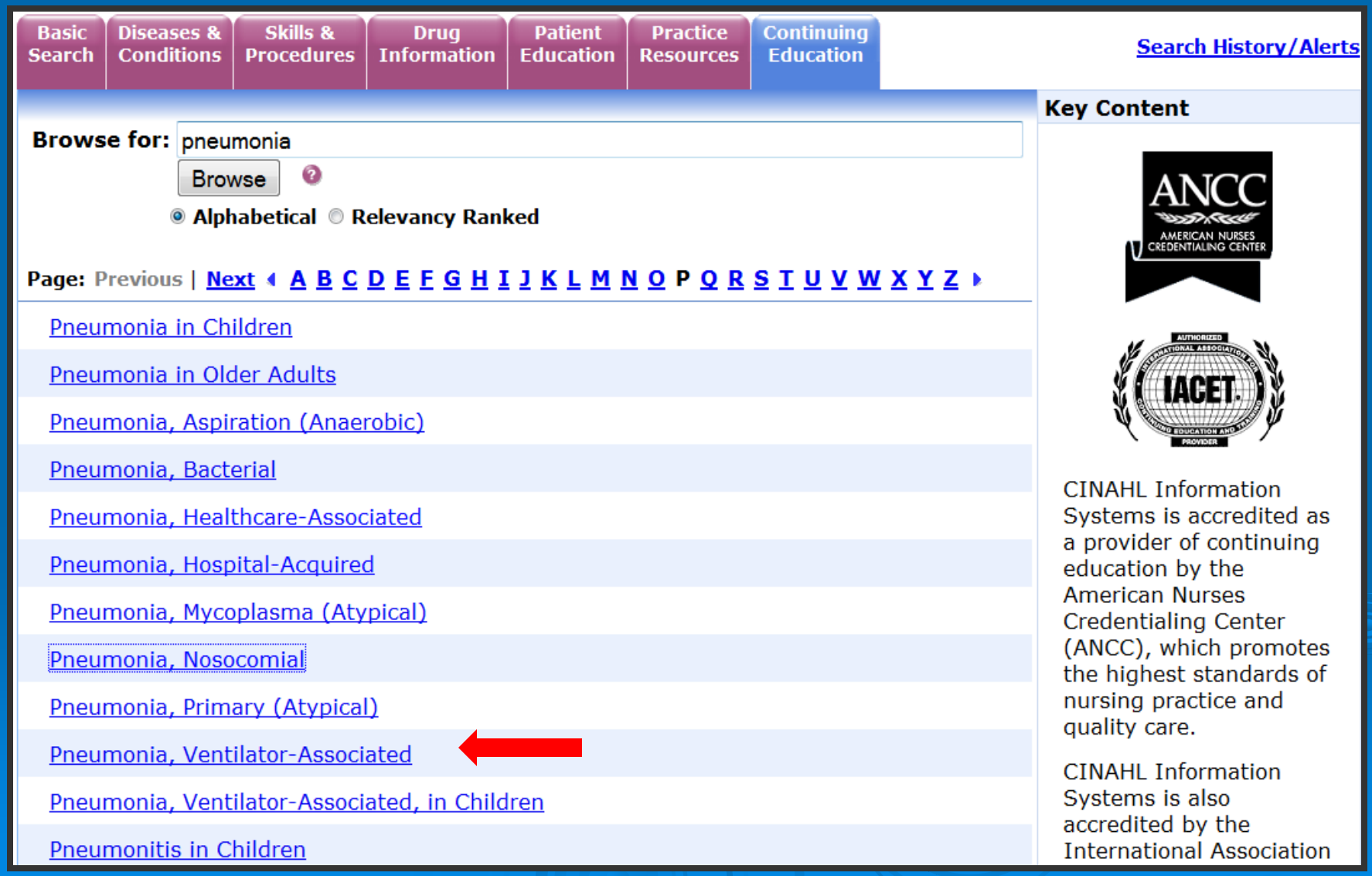
Related Information

- Quick Lessons
- Skills
- Evidence-Based Care Sheets
- Drugs
- Patient Education
- Guidelines
- CE
- Books
- Legal Cases

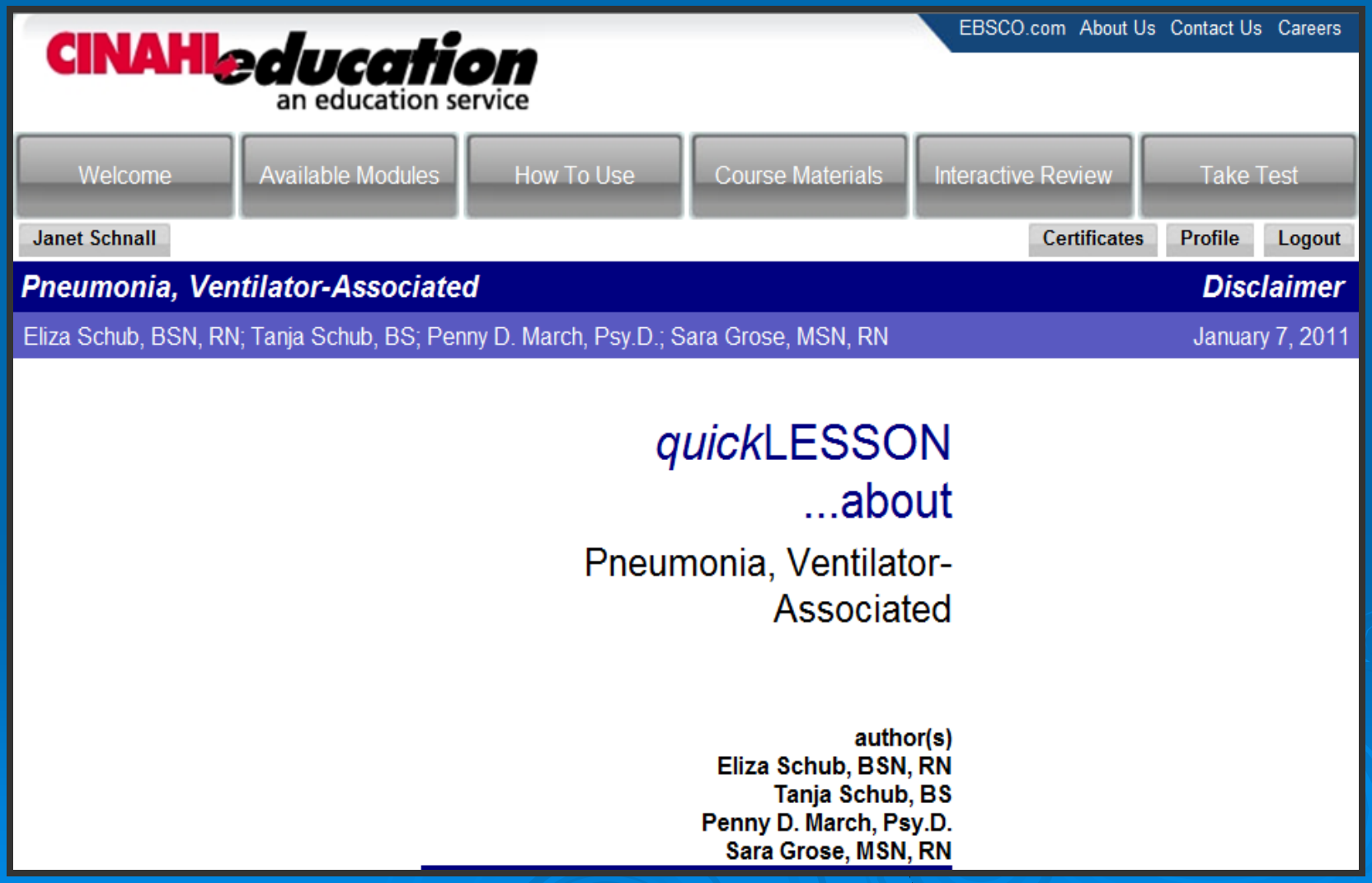
Reasons for Procedure

Your lungs help exchange gases in your body. Oxygen gets moved from the air in your lungs into your blood, and carbon dioxide in your blood moves into the air in your lungs. This movement of gases is needed to live. If you cannot move air into and out of your lungs, then this gas exchange cannot happen. Intubation and mechanical

Continuing Education Credit



Continuing Education Credit



Natural Standard

- provides high quality, evidence-based information on:
  - dietary supplements (including herbs, vitamins, and minerals)
  - functional foods
  - diets
  - complementary practices (modalities)
  - exercises
  - medical conditions

Natural Standard

Ginger

Professional reading level

12th grade reading level

Spanish

Spanish

Patient handout 5th grade

Natural Standard Professional Monograph

Ginger (*Zingiber Officinale* Roscoe)

Natural Standard *Professional Monograph, Copyright © 2011 (www.naturalstandard.com).*

Synonyms/Common Names/Related Substances:

- (+)-germacrene D synthase, 1-(4'-hydroxy-3'-methoxyphenyl)-2-nonadecen-1-one, 1-(4-O-beta-D-glucopyranosyl-3-methoxyphenyl)-3,5-dihydroxydecane, 1,7-bis-(4'-hydroxy-3'-methoxyphenyl)-3-hydroxy-5-acetoxyheptane, 1,7-bis-(4'-hydroxy-3'-methoxyphenyl)-5-methoxyheptan-3-one, 1-dehydrogingerdione, 1-hydroxy-[6]-paradol, 3-acetoxy-[4]-gingerdiol, 3-acetoxydihydro-[6]-paradol methyl ether, 5-acetoxy-3-deoxy-[6]-gingerol, 5-acetoxy-[6]-gingerdiol (stereoisomer), 5-methoxy-[n]-gingerols, 5-O-beta-D-glucopyranosyl-3-hydroxy-1-(4-hydroxy-3-methoxyphenyl)decane, 6-(4'-hydroxy-3'-methoxyphenyl)-2-nonyl-2-hydroxytetrahydropyran, 6-dehydro-[6]-gingerol, 6-dehydrogingerdione, 6-gingerdiol, 6-gingerol, 8- gingerol, 10-gingerol, 6-gingesulfonic acid, 6-hydroxy-[n]-shogaol, [6]-isoshogaol, 6-paradol, 6-shogaol, 8-shogaol, and 10-shogaol, acetoxy-3-dihydrodemethoxy-[6]-shogaol, aadaa (Assamese, Bengali), adarak (Hindi), adrak (Urdu), adraka (Urdu), adruka (Hindi), aduvaa (Nepalese), African ginger, allaama (Telugu), allaamu (Telugu), alpha-curcumene, alpha

Clinical Bottom Line/Effectiveness

Brief Background:

- The rhizomes and stems of ginger have assumed significant roles in Chinese, Japanese, and Indian medicine since the 1500s. The oleoresin of ginger is often contained in digestive, antitussive, antiflatulent, laxative, and antacid compounds.
- There is supportive evidence from several randomized controlled trials that ginger reduces the severity and duration of nausea or emesis during pregnancy (1;2;3;4;5;6;7;8;9;10). Ginger's effects on other types of nausea or emesis, such as chemotherapy-induced (11;12;13;14;15), postoperative nausea, or motion sickness remain undetermined (16;17). Zinopin, made of Pycnogenol® and standardized ginger root extract (SGRE), has been suggested as a possible treatment for motion sickness (18). However, a clinical trial reported that patients could not distinguish ginger from placebo (19).
- Ginger is used orally, topically, and intramuscularly for a wide array of other conditions without clear scientific evidence of benefit.
- The most frequent side effects associated with ginger use are gastrointestinal upset, heartburn, gas, and bloating. Ginger may inhibit platelet aggregation or decrease platelet thromboxane production, thus theoretically increasing bleeding risk.

