

How Relevant Are the Systematic Reviews in the Cochrane Library to Emergency Medical Practice?

From the Department of Emergency Medicine, New York Presbyterian Hospital, New York, NY*; Department of Medicine, Weill Medical College, Cornell University, New York, NY†; Emergency Services, Columbia University College of Physicians and Surgeons, New York, NY‡; the Department of Emergency Medicine, Spectrum Health and Michigan State University, Grand Rapids, MI§; the Department of Emergency Medicine, Indiana University School of Medicine, Indianapolis, IN¶; and the Division of Emergency Medicine# and the Department of Public Health Sciences,** University of Alberta, Edmonton, Alberta, Canada.

Author contributions are provided at the end of this article.

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Address for correspondence:
Stephen D. Emond, MD, Emergency Department, Kaiser Permanente Santa Clara Medical Center, 900 Kiely Boulevard, Santa Clara, CA 95051; 408-236-5942; E-mail steve.emond@kp.org.

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Stephen D. Emond, MD**
Peter C. Wyer, MD*§
Michael D. Brown, MD¶
William H. Cordell, MD¶
Carol H. Spooner, BScN, MSc#
Brian H. Rowe, MD, MSc***

Study objectives: The Cochrane Database of Systematic Reviews (CDSR), one of the databases in the Cochrane Library, is a compilation of regularly updated systematic reviews with meta-analytic summary statistics. We conducted a study of the CDSR to evaluate the relevance of this database to emergency medical practice.

Methods: Using criteria that were determined a priori, 2 reviewers independently screened the titles of 795 completed reviews from the April 2000 CDSR for possible relevance to emergency medicine practice. Five reviewers independently ranked summaries of these reviews for degree of relevance. Agreement was measured using κ statistics. Disagreements were resolved by consensus or adjudication.

Results: Screening of 795 completed reviews identified 136 (17%) as "possibly" and 151 (19%) as "likely" relevant (simple agreement, 74%; $\kappa=0.82$). Further independent assessment indicated 95 (12%) of the 151 "likely" systematic reviews were directly relevant to emergency medicine practice, whereas 44 (6%) were indirectly relevant (simple agreement, 77%; $\kappa=0.45$). Cochrane Review Groups producing the most emergency medicine-relevant systematic reviews included acute respiratory infections (14 [10%]), injuries (14 [10%]), pregnancy and childbirth (13 [10%]), stroke (12 [10%]), and airways (11 [8%]). In contrast, only 1 (0.1%) of the reviews produced by the Heart Review Group was considered directly relevant to emergency medicine practice.

Conclusion: More than one third of CDSR reviews have some relevance, and 12% are directly relevant, to emergency medical practice or discharge planning. Although certain conditions are well covered, other key emergency medicine areas are not. Emergency physicians should consider the Cochrane Library an important evidence-based resource for emergency medicine therapeutic interventions and should examine ways of increasing the number of reviews relevant to emergency medicine.

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INTRODUCTION

Advances in biomedical knowledge continue to expand the information available to guide clinicians in the care of patients. To effectively translate this evidence into practice, a clinician needs to access relevant data, determine its validity, and then decide whether it applies to a given patient. These tasks are particularly challenging in the emergency setting, where the scope of practice crosses numerous medical disciplines and the pace of decision-making can be frenetic.

In this context, traditional resources such as textbooks and MEDLINE searches are of limited value in identifying the best evidence to guide clinical practice. However, the promise of evidence-based medicine resources is to provide the busy clinician with rapidly accessible synthesized information using valid and reliable approaches. The Cochrane Library, a compendium of databases and related instructional tools, has been promoted as just such a reference.¹

The Cochrane Library is composed of several databases, including the Cochrane Controlled Trials Register (CCTR), the database of Abstracts of Reviews of Effectives (DARE), and the Cochrane Database of Systematic Reviews (CDSR). The CDSR database is a compilation of regularly updated systematic reviews with meta-analytic summary statistics. Collaborative review groups representing various medical topic areas (eg, airways, musculoskeletal, heart, epilepsy) contribute content to the CDSR.

The CDSR consists of protocols and completed reviews. Protocols describe the objectives of systematic reviews that are in the process of being completed. Completed reviews include the full text and usually present summary statistics. The protocols and completed reviews are produced using rigorous methodological standards and undergo peer review before publication. Regular updates are required to capture new evidence and address criticisms and/or identified errors.