Natural Standard

Ginger

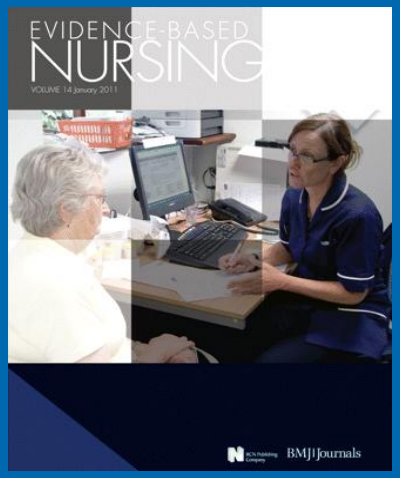
Indication	Evidence Grade
Hyperemesis gravidarum	B
Anti-platelet agent	C
Chemotherapy-induced leukopenia	C
Chemotherapy-induced nausea and vomiting	C
Dysmenorrhea	C
Exercise recovery	C
Hemorrhage (upper digestive tract)	C
Hyperglycemia-evoked dysrhythmias	C
Hyperlipidemia	C
Knee pain	C
Migraine	C
Motion sickness/sea sickness	C
Nausea and vomiting (postoperative)	C
Osteoarthritis	C
Rheumatoid arthritis	
Shortening labor	
Urinary disorders (post-stroke)	
Weight loss	

Level of Evidence Grade	Criteria
A (Strong Scientific Evidence)	Statistically significant evidence of benefit from >2 properly randomized trials (RCTs), OR evidence from one properly conducted RCT AND one properly conducted meta-analysis, OR evidence from multiple RCTs with a clear majority of the properly conducted trials showing statistically significant evidence of benefit AND with supporting evidence in basic science, animal studies, or theory.
B (Good Scientific Evidence)	Statistically significant evidence of benefit from 1-2 properly randomized trials, OR evidence of benefit from ≥1 properly conducted meta-analysis OR evidence of benefit from >1 cohort/case-control/non-randomized trials AND with supporting evidence in basic science, animal studies, or theory. *This grade applies to situations in which a well designed randomized controlled trial reports negative results but stands in contrast to the positive efficacy results of multiple other less well designed trials or a well designed meta-analysis, while awaiting confirmatory evidence from an additional well designed randomized controlled trial.*
C (Unclear or conflicting scientific evidence)	Evidence of benefit from ≥1 small RCT(s) without adequate size, power, statistical significance, or quality of design by objective criteria,* OR conflicting evidence from multiple RCTs without a clear majority of the properly conducted trials showing evidence of benefit or ineffectiveness, OR evidence of benefit from ≥1 cohort/case-control/non-randomized trials AND without supporting evidence in basic science, animal studies, or theory, OR evidence of efficacy only from basic science, animal studies, or theory.
D (Fair Negative Scientific Evidence)	Statistically significant negative evidence (i.e., lack of evidence of benefit) from cohort/case-control/non-randomized trials, AND evidence in basic science, animal

Nausea and related conditions

Levels of scientific evidence for specific therapies

Grade: A (Strong Scientific Evidence)	
Therapy	**Specific therapeutic Use(s)**
Acupressure, shiatsu, tuina	Nausea (of various etiologies)
Grade: B (Good Scientific Evidence)	
Therapy	**Specific therapeutic Use(s)**
Acupuncture	Nausea (chemotherapy-induced)
Acupuncture	Post-operative nausea / vomiting (adults)
Acustimulation	Motion sickness
Acustimulation	Nausea (postoperative)
Cayenne	Post-operative nausea / vomiting (plaster at acupoint)
Ginger	Hyperemesis gravidarum
Grade: C (Unclear or Conflicting Scientific Evidence)	
Therapy	**Specific therapeutic Use(s)**
Acupuncture	Nausea
Acupuncture	Nausea and vomiting of pregnancy
Acupuncture	Post-operative nausea / vomiting (pediatric)
Acustimulation	Nausea (chemotherapy-induced)
Acustimulation	Nausea and vomiting (electroconvulsive therapy-related)
Acustimulation	Nausea and vomiting during pregnancy
Aromatherapy	Nausea and vomiting (postoperative)
Ginger	Motion sickness/sea sickness
Ginger	Nausea and vomiting (postoperative)
Hypnotherapy, hypnosis	Nausea/vomiting
Music therapy	Nausea/vomiting
Peppermint	Post-operative nausea (inhalation)



Evidence-Based Nursing

- Surveys a wide range of international medical journals applying strict criteria for the quality and validity of research
- Practicing clinicians assess the clinical relevance of the best studies
- Key details of these essential studies are presented in a succinct, informative abstract with an expert commentary on its clinical application

Evidence-Based Nursing review

Quantitative study – other

The style of nursing leadership in hospitals is an independent risk factor for 30-day mortality of patients in acute care

Lisbeth Fagerström

Commentary on: **Cummings GG**, Midodzi WK, leadership styles to 30-day patient mortality.

Context

The focus of the study is on nursing leadership an association to patient mortality. Cummings and collea state in the introduction that the relationship bet nursing leadership styles in hospitals and patient comes has not been explored in many studies. The au discuss the influence of different nursing leadership s such as task- and relationship-focused, emotionally i ligent and transformational leadership styles.

Methods

The purpose of the study was to examine the contribu of hospital nursing leadership styles to 30-day mor after controlling for patient demographics, comorbi and hospital factors. Secondary data about nurses, pat and institutions from 90 hospitals collected from 19

leadership, patient factors and hospital nursing variables on mortality was estimated, including their independent effect after adjustment. Finally, the residual effect of leadership styles was assessed after controlling for all patients, hospital nursing and institutional factors.

Findings

After controlling for patient demographics, comorbidities and institutional and hospital characteristics, nursing leadership styles explained 5.1% of the 72.2% variance in mortality across the hospitals. High-resonant leadership (eg, a style that is visionary, coaching, affiliative and democratic) was significantly related to lower mortality.

Commentary

The strengths of the article are a well-structured literature review including the most important factors/issues associated with outcome variables in healthcare; it is a comprehensive empirical study based on large data material. The chosen variables of the tested model are generally described in a clear manner. To increase trustworthiness, some nursing predictor variables such as nursing time, skill mix and nurse education could have been described in greater detail. Furthermore, the principle used to include hospitals in the study is debatable; the criterion for inclusion was that at least five registered nurses had responded. Can so few responses give an accurate picture of leadership styles?

The study results are based on data that is more than 10 years old. Patient mortality has historically been used

Implications for practice

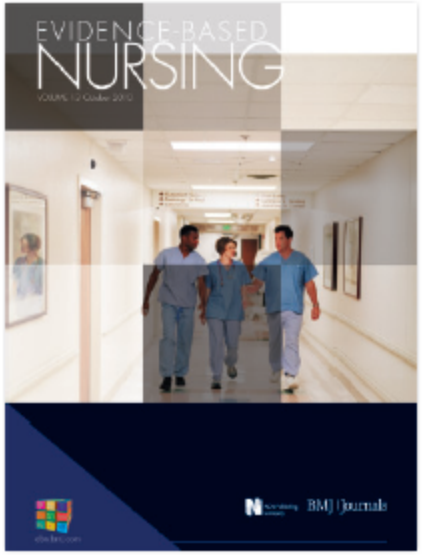
The study has shown that 'nursing leadership makes a difference' for staff as well as for patients. The results indicate that more focus on leadership and management in nursing education is needed at master's as well as doctoral levels. The most characteristic features of healthcare today may be the continuously changing environment and resulting organisational changes.[3] Especially during times of organisational change, the importance of clear objectives, vision, information, dialogue and leader support increases. Contextual changes to hospitals and the effect of situational leadership should be included in future research on leadership styles and outcomes. An organisation's culture is important and affects leadership style during change; the same applies to nurses' expectations of their nurse leaders. A person-centred nursing culture promotes the outcome of nursing to patients' benefit and also increases nurses' well-being and job satisfaction.

Competing interests None.

References

1. **Whitman GR**, Kim Y, Davidson LJ, *et al*. The impact of staffing on patient outcomes across specialty units. *J Nurs Adm* 2002;32:633–9.
2. **Fagerström L**, Rauhala A. Benchmarking in nursing care by the RAFAELA patient classification system – a possibility for nurse managers. *J Nurs Manag* 2007;15:683–92.
3. **Fagerström L**, Salmela S. Leading change: a challenge for leaders in Nordic health care. *J Nurs Manag* 2010;18:613–17.

Evidence-Based Nursing



Contents

October 2010 Vol 13 No 4

Additional Point of Care Evidence-Based Resources for Nursing

- Lippincott's Nursing Advisor $$ *lwwnursingsolutions.com/content/lippincott's-nursing-advisor*
- Lippincott's Nursing Procedures & Skills $$ *lwwnursingsolutions.com/content/lippincott's-nursing-procedures-and-skills*
- Mosby's Nursing Consult $$ *nursingconsult.com*
- Mosby's Nursing Skills $$ *mosbysnursingskills.com*
- UptoDate $$ *uptodate.com*

UpToDate

uptodate.com

- Concise comprehensive up-to-date reviews of clinical topics in multiple specialties
- Cost: individual **$$**495/year
- Ventilator Associated Pneumonia monographs:
  - Rx of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia in adults
  - Epidemiology, pathogenesis, microbiology, and diagnosis of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia in adults
  - Clinical presentation and dx of ventilator-associated pneumonia
  - Risk factors /prevention of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia in adults
  - The ventilator circuit and ventilator-associated pneumonia Infections in the ICU

Risk factors and prevention of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia in adults

Author
Thomas M File, Jr, MD

Section Editor
John G Bartlett, MD

Deputy Editor
Anna R Thorner, MD

Last literature review version 19.1: January 2011 | **This topic last updated:** February 9, 2011 **(More)**

INTRODUCTION — Hospital-acquired (or nosocomial) pneumonia (HAP), ventilator-associated pneumonia (VAP), and healthcare-associated pneumonia (HCAP) are important causes of morbidity and mortality despite improved antimicrobial therapy, supportive care, and prevention [1]. The risk factors and prevention of HAP, VAP, and HCAP will be reviewed here.

The clinical presentation, diagnosis, epidemiology, pathogenesis, microbiology, and treatment of HAP, VAP, and HCAP are discussed separately. (See "Clinical presentation and diagnosis of ventilator-associated pneumonia" and "Epidemiology, pathogenesis, microbiology, and diagnosis of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia in adults" and "Treatment of hospital-acquired, ventilator-associated, and healthcare-associated pneumonia in adults".)

DEFINITIONS

Pneumonia types — The 2005 ATS/IDSA guidelines distinguish the following types of pneumonia [2]:

- Hospital-acquired (or nosocomial) pneumonia (HAP) is pneumonia that occurs 48 hours or more after admission and did not appear to be incubating at the time of admission.
- Ventilator-associated pneumonia (VAP) is a type of HAP that develops more than 48 to 72 hours after endotracheal intubation.
- Healthcare-associated pneumonia (HCAP) is defined as pneumonia that occurs in a non-hospitalized patient with extensive healthcare contact, as defined by one or more of the following:

Essential Nursing Resources from ICIRN *icirn.org*

25th ed. 2009
26th ed. TBP 2011

ESSENTIAL Nursing Resources

EDITED BY JANET G. SCHNALL AND JUNE LEVY

for the Interagency Council on Information Resources in Nursing (ICIRN)

THE 25TH EDITION OF THE ICIRN *Essential Nursing Resources* list (formerly *Essential Nursing References*) is presented as a resource for locating nursing information and for collection development. The list includes print and electronic sources to support nursing practice, education, administration, and research activities. The most recent editions or websites are in
to pathways for exploration, rather than be an end point, and to expand to other formats beyond
this edition is Cultural Competencies. Databases and citations marked $ indicate availability via

This list was compiled from the contributions of the following representatives of the Interagency
Nursing (ICIRN) member agencies: Richard Barry, Leslie Block, Warren G. Hawkes, Suzanne He
Jacobs, June Levy, Susan Pierce, Diane Pravikoff, Juliette Ratner, Janet G. Schnall, and Annelle T
also be accessed at the ICIRN website, along with more information about ICIRN: www.icirn.org

DISCLAIMER: *All information contained on this list is intended for informational and educational purposes. Refe
but represent the opinions of the contributors only. All information was current at the time this list was published. Co*

META-SITES FOR NURSING INFORMATION

American Nurses Association's Nursing World Links to state nurses associations and allied nursing organizations globally. www.nursingworld.org

Canadian Nursing Index Comprehensive links to education, employment, and other resources focused on needs of Canadian nurses. www.nursingindex.com

INTUTE: Nursing, Midwifery, and Allied Health UK gateway to high quality biomedical resources. www.intute.ac.uk/healthandlifesciences/nursing/

National Institute of Nursing Research www.ninr.nih.gov/ninr/

National League for Nursing www.nln.org

Nursing and Allied Health Resources Section (NAHRS), Medical Library Association Section activities, newsletter, current research, nursing resources wiki. www.nahrs.mlanet.org

Nursing Theory Page University of San Diego Hahn School of Nursing and Health Sciences. www.sandiego.edu/academics/nursing/theory/

Nursing on the Net: Health Care Resources You Can Use Web sampler of resources for nurse professionals provided by the National Network of Libraries of Medicine (NNLM). www.nnlm.gov/training/nursing/sampler.html

NursingCenter Lippincott Williams & Wilkins. Includes CE articles in full text with immediate test results and certification; 50 nursing journals with table of contents and abstracts; databases of certification, licensure, and nursing organizations. www.nursingcenter.com

Online Journal of Issues in Nursing American Nurses Association. Example of free, peer-reviewed, international, online publication. www.nursingworld.org/ojin/

PDA/Mobile Devices Resources & Information Yale University School of Medicine. Guide to free and licensed PDA and mobile devices applications for health care. www.med.yale.edu/library/technology/PDA/

Sigma Theta Tau International/Honor Society of Nursing www.nursingsociety.org

ALERTING SERVICES/BLOGS/RSS FEEDS

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MDLinx Nursing HSS feeds for nur
www.mdlinx.com/Nurse/Live/feeds.c

Medscape Nurse Blogs, experts, a
other editions) and daily alerts on c
education, and news. www.medscap

NIH Clinical Alerts and Advisories
from NIH-funded clinical trials.
www.nlm.nih.gov/databases/alertsfe

US National Library of Medicine N
Webcasts. www.nlm.nih.gov/listser

FORUMS AND ELECTRONIC DISCUSS

CCNL Deals with critical care nur
http://health.groups.yahoo.com/gro

GLOBALRN Worldwide Internet c
bases. www.nursesweb.ucsf.edu/ww

NPInfo List for nurse practitioners.

NURSENET: A Global Forum for N
www.lsoft.com/scripts/wl.exe?SL1=

Nurse in Recovery List began for
health care professionals are welco

Nursing Discussion Forums Univer
www.nursing.buffalo.edu/mccarthy/

BIBLIOGRAPHIES/BOOK LIS

*In addition to sources listed below, i
publishers' catalogs, library catalogs including locatorplus.gov, CINAHL, and print
and online catalogs of professional nursing organizations.*

AJN Book of the Year Awards Annual. Annotated list as chosen by and published in January issue of *American Journal of Nursing*.

$$ Mosby's Nursing Skills Elsevier. Online skills references system featuring >830 interactive skills from five highly respected reference texts: Perry & Potter's *Clinical Nursing Skills & Techniques*, Proehl's *Emergency Nursing Procedures*, *AACN Procedure Manual for Critical Care*, *AACN Procedure Manual for Pediatric Acute and Critical Care*, Wong's *Nursing Care of Infants and Children*. www.mosbysnursingskills.com

$$ Nursing Reference Center EBSCO. Provides access to nearly 2,500 Evidence-Based Care Sheets and Quick Lessons plus patient education materials in English and Spanish, practice guidelines, drug information, legal cases, full-text reference books, research instrument records, free continuing education modules, and the latest medical news; separate subscription also accesses CINAHL databases. www.ebscoweb.com

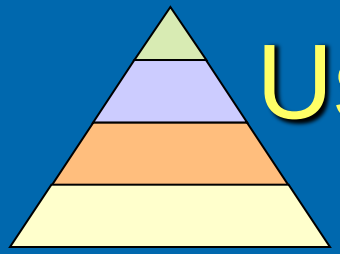
Meta-sites for Evidence-Based Nursing Practice

Numerous websites are devoted to evidence-based medicine and the overarching concept of evidence-based practice. These sites are a sampling of those focused on nursing and interdisciplinary EBP.

Academic Center for Evidence-Based Nursing (ACE) University of Texas Health Science Center at San Antonio. Includes model for ACE Star Model of Knowledge Transformation, which demonstrates diffusion of innovation from research to practice. www.acestar.uthscsa.edu/About.htm

Joanna Briggs Institute Site for Evidence-Based Nursing
www.joannabriggs.edu.au/about/eb_nursing.php

www.icirn.org/Homepage/Essential-Nursing-Resources.aspx



Use a Meta -Search Engines to find evidence sites

TRIP

tripdatabase.com

SUMSearch 2

sumsearch.org

TRIP Database

tripdatabase.com

- Metasearch engine
- Performs a simple search of more than 75 databases
- Finds evidence based resources
- Searches *Cochrane, National Guideline Clearinghouse, Bandolier*, etc.

Donate

trip database

catheter* urinary tract infections

Search Advanced Search History Search Tips

Order By: Date **Relevance**

SELECT ALL Choose Your Action

1. Urethral catheter or suprapubic aspiration to reduce contamination of urine samples in young children?
BestBETS 2009
Developing World? CPD/CME Preview ~~Conclusion~~ Related TILT

2. Washout policies in long-term indwelling urinary catheterisation in adults
Cochrane Database of Systematic Reviews 2010
Developing World? CPD/CME Preview ~~Conclusion~~ Related TILT

3. Urinary catheter policies for long-term bladder drainage
Cochrane Database of Systematic Reviews 2009
Developing World? CPD/CME Preview Conclusion Related TILT

4. Removal of Short-term Indwelling Urethral Catheters
Joanna Briggs Institute 2006
Developing World? CPD/CME ~~Preview~~ ~~Conclusion~~ Related TILT

5. Catheter care: RCN guidance for nurses
Royal College of Nursing 2008
Developing World? CPD/CME ~~Preview~~ ~~Conclusion~~ Related TILT

6. Short term urinary catheter policies following urogenital surgery in adults
Cochrane Database of Systematic Reviews 2006
Developing World? CPD/CME Preview Conclusion Related TILT