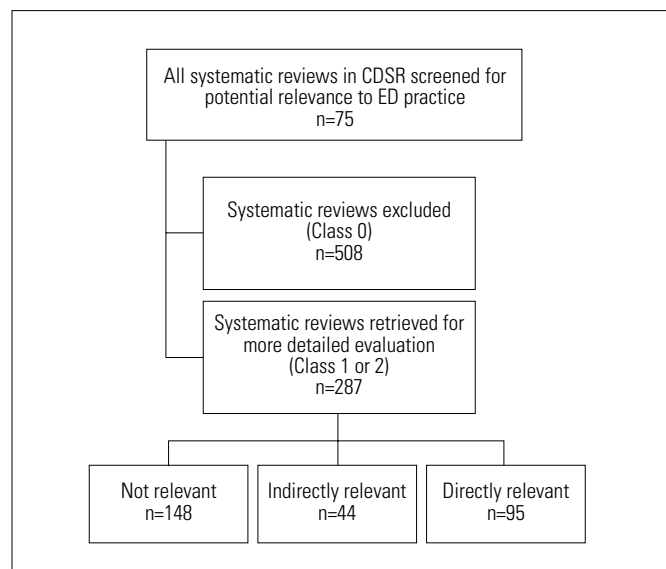
Although the CDSR database contains rigorously produced systematic reviews, the relevance of these reviews to emergency medicine practice has not been previously evaluated. We therefore conducted a study to assess the relevance of the CDSR database reviews to emergency medicine practice.

MATERIALS AND METHODS

The study methodology is summarized in Figure 1. For the purposes of this study, we defined “relevant” as “important or essential to emergency medicine patient care or disposition.” Using criteria that were determined a priori, 2 reviewers (SDE, BHR) independently screened the titles of the 795 completed reviews listed in the April 2000, Issue 2, CDSR to identify potentially relevant reviews for further study. Titles were scored using a 3-category scale (Figure 2). Disagreement was resolved by consensus. Interrater agreement was measured by using simple agreement and κ weighted statistics.

Reviews rated as “clearly and directly related to emergency medicine” and “can’t tell” were evaluated further. Three reviewers (PCW, MDB, WHC) independently examined the structured abstracts of the “selected” reviews and scored their relevance to emergency medicine practice using a second 3-category scale: “not relevant,” “indirectly relevant,” (ie, may be important to emergency medicine patients, but not directly used in emergency department or discharge planning) or “directly relevant” (important to emergency medicine patients, care in the ED, or discharge care). Disagreement was resolved by consensus. To assess the interrater agreement, 25% of reviews were examined by 2 different reviewers (BHR,

Figure 1.
Study methodology.



SDE). Interrater agreement was measured by using simple agreement and κ weighted statistics.

The institutional review board at New York Presbyterian Hospital/Weill Cornell Center ruled that this structured survey was exempt from review.

RESULTS

Screening of the 795 completed reviews in the CDSR database identified 136 (17%) as “potentially” relevant and 151 (19%) as “likely” relevant (simple agreement, 74%; $\kappa=0.82$). Independent scoring of the 151 “likely” relevant reviews indicated that 95 (12%) were “directly” relevant to emergency medical practice and 44 (6%) were “indirectly” relevant to emergency medical practice (simple agreement, 77%; $\kappa=0.45$). The remaining reviews were deemed “not relevant” to emergency medical practice.

The majority of completed reviews in the CDSR database rated as “relevant” to emergency medical practice were produced by 5 Cochrane Reviews Groups (CRGs) (Figure 3). These included 14 (10%) completed reviews by the acute respiratory infections CRG, 14 (10%) by the injuries CRG, 13 (10%) by the pregnancy and childbirth CRG, 12 (10%) by the stroke CRG, and 11 (8%) by the airways CRG. For the completed reviews rated as “indirectly relevant,” 16 (11%) were produced by the stroke

CRG and 7 (5%) by the pregnancy and childbirth CRG. Only 1 of the completed reviews produced by the heart CRG was rated as “directly relevant” to emergency medical practice.