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USA	0
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Clinical Q...	0
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Extended primary research	2
eTextbooks	2
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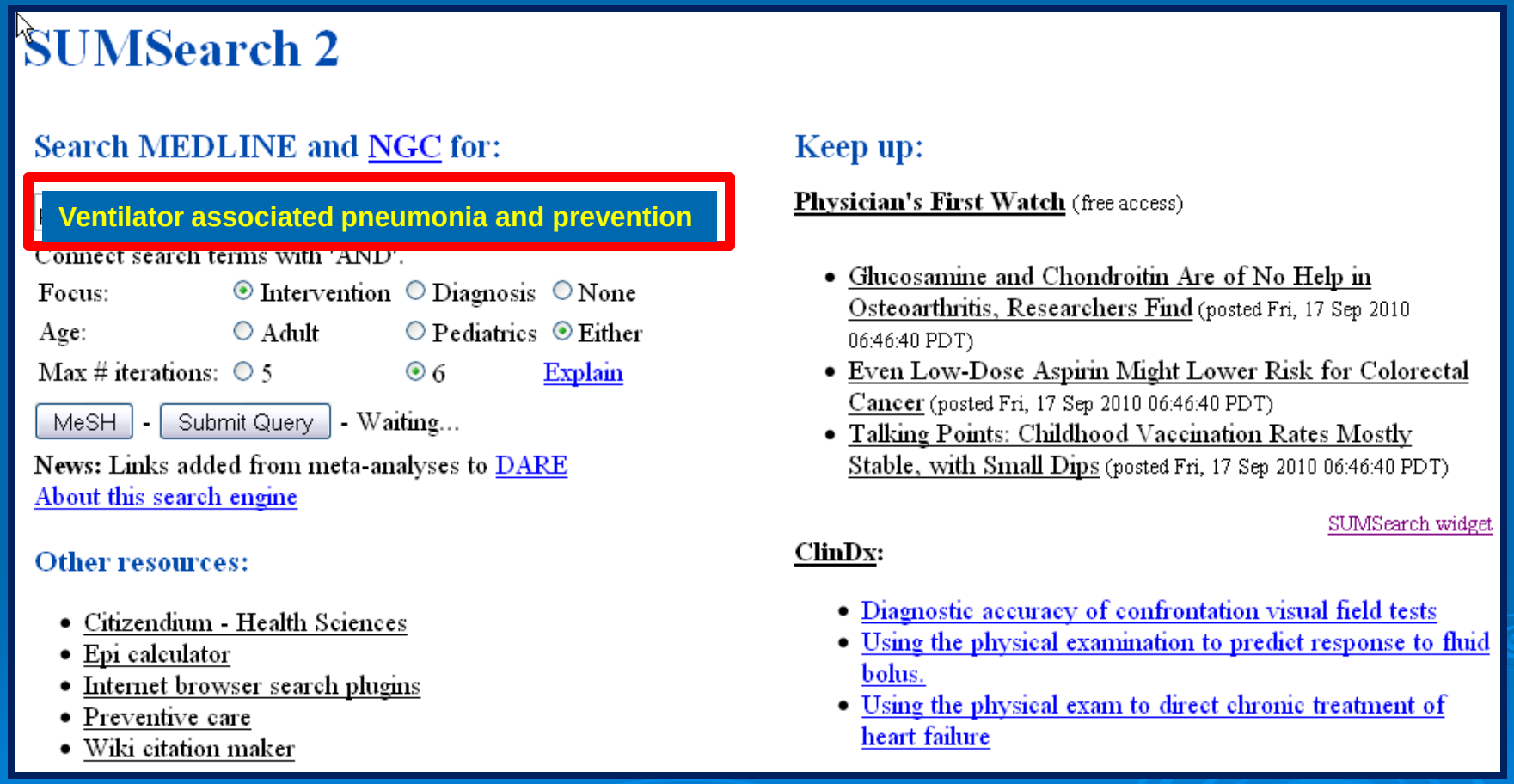
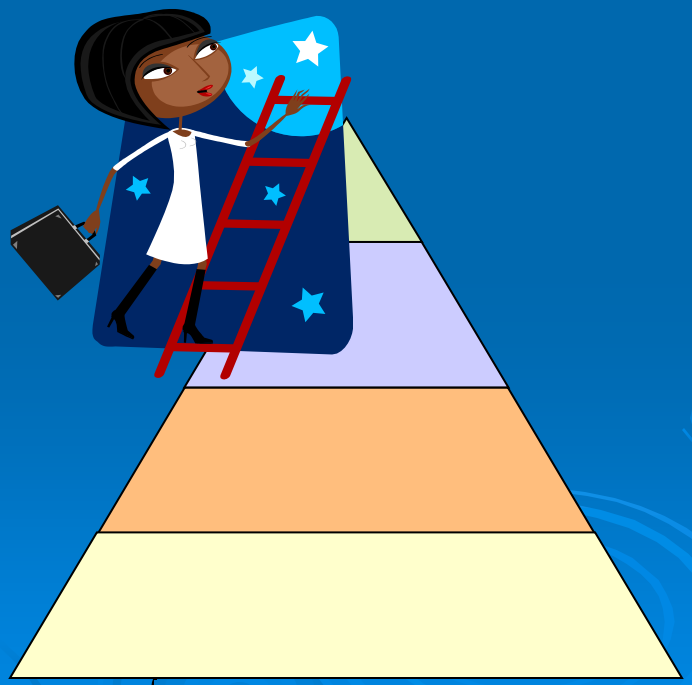


Search for Systematic Reviews and Meta-Analyses Resources

- Cochrane Database of Systematic Reviews
- PubMed Clinical Queries
- CINAHL



Systematic review vs Meta-analysis

- Systematic review:
  - a literature review of RCTs focused on a single question which tries to identify, appraise, select and synthesize all high quality research evidence relevant to that question.
  - Uses explicit methods to identify, select and critically evaluate relevant research.
- Meta-analysis:
  - a systematic review combining results of several studies using quantitative statistics.

Cochrane Database of Systematic Reviews

- Widely regarded as the "gold standard" of evidence-based information
- Extensive systematic reviews and complex synthesis
- Very focused, specific questions
- Includes full-text reviews and protocols
- Cochrane Abstracts indexed in *PubMed* and *CINAHL*

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antibiotics ventilator associated pneumonia

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Search Results

Show Results in:

Cochrane Reviews [4] | Other Reviews [1] | Clinical Trials [60] | Methods Studies [0] | Technology Assessments [0] | Economic Evaluations [1] | Cochrane Groups [0]

There are **4** results out of **6602 records** for: "**antibiotics ventilator associated pneumonia** in **Title, Abstract or Keywords** in **Cochrane Database of Systematic Reviews**"

Save Search

Edit Search

View: **1-4**

Export All Results

Record Information — Issue: Current | **All** — Restrict to: Reviews | Protocols — Sort by: Record Title | **Match %** | Date

1. Antibiotic prophylaxis to reduce respiratory tract infections and mortality in adults receiving intensive care
   Alessandro Liberati, Roberto D'Amico, Silvia Pifferi, Valter Torri, Luca Brazzi, Elena Parmelli
   September 2010
   Review

2. Quantitative versus qualitative cultures of respiratory secretions for clinical outcomes in patients with ventilator-associated pneumonia
   Danilo Cortozi Berton, Andre C Kalil, Manuela Cavalcanti, Paulo José Zimermann Teixeira
   October 2008
   Review

3. Surfactant for bacterial pneumonia in term and late preterm infants
   Kenneth Tan, Nai Ming Lai, Ajay Sharma
   October 2009
   Protocol

4. Antibiotics for ventilator-associated pneumonia
   Adrian G Selim, George Balalis, Balu Bhaskar, Mieke L van Driel
   September 2010
   Protocol

[Intervention Review]

Antibiotic prophylaxis to reduce respiratory tract infections and mortality in adults receiving intensive care

Alessandro Liberati[1], Roberto D'Amico[2], Silvia Pifferi[3], Valter Torri[4], Luca Brazzi[5], Elena Parmelli[6]

[1]Italian Cochrane Centre, Mario Negri Institute for Pharmacological Research, Milan, Italy. [2]Statistics Unit, Department of Oncology, Hematology and Respiratory Disease, University of Modena and Reggio Emilia, Modena, Italy. [3]Policlinico San Matteo, Pavia, Milano, Italy. [4]Laboratorio di Epidemiologia Clinica, Mario Negri Institute, Milano, Italy. [5]IRCCS - Istituto di Anestesia e Rianimazione, Ospedale Maggiore Policlinico, Milano, Italy. [6]Department of Oncology, Hematology and Respiratory Diseases, University of Modena and Reggio Emilia, Modena, Italy

Contact address: Alessan Milan, 20156, Italy. alesslib@mailbase.it.

Editorial group: Cochrane
Publication status and da
Review content assessed

Citation: Liberati A, D'An mortality in adults receiving intensive care. 022.pub3.

Authors' conclusions:

A combination of topical and systemic prophylactic antibiotics reduces RTIs and overall mortality in adult patients receiving intensive care. Treatment based on the use of topical prophylaxis alone reduces respiratory infections but not mortality. The risk of resistance occurring as a negative consequence of antibiotic use was appropriately explored only in one trial which did not show any such effect.

Next >

Abstract

Background

Pneumonia is an important cause of mortality in intensive care units (ICUs). The incidence of pneumonia in ICU patients ranges between 7% and 40%, and the crude mortality from ventilator-associated pneumonia may exceed 50%. Although not all deaths in

Finding Systematic Reviews and Meta-Analyses in *PubMed and CINAHL*

- In CINAHL:
  - Refine search to Publication Type:
    Systematic Review
  - Search for Meta Analysis as a Subject Heading

- In PubMed:
  - Select Systematic Reviews in Clinical Queries section
  - Limit to Meta-analysis as Type of Article

PubMed Clinical Queries

Strategy #2: Clinical Queries – Link on Advanced Search or Home page

Search (glucose control OR hyperglycemia) AND intensive care units

Results of searches on this page are limited to specific clinical research areas. For comprehensive searches,

Clinical Study Categories

Category: Therapy

Scope: Narrow

Results: 5 of 16

A comparison study of continuous insulin infusion protocols in the medical intensive care unit: computer-guided vs. standard column-based algorithms. [J Hosp Med. 2010]

Control of hyperglycaemia in paediatric intensive care (CHiP): study protocol. [BMC Pediatr. 2010]

[RCTs found in this column]

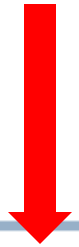
[Chest. 2010]

Key performance indicators in intensive care medicine. A retrospective matched cohort study. [J Int Med Res. 2009]

A prospective randomised multi-centre controlled trial on tight glucose control by intensive insulin therapy in adult intensive care units: the Glucontrol study. [Intensive Care Med. 2009]

See all (16)

Systematic Reviews



Results: 5 of 13

An overview of glycemic control in the coronary care unit with recommendations for clinical management. [J Diabetes Sci Technol. 2009]

Intensive care unit-acquired weakness: risk factors and prevention. [Crit Care Med. 2009]

Toward understanding tight glycemic control in the ICU: a systematic review and metaanalysis. [Chest. 2010]

Glucose control in the intensive care unit: a roller coaster ride or a swinging pendulum? [Ann Intern Med. 2009]

Clinical impact of early hyperglycemia during acute phase of traumatic brain injury. [Neurocrit Care. 2009]

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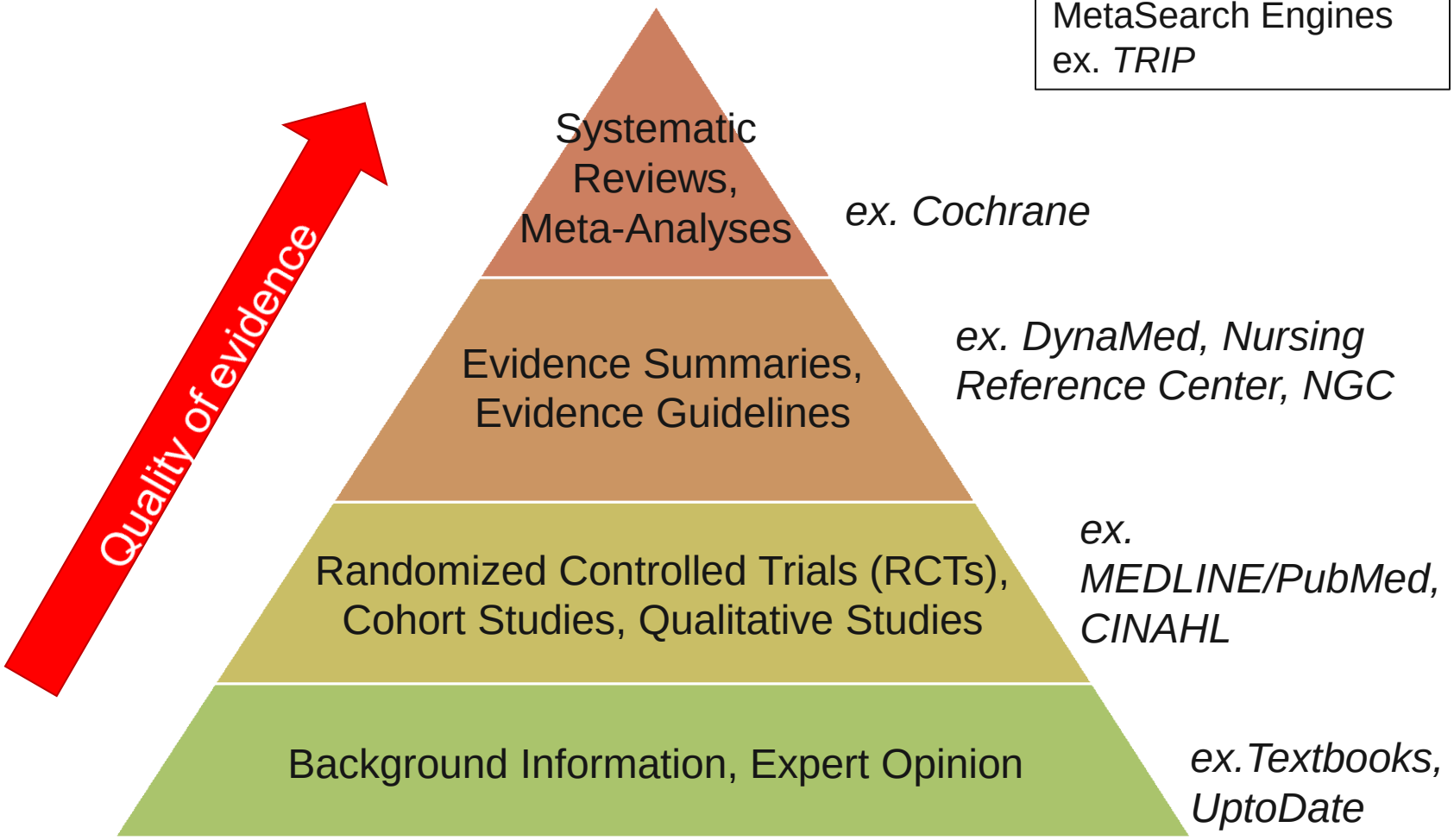
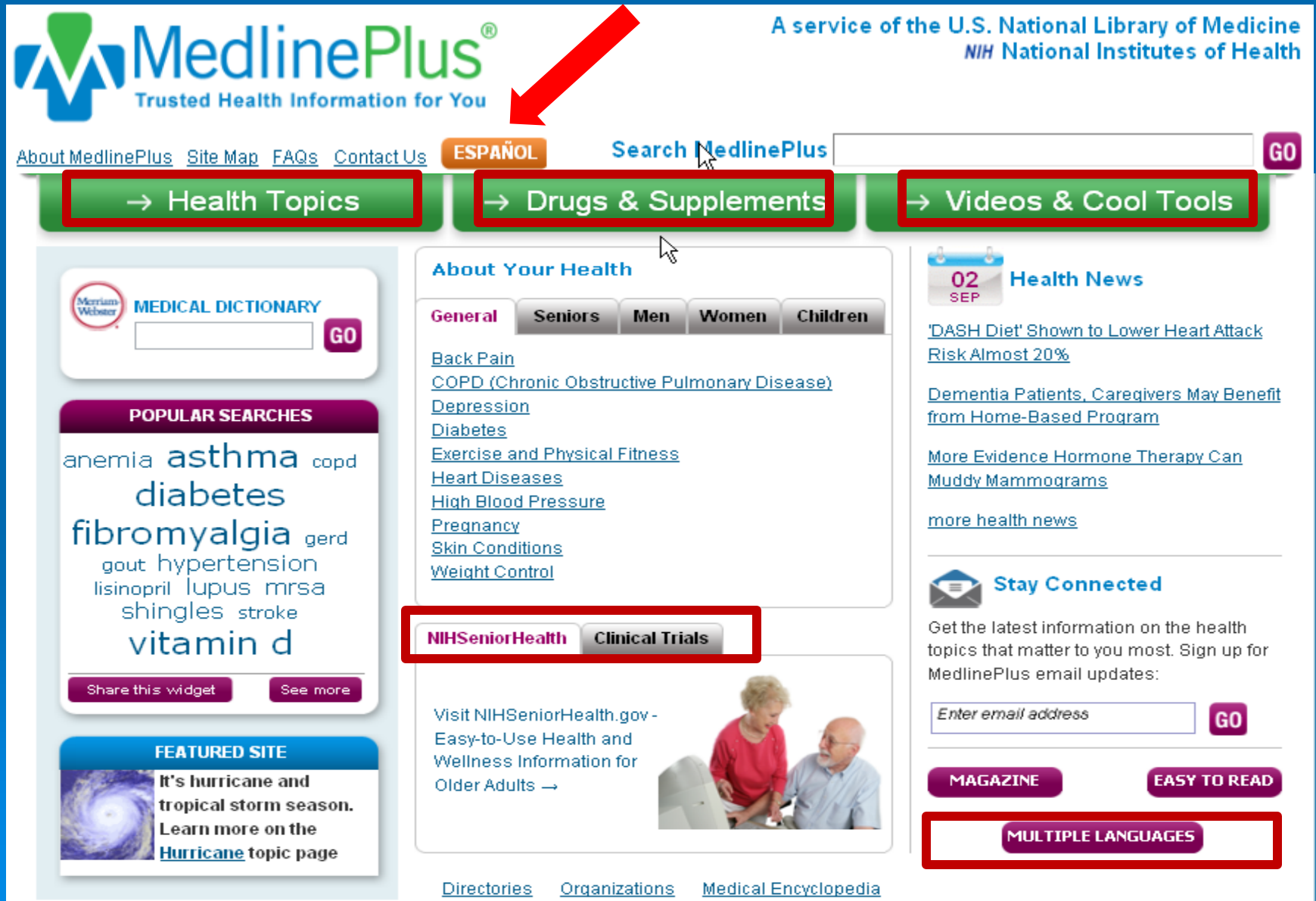
Searching for Evidence Pyramid



Additional Resources for Evidence on the Web

Patient Education: MedlinePlus

medlineplus.gov



Traumatic Brain Injury

Head injury, Head trauma, TBI

Every year, millions of people in the U.S. sustain head and brain injuries. More than half are bad enough that people must go to the hospital. The worst injuries can lead to permanent brain damage or death.

Half of all traumatic brain injuries (TBIs) are due to motor vehicle accidents. Military personnel are also at risk. Symptoms of a TBI may not appear until days or weeks following the injury. Serious traumatic brain injuries need emergency treatment.

Treatment and outcome depend on the injury. TBI can cause a wide range of changes affecting thinking, sensation, language, or emotions. TBI can be associated with post-traumatic stress disorder. People with severe injuries usually need rehabilitation.

Get Traumatic Brain Injury updates by email — Enter email address — GO — What's this?