DISCUSSION

The Cochrane Library is produced by the Cochrane Collaboration, an international, multidisciplinary, volunteer network of health care professionals, consumers, researchers, and policymakers and published quarterly by Update Software Ltd. (Oxford, England).^{1,2} The goal of the Collaboration is to produce, maintain, and disseminate evidence on therapy. In general, the Cochrane Collaboration uses groupings known as “fields” and “networks” to define dimensions of health care other than health problems. These include the setting of care (eg, primary care), the type of consumer (eg, older people), the type of provider (eg, nurses), and the type of intervention (eg, physical therapies).

Persons working in the fields/networks hand search specialty journals and help ensure that priorities and perspectives in their field of interest are reflected in the work of collaborative review groups. They also compile specialist databases of reviews, coordinate activities with relevant agencies outside the Cochrane Collaboration, and comment on systematic reviews relating to their particular area. Cochrane fields include child health, complementary medicine, health care of older people, health promotion and public health, nursing, pharmaceuticals, primary health care, rehabilitation, and vaccines. Given its comprehensive goals, this effort has been described as “the Human Genome Project of randomized, controlled trials.”³

The Cochrane Library consists of several databases, 3 of which may be useful to the emergency physician. The CCTR is an extensive bibliographic database of controlled trials that has been identified through structured searches of electronic databases, and hand searching by CRGs. Currently, it contains more than 300,000 references (Cochrane Library, version 3, 2001) and can function as a primary literature searching approach with therapeutic topics. DARE consists of critically appraised structured abstracts of non-Cochrane published reviews that meet standards set by the Centre for Reviews and Dissemination at the University of York, England. The last, and possibly most important, resource is the CDSR, which was the focus of this study.

The methodology used to produce these Cochrane Library databases is strict. Independent review of studies for possible inclusion is emphasized to minimize selec-

Figure 2.
Screening classification.

<p>Class 0: Clearly unrelated to ED practice Examples: Methotrexate as a steroid-sparing agent for chronic asthma in adults. Routine versus selective antifungal administration for control of fungal infections in patients with cancer. Electroconvulsive therapy for schizophrenia.</p> <p>Class 1: Can't tell (The review may possibly be related to emergency medical care, but the title is ambiguous regarding acute disease treatments) Examples: Short-term low-dose corticosteroids versus placebo and nonsteroidal anti-inflammatory drugs in rheumatoid arthritis. Vaccines for preventing influenza in people with asthma. Organized inpatient (stroke unit) care for acute stroke.</p> <p>Class 2: Clearly and directly related to ED practice (The review summarizes data on a topic with day-to-day relevance to the practice of emergency medicine [acute care of the ill or injured]) Examples: Magnesium use in acute asthma. Antibiotics for acute otitis media in children. Anticoagulants for acute ischemic stroke.</p>

Figure 3.

Reviews rated as relevant to emergency medicine (grouped by CRG).

<p>Acute respiratory infections (14 of 25 completed reviews)</p> <p>Amantadine and rimantadine for preventing and treating influenza A in adults</p> <p>Antibiotics for acute bronchitis</p> <p>Antibiotics for acute maxillary sinusitis</p> <p>Antibiotics for acute otitis media in children</p> <p>Antibiotics for sore throat</p> <p>Antibiotics for the common cold</p> <p>Bronchodilators for bronchiolitis</p> <p>Chest radiograph in acute respiratory infections in children</p> <p>Glucocorticoids for croup</p> <p>Homeopathic oscillococinum for preventing and treating influenza and influenza-like syndromes</p> <p>Nasal decongestants for the common cold</p> <p>Neuraminidase inhibitors for preventing and treating influenza in healthy adults</p> <p>Ribavirin for respiratory syncytial virus infection of the lower respiratory tract</p> <p>Short course antibiotics for acute otitis media</p> <p>Airways (11 of 45 completed reviews)</p> <p>Anticholinergic drugs for wheeze in children <2 years old</p> <p>Combined inhaled anticholinergic agents and β_2-agonists for initial treatment of acute asthma in children</p> <p>Corticosteroids for acute exacerbations of chronic obstructive pulmonary disease</p> <p>Corticosteroids for acute severe asthma in hospitalized patients</p> <p>Corticosteroids for preventing relapse after acute exacerbations of asthma</p> <p>Doxapram for ventilatory failure resulting from exacerbations of chronic obstructive pulmonary disease</p> <p>Early ED treatment of acute asthma with systemic corticosteroids.</p> <p>Holding chambers versus nebulizers for β-agonist treatment of acute asthma</p> <p>Inhaled β-agonists for asthma in mechanically ventilated patients</p> <p>Magnesium sulfate for treating exacerbations of acute asthma in the ED</p> <p>Manual therapy for asthma</p> <p>Anesthesia (0 of 0 completed reviews)</p> <p>Back (4 of 12 completed reviews)</p> <p>Acupuncture for low back pain</p> <p>Bed rest for acute low back pain and sciatica</p> <p>Exercise therapy for low back pain</p> <p>Nonsteroidal anti-inflammatory drugs for low back pain</p> <p>Breast cancer (0 of 1 completed reviews)</p> <p>Colorectal cancer (0 of 2 completed reviews)</p> <p>Consumers and communication (0 of 2 completed reviews)</p> <p>Cystic fibrosis and genetic disorders (0 of 17 completed reviews)</p> <p>Dementia and cognitive impairment (0 of 20 completed reviews)</p> <p>Depression, anxiety, and neurosis (1 of 9 completed reviews)</p> <p>Brief psychological interventions ("debriefing") for trauma-related symptoms and the prevention of posttraumatic stress disorder</p> <p>Developmental, psychosocial, and learning problems group (0 of 5 completed reviews)</p> <p>Drugs and alcohol (0 of 3 completed reviews)</p> <p>Ear, nose, and throat disorders (0 of 3 completed reviews)</p> <p>Effective practice and organization of care group (0 of 15 completed reviews)</p> <p>Epilepsy (0 of 4 completed reviews)</p>	<p>Eyes and vision (1 of 8 completed reviews)</p> <p>Antibiotics for acute bacterial conjunctivitis</p> <p>Fertility regulation (1 of 6 completed reviews)</p> <p>Interventions for emergency contraception</p> <p>Gynecological cancer (0 of 13 completed reviews)</p> <p>Heart (1 of 3 completed reviews)</p> <p>Primary angioplasty versus intravenous thrombolysis for acute myocardial infarction</p> <p>Hepatobiliary (1 of 4 completed reviews)</p> <p>Somatostatin or octreotide for acute bleeding esophageal varices</p> <p>HIV/AIDS (0 of 3 completed reviews)</p> <p>Hypertension (0 of 2 completed reviews)</p> <p>Incontinence (0 of 12 completed reviews)</p> <p>Infectious diseases (7 of 38 completed reviews)</p> <p>Antibiotics for treating salmonella gut infections</p> <p>Drugs for treating giardiasis</p> <p>Interventions for preventing reactions to snake antivenom</p> <p>Interventions for treating head lice</p> <p>Interventions for treating scabies</p> <p>Interventions for treating trichomoniasis in women</p> <p>Rice-based oral rehydration solution for treating diarrhea</p> <p>Inflammatory bowel disease (0 of 7 completed reviews)</p> <p>Injuries (14 of 19 completed reviews)</p> <p>Anti-epileptic drugs for preventing seizures after acute traumatic brain injury</p> <p>Barbiturates for acute traumatic brain injury</p> <p>Calcium channel blockers for acute traumatic brain injury</p> <p>Colloid solutions for fluid resuscitation</p> <p>Colloids versus crystalloids for fluid resuscitation in critically ill patients</p> <p>Corticosteroids for acute traumatic brain injury</p> <p>Helmets for preventing head and facial injuries in bicyclists</p> <p>Human albumin solution for resuscitation and volume expansion in critically ill patients</p> <p>Hyperbaric oxygen for carbon monoxide poisoning</p> <p>Hyperventilation therapy for acute traumatic brain injury</p> <p>Mannitol for acute traumatic brain injury</p> <p>Medical