Start Here

- Head Injuries: What to Watch for Afterward (American Academy of Family Physicians)
  Also available in Spanish
- Traumatic Brain Injury: Hope through Research *NIH* (National Institute of Neurological Disorders and Stroke)
  Also available in Spanish
- Traumatic Brain Injury *Interactive Tutorial* (Patient Education Institute)
  Also available in Spanish

Basics

- Overviews
- Latest News
- Diagnosis/Symptoms
- Treatment
- Prevention/Screening

Learn More

- Rehabilitation/Recovery
- Specific Conditions
- Related Issues

Multimedia & Cool Tools

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- Clinical Trials
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- Children
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MedlinePlus

MEDICAL ENCYCLOPEDIA

- Brain components
- Brain herniation
- Brain injury - discharge
- Cerebral hypoxia
- Chronic subdural hematoma
- CPK isoenzymes test
- Cranial CT scan
- CSF leak
- Daily bowel care program
- EEG

Related Topics

- Coma
- Concussion
- Brain and Nerves
- Injuries and Wounds

National Institutes of Health

The primary NIH organization for research on

Authoritative, Quality Links for Consumers

Overviews

- Living with Brain Injury (Brain Injury Association of America)
- Traumatic Brain Injury (Centers for Disease Control and Prevention)
- Traumatic Brain Injury ***NIH*** (National Institute of Neurological Disorders and Stroke) - Short Summary

Latest News

- Depression Common After Brain Injury (04/19/2011, HealthDay)
- Steroid May Help Cut Pneumonia Risk After Brain Trauma (03/22/2011, HealthDay)
- Learn TBI Signs, Symptoms and How to Respond (03/07/2011, Centers for Disease Control and Prevention)

Diagnosis/Symptoms

- CT -- Head (American College of Radiology, Radiological Society of North America)
  Also available in Spanish
- Diagnosing Brain Injury (Brain Injury Association of America)
- Functional MR Imaging (fMRI) -- Brain (American College of Radiology, Radiological Society of North America) - PDF
  Also available in Spanish

Treatment

- Brain Injury Treatment (Brain Injury Association of America)
- Head Trauma: First Aid (Mayo Foundation for Medical Education and Research)
- Neurosurgery - What Is It? ***Interactive Tutorial*** (Patient Education Institute)
  Also available in Spanish

Return to top

Prevention/Screening

- What Can I Do to Help Prevent Concussion and Other Forms of TBI? (Centers for Disease Control and Prevention)
  Also available in Spanish

Return to top

Rehabilitation/Recovery

- Cognitive Retraining (American Brain Tumor Association)
- Guide to Selecting and Monitoring Brain Injury Rehabilitation Services (Brain Injury Association of America) - PDF
- Traumatic Brain Injury (TBI), Effects and Intervention (American Occupational Therapy Association)

Interactive Tutorial

X-Plain PATIENT EDUCATION

MedlinePlus® Trusted Health Information for You

Traumatic Brain Injury

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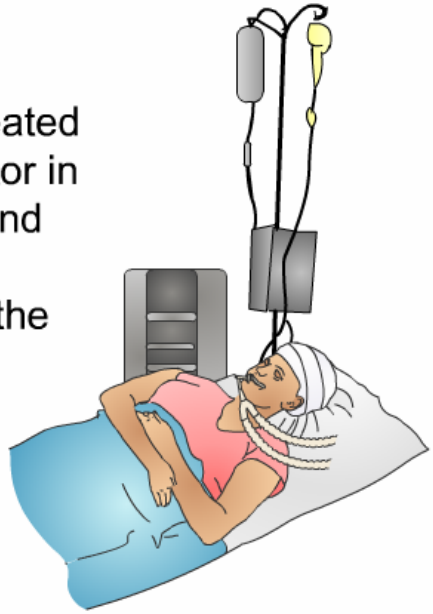
- Introduction
- Causes of TBI
- Effects of TBI
- Types of TBI
- Symptoms
- Complications
- Diagnosis
- Treatment
- Conclusion

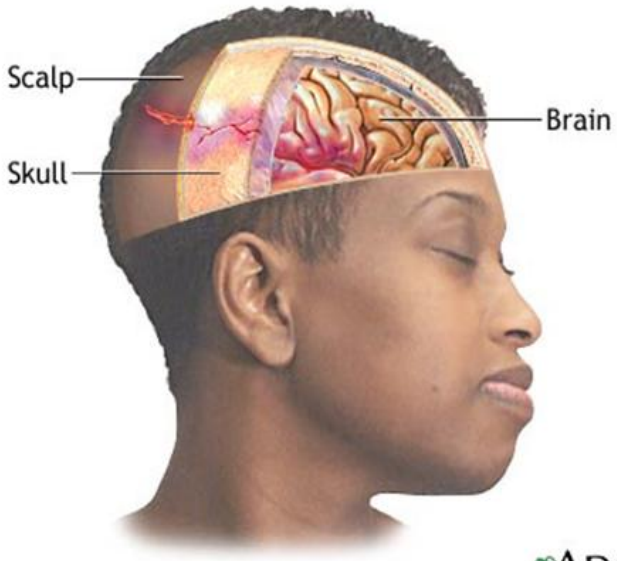
Severe TBI is sometimes treated with placement on a respirator in order to protect the airway and hyperventilate the patient. Hyperventilation decreases the pressure inside the skull.



Slide 70 of 86

Medical Encyclopedia

Head injury



Head injuries can range from a minor bump on the head to a devastating brain injury. Learning to recognize a serious head injury, and implementing basic first aid, can make the difference in saving someone's life. Common causes of head injury include traffic accidents, falls, physical assault, and accidents at home, work, outdoors, or while playing sports.

Step 3 for EBN Practice: Critically Appraise the Evidence

- Determine the level of evidence
- Use a critical appraisal guide

Levels and Grades of Evidence

Levels of Evidence and Grades of Recommendations

Grade of recommendation	Level of evidence	Interventions
A	1a	Systematic review of randomized controlled trials
	1b	Individual randomized controlled trial
B	2a	Systematic review of cohort studies
	2b	Individual cohort study
	3a	Systematic review of case-control studies
	3b	Individual case-control study
C	4	Case series
D	5	Expert opinion without explicit critical appraisal or based on physiology or bench research

REPROLINE, Johns Hopkins University *www.reproline.jhu.edu*

AACN Evidence Leveling System

Level A: meta-analyses with consistent evidence

Level B: well-designed, controlled studies with consistent evidence

Level C: qualitative studies, descriptive studies, integrative review, systematic reviews, or RCTs with inconsistent results.

Level D: peer-reviewed professional organization standards with supporting clinical studies

Level E: case reports, professional organization standards, etc., without supporting clinical studies

Level M: manufacturer's recommendations

Appraising the Evidence

- Given my clinical question, what is the appropriate study design?
- Is this study (or review) valid?
- Are the results significant (important)?
- Are the patients in those studies similar to mine?
- Is the treatment setting similar to mine?

Therapy: Critical Appraisal Sheet

1a. R- Was the assignment of patients to treatments randomised?	
What is best?	Where do I find the information?
Centralised computer randomisation is ideal and often used in multi-centred trials. Smaller trials may use an *independent* person (e.g. the hospital pharmacy) to "police" the randomization.	The ***Methods*** should tell you how patients were allocated to groups and whether or not randomisation was concealed.
This paper: Yes ☐ No ☐ Unclear ☐ Comment:	
1b. R- Were the groups similar at the start of the trial?	
What is best?	Where do I find the information?
If the randomisation process worked (that is, achieved comparable groups) the groups should be similar. The more similar the groups the better it is. There should be some indication of whether differences between groups are statistically significant (ie. p values).	The ***Results*** should have a table of "Baseline Characteristics" comparing the randomized groups on a number of variables that could affect the outcome (ie. age, risk factors etc). If not, there may be a description of group similarity in the first paragraphs of the ***Results*** section.
This paper: Yes ☐ No ☐ Unclear ☐ Comment:	
2a. A – Aside from the allocated treatment, were groups treated equally?	
What is best?	Where do I find the information?
Apart from the intervention the patients in the different groups should be treated the same, eg. additional treatments or tests.	Look in the ***Methods*** section for the follow-up schedule, and permitted additional treatments, etc and in ***Results*** for actual use.
This paper: Yes ☐ No ☐ Unclear ☐ Comment:	
2b. A – Were all patients who entered the trial accounted for? – and were they analysed in the groups to which they were randomised?	
What is best?	Where do I find the information?
Losses to follow-up should be minimal – preferably less than 20%. However, if few patients have the outcome of interest, then even small losses to follow-up can bias the results. Patients should also be analysed in the groups to which they were randomised – '*intention-to-treat analysis*'.	The ***Results*** section should say how many patients were randomised (eg. Baseline Characteristics table) and how many patients were actually included in the analysis. You will need to read the results section to clarify the number and reason for losses to follow-up.
This paper: Yes ☐ No ☐ Unclear ☐ Comment:	
3. M - Were measures objective or were the patients and clinicians kept "blind" to which treatment was being received?	
What is best?	Where do I find the information?
It is ideal if the study is 'double-blinded' – that is, both patients and investigators are unaware of treatment allocation. If the outcome is *objective* (eg. death) then blinding is less critical. If the outcome is *subjective* (eg. symptoms or function) then blinding of the outcome assessor is critical.	First, look in the ***Methods*** section to see if there is some mention of masking of treatments, eg. placebos with the same appearance or sham therapy. Second, the ***Methods*** section should describe how the outcome was assessed and whether the assessor/s were aware of the patients' treatment.

Translate Research into Practice

- Step 4: Apply the findings to your clinical practice along with your clinical expertise and patient's values and preferences

- Step 5: Evaluate the outcomes of your practice decisions or changes based on evidence

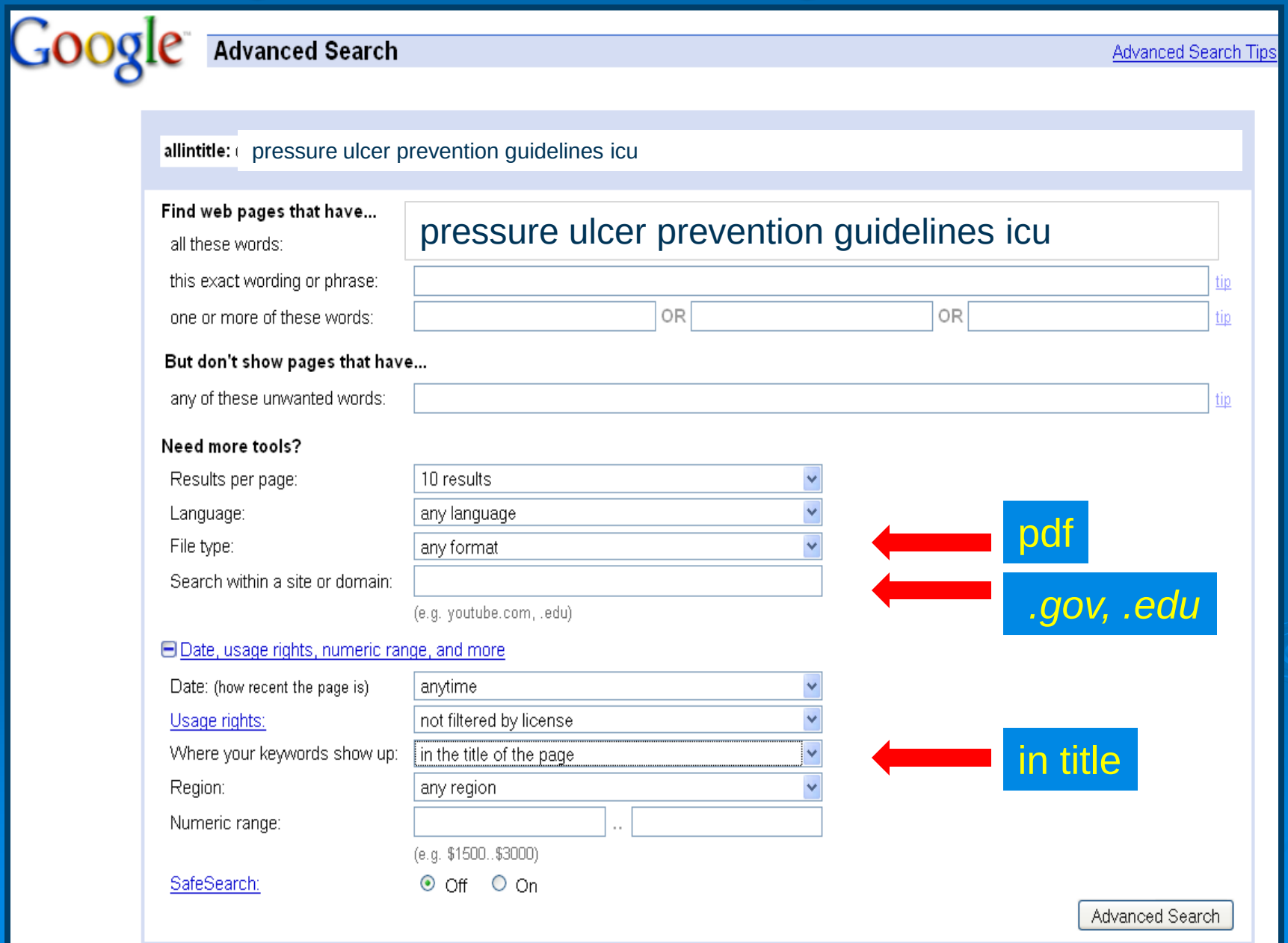
Navigating the Web Beyond Basic Google to Find Evidence

- Google Advanced Search

  google.com/advanced_search?hl=en

- Google Scholar *scholar.google.com*

Searching Advanced Google for Guidelines



pressure ulcer guidelines icu site:.org

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Preventing **pressure ulcers**: a systematic review - Reddy - Cited by 226

... air suspension bed in the prevention of **pressure ulcers** - Inman - Cited by 114

... **pressure** air mattress for the prevention of **pressure** ... - Vanderwee - Cited by 39

Intensive Care Nurses' Knowledge of Pressure Ulcers: Development ...

by C Tweed - 2008 - Cited by 10 - Related articles

Jul 1, 2008 ... The **ICU** nursing staff had a high level of knowledge of **pressure ulcers** before any ... **Pressure Ulcer** Prevention and Treatment **Guidelines**. ...

ajcc.aacnjournals.org/content/17/4/338.full

[PDF]

Pressure ulcers in the intensive care unit: The 'forgotten' enemy

File Format: PDF/Adobe Acrobat - Quick View

by EF Reilly - 2007 - Cited by 3 - Related articles

Data on the epidemiology of **pressure ulcers** in the **ICU** demonstrate the magnitude of ..... ulcers are preventable. Three general **guidelines** for PU prevention ...

www.opus12.org/uploads/O12-SCI-V01-N02-P17.pdf - Similar

Are Pressure Ulcers Really a 'Never Event'? | The American College ...

Mar 5, 2011 ... SAN DIEGO – The development of hospital-acquired **pressure ulcers** may be ... "The evidence-based **guidelines** include the acronym SKIN, ... of **pressure ulcers** in the **ICU** (odds ratios of 4.55 and 2.17, respectively). ...

www.chestnet.org/accp/.../are-**pressure-ulcers**-really-'never-event' - Cached

Reducing the Incidence of Pressure Ulcer Development in the ICU

by D Antle - 2001 - Cited by 1 - Related articles

age number of **pressure ulcers** reported in the total **ICU** popu- ..... **Pressure Ulcers Guideline** Panel. Treatment of **pressure ulcers**. ...

www.jstor.org/stable/3522394 - Similar

[PDF] The Complex ICU Patient: Treating the "sickest of the sick."

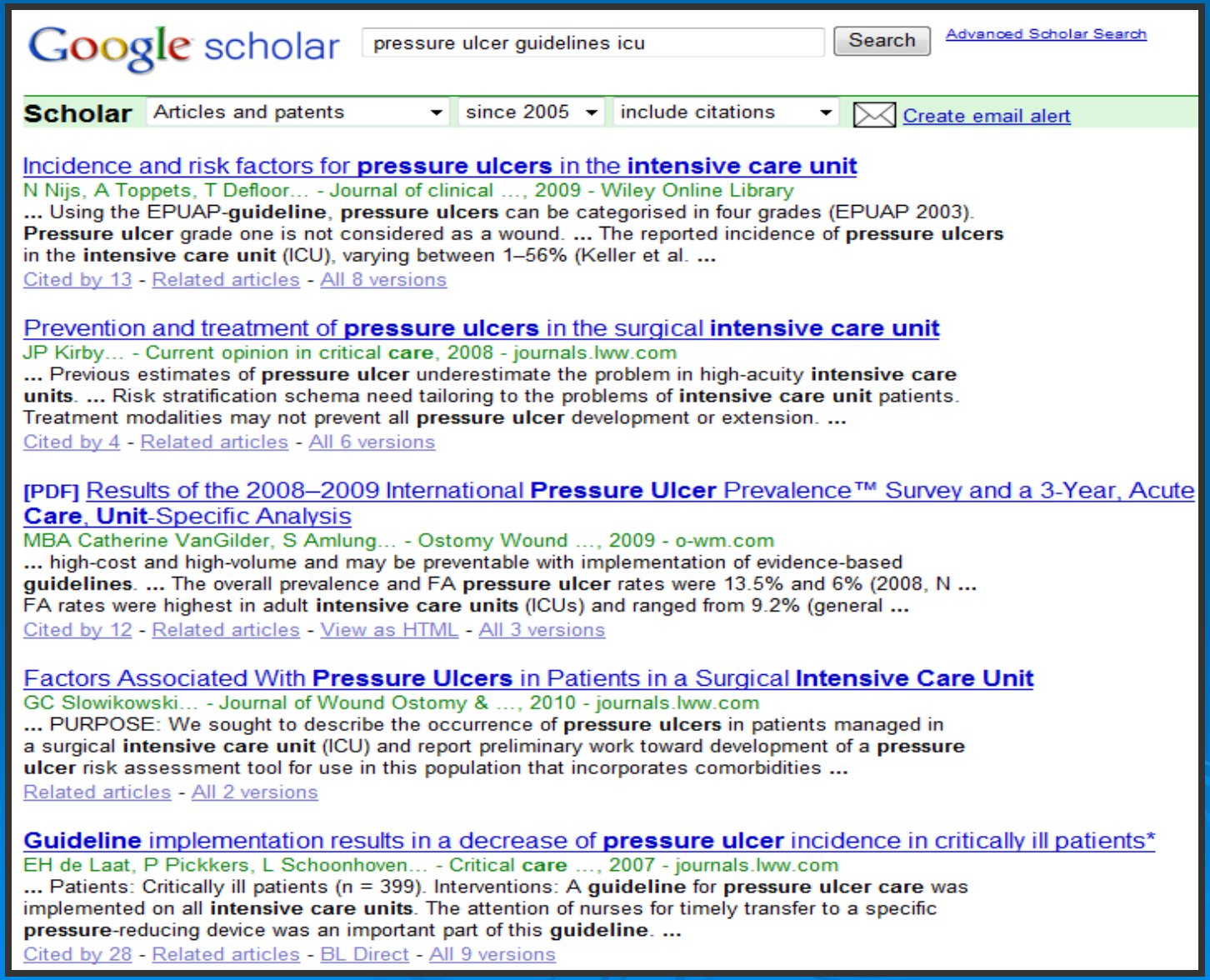
File Format: PDF/Adobe Acrobat - View as HTML

Google Scholar

scholar.google.com

- Searches for scholarly literature, including peer-reviewed papers, theses, books, abstracts and technical reports
- Finds articles from academic publishers, professional societies, universities, etc. as well as scholarly articles on the web
- "Cited by" link identifies # that have cited the original
- Access to full text only available with subscription
- **Caution:** Not a reliable sole source for searching scholarly literature

Google Scholar



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Incidence and risk factors for **pressure ulcers** in the **intensive care unit**
N Nijs, A Toppets, T Defloor... - Journal of clinical ..., 2009 - Wiley Online Library
... Using the EPUAP-**guideline**, **pressure ulcers** can be categorised in four grades (EPUAP 2003). **Pressure ulcer** grade one is not considered as a wound. ... The reported incidence of **pressure ulcers** in the **intensive care unit** (ICU), varying between 1–56% (Keller et al. ...
Cited by 13 - Related articles - All 8 versions

Prevention and treatment of **pressure ulcers** in the surgical **intensive care unit**
JP Kirby... - Current opinion in critical **care**, 2008 - journals.lww.com
... Previous estimates of **pressure ulcer** underestimate the problem in high-acuity **intensive care units**. ... Risk stratification schema need tailoring to the problems of **intensive care unit** patients. Treatment modalities may not prevent all **pressure ulcer** development or extension. ...
Cited by 4 - Related articles - All 6 versions

[PDF] Results of the 2008–2009 International **Pressure Ulcer** Prevalence™ Survey and a 3-Year, Acute **Care**, **Unit**-Specific Analysis
MBA Catherine VanGilder, S Amlung... - Ostomy Wound ..., 2009 - o-wm.com
... high-cost and high-volume and may be preventable with implementation of evidence-based **guidelines**. ... The overall prevalence and FA **pressure ulcer** rates were 13.5% and 6% (2008, N ... FA rates were highest in adult **intensive care units** (ICUs) and ranged from 9.2% (general ...
Cited by 12 - Related articles - View as HTML - All 3 versions

Factors Associated With **Pressure Ulcers** in Patients in a Surgical **Intensive Care Unit**
GC Slowikowski... - Journal of Wound Ostomy & ..., 2010 - journals.lww.com
... PURPOSE: We sought to describe the occurrence of **pressure ulcers** in patients managed in a surgical **intensive care unit** (ICU) and report preliminary work toward development of a **pressure ulcer** risk assessment tool for use in this population that incorporates comorbidities ...
Related articles - All 2 versions