anti-shock trousers (pneumatic anti-shock garments) for circulatory support in patients with trauma</p> <p>Pharmacologic interventions for acute spinal cord injury</p> <p>Therapeutic hypothermia for head injury</p> <p>Lung cancer (0 of 2 completed reviews)</p> <p>Menstrual disorders and subfertility (2 of 44 completed reviews)</p> <p>Interventions for tubal ectopic pregnancy</p> <p>Nonsteroidal anti-inflammatory drugs for heavy menstrual bleeding</p> <p>Metabolic and endocrine disorders (0 of 4 completed reviews)</p> <p>Movement disorders (0 of 4 completed reviews)</p> <p>Multiple sclerosis (0 of 0 completed reviews)</p> <p>Musculoskeletal (1 of 30 completed reviews)</p> <p>Interventions for shoulder pain</p> <p>Musculoskeletal injuries group (0 of 23 completed reviews)</p> <p>Neuromuscular disease (0 of 4 completed reviews)</p> <p>Neonatal group (1 of 87 completed reviews)</p> <p>Nasal versus oral intubation for mechanical ventilation of newborn infants</p> <p>Oral health (0 of 2 completed reviews)</p> <p>Pain, palliative care, and supportive care (2 of 7 completed reviews)</p> <p>Anticonvulsant drugs for acute and chronic pain</p> <p>Single-dose oral aspirin for acute pain</p>	<p>Peripheral vascular diseases (1 of 11 completed reviews)</p> <p>Fixed-dose subcutaneous low molecular weight heparins versus adjusted-dose unfractionated heparin for venous thromboembolism</p> <p>Pregnancy and childbirth (13 of 159 completed reviews)</p> <p>Antibiotic regimens for endometritis after delivery</p> <p>Antibiotics for asymptomatic bacteriuria in pregnancy</p> <p>Drugs for rapid treatment of very high blood pressure during pregnancy</p> <p>Duration of treatment for asymptomatic bacteriuria during pregnancy</p> <p>Interventions for nausea and vomiting in early pregnancy</p> <p>Interventions for treating bacterial vaginosis in pregnancy</p> <p>Interventions for treating constipation in pregnancy</p> <p>Interventions for treating genital chlamydia trachomatis infection in pregnancy</p> <p>Interventions for treating gonorrhoea in pregnancy</p> <p>Interventions for trichomoniasis in pregnancy</p> <p>Magnesium sulfate versus diazepam for eclampsia</p> <p>Magnesium sulfate versus phenytoin for eclampsia</p> <p>Topical treatment for vaginal candidiasis in pregnancy</p> <p>Prostatic diseases and urologic cancers (0 of 6 completed reviews)</p> <p>Renal (1 of 4 completed reviews)</p> <p>Cranberries for treating urinary tract infections</p> <p>Schizophrenia (2 of 48 completed reviews)</p> <p>Crisis intervention for people with severe mental illnesses</p> <p>Seclusion and restraint for people with serious mental illnesses</p> <p>Sexually transmitted diseases (0 of 0 completed reviews)</p> <p>Skin (2 of 6 completed reviews)</p> <p>Surgical treatments for ingrown toenails</p> <p>Topical treatments for fungal infections of the skin and nails of the foot</p> <p>Stroke (12 of 43 completed reviews)</p> <p>Anticoagulants for acute ischemic stroke</p> <p>Anticoagulants for preventing recurrence after ischemic stroke or transient ischemic attack</p> <p>Antifibrinolytic therapy for aneurysmal subarachnoid hemorrhage</p> <p>Antiplatelet therapy for acute ischemic stroke</p> <p>Calcium antagonists for acute ischemic stroke</p> <p>Calcium antagonists for aneurysmal subarachnoid hemorrhage</p> <p>Corticosteroids for acute ischemic stroke</p> <p>Interventions for deliberately altering blood pressure in acute stroke</p> <p>Surgery for primary supratentorial intracerebral hemorrhage</p> <p>Thienopyridine derivatives (ticlopidine, clopidogrel) versus aspirin for preventing stroke and other serious vascular events in high vascular risk patients</p> <p>Thrombolysis (different doses, routes of administration and agents) for acute ischemic stroke</p> <p>Thrombolysis for acute ischemic stroke</p> <p>Tobacco addiction (0 of 18 completed reviews)</p> <p>Upper gastrointestinal and pancreatic diseases (3 of 5 completed reviews)</p> <p>Initial management strategies for dyspepsia</p> <p>Pharmacologic interventions for nonulcer dyspepsia</p> <p>Short-term treatment with proton pump inhibitors, H_2-receptor antagonists and prokinetics for gastroesophageal reflux disease-like symptoms and endoscopy-negative reflux disease</p> <p>Wounds (0 of 7 completed reviews)</p>
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tion bias. Comprehensive searches of published, unpublished, and foreign language literature are employed to limit publication bias. Quality grading (to enable sensitivity analysis) and standardized statistical methodology (to ensure uniformity) are also used. These procedures are in place to help ensure validity and produce unbiased reviews offering the highest level of evidence on which to base clinical decisions.

Despite anticipation that the CDSR would be useful in primary care, emergency medicine