Guideline implementation results in a decrease of **pressure ulcer** incidence in critically ill patients*
EH de Laat, P Pickkers, L Schoonhoven... - Critical **care** ..., 2007 - journals.lww.com
... Patients: Critically ill patients (n = 399). Interventions: A **guideline** for **pressure ulcer care** was implemented on all **intensive care units**. The attention of nurses for timely transfer to a specific **pressure**-reducing device was an important part of this **guideline**. ...
Cited by 28 - Related articles - BL Direct - All 9 versions

Must Evaluate Web Resources: Evaluation Strategies

- Evaluate using **Criteria for Evaluating Web Resources**
- Determine the type of site by analyzing **Web Site Addresses**
- A User's Guide to Finding and Evaluating Health Information on the Web
  www.mlanet.org/resources/userguide.html

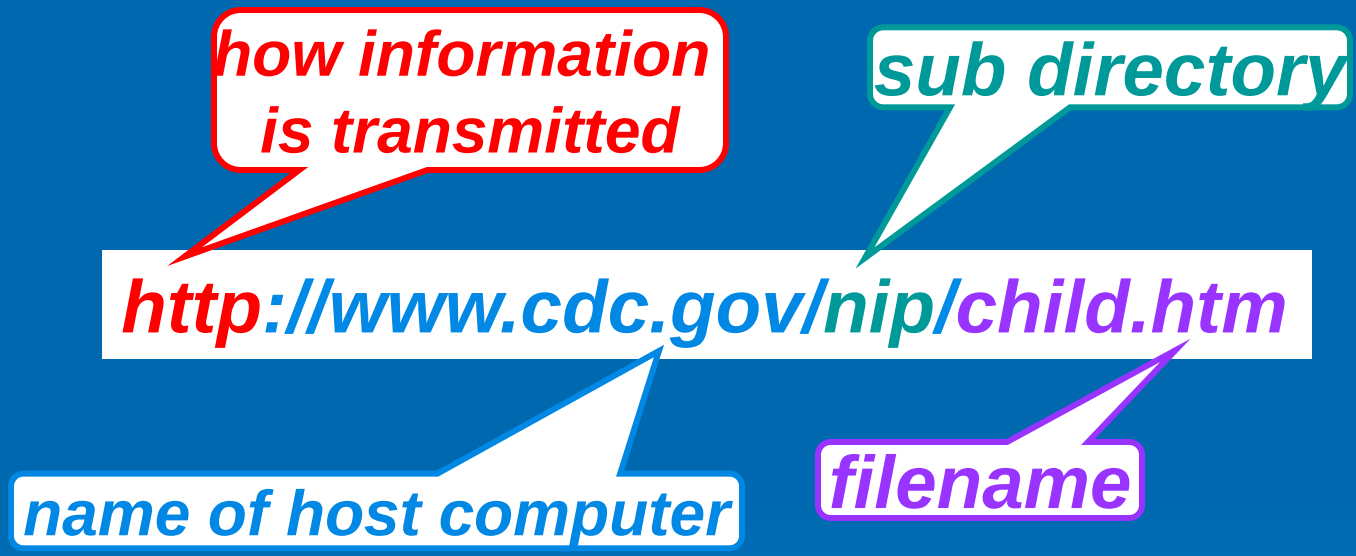
Criteria for Evaluating Web Sites

healthlinks.washington.edu/howto/navigating/criteria.pdf

- Authority
- Accuracy
- Objectivity
- Currency
- Coverage

Analyze the Website Address

- edu
- org
- com
- gov
- net



The URL (Uniform Resource Locator) includes the name of the host computer which can indicate the purpose of the web site.

Information Overload!

- 2 million articles published in biomedical journals each year
- considering everything of potential biomedical importance would require perusing about 6,000 articles per day…
- If you only read 2 articles a day, at the end of year you would be 60 centuries behind.

Lundberg GD. Perspective from the editor of JAMA, The Journal of the American Medical Association. *Bull Med Libr Assoc.* 1992 Apr;80(2):110-4.

What are Email Alert Services?

- Deliver current citations into your email
- Based on a search strategy you create
- In most cases, abstracts of the articles are provided
- May provide links to *PubMed, CINAHL* and full-text articles

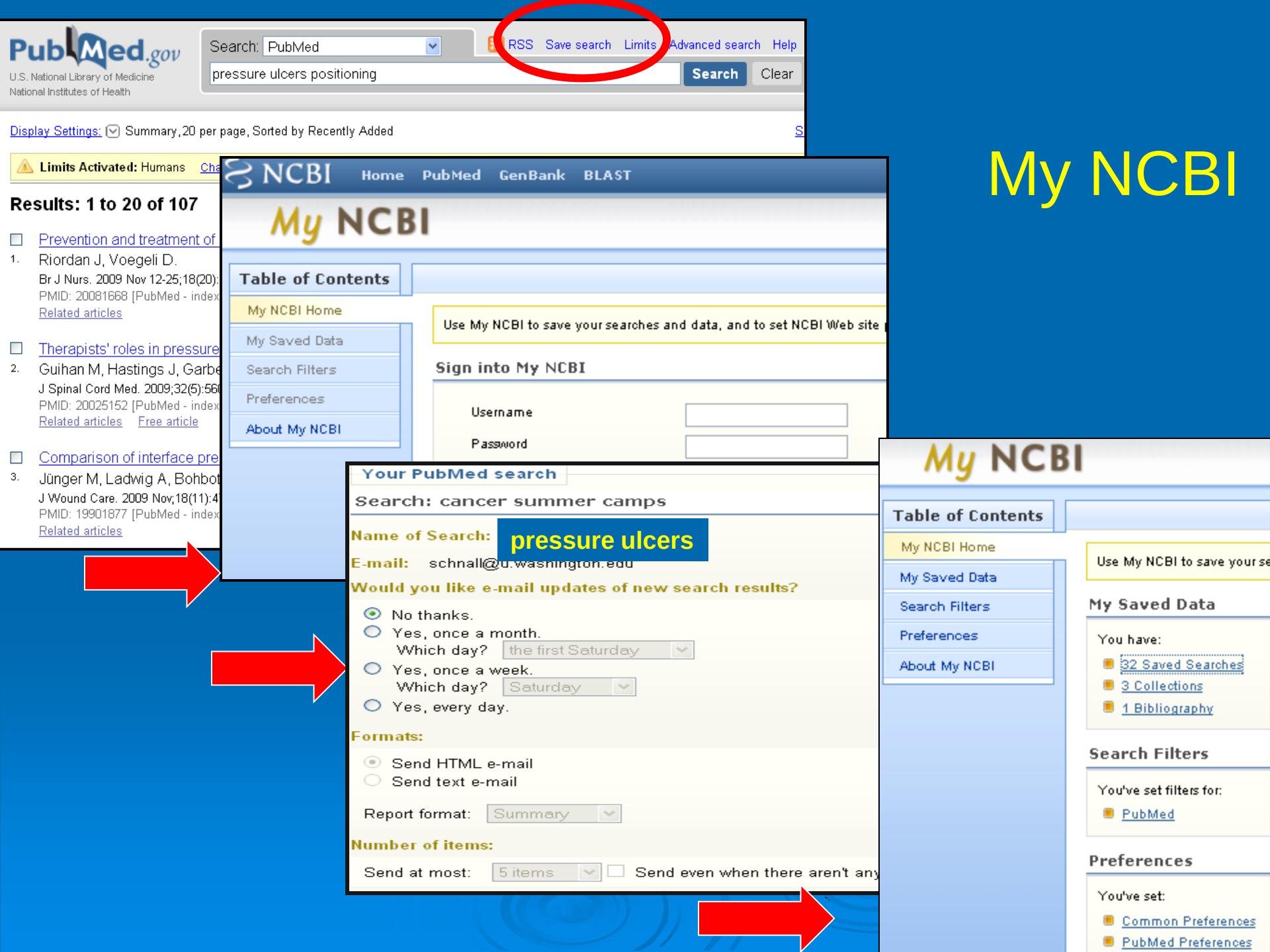
PubMed: My NCBI

- Your personal space on the NLM computer system for:
  - storing search strategies used to generate updates
  - storing references
  - creating email alerts (recent PubMed citations sent automatically to your email
- Free registration

Alerting Services

healthlinks.washington.edu/howto/alerts.html

Alert Service	Database Coverage	RSS
My NCBI	PubMed	yes
Alerts (EBSCO)	MEDLINE CINAHL	yes


PubMed.gov
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Prevention and treatment of
1. Riordan J, Voegeli D.
Br J Nurs. 2009 Nov 12-25;18(20):
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J Spinal Cord Med. 2009;32(5):56
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3. Jünger M, Ladwig A, Bohbot
J Wound Care. 2009 Nov;18(11):4
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Search: cancer summer camps
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E-mail: schnall@u.washington.edu
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Yes, every day.
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Send text e-mail
Report format: Summary
Number of items:
Send at most: 5 items
Send even when there aren't any
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3 Collections
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Common Preferences
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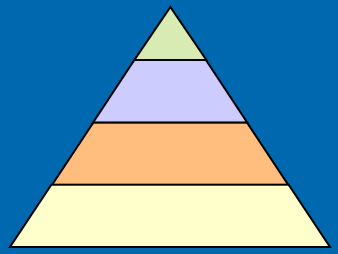
Final Thoughts

- Use  to decide where to look on web for answers to your clinical questions
- Remember key evidence e-resources to improve patient care, for example:
  - PubMed and CINAHL
  - DynaMed and Nursing Reference Center
  - Cochrane and more…
- Incorporate evidence into your clinical practice, along with your clinical expertise and pt's perspectives
- Contact the ultimate search engine… **your librarian!**



Resources

schnall@uw.edu

- PowerPoint located:

  healthlinks.washington.edu/hsl/liaisons/schnall/AACN2011.pptx

- List of e-Resources discussed:

  healthlinks.washington.edu/hsl/liaisons/schnall/AACN2011.docx

- Essential Nursing Resources (ICIRN)

  www.icirn.org/Homepage/Essential-Nursing-Resources/Essential-Nursing-Resources.aspx

- Evidence-Based Practice, Step by Step
  - 9 article series/overview of EBP for nurses in *AJN*
  - Available full-text FREE

  journals.lww.com/ajnonline/pages/collectiondetails.aspx?TopicalCollectionId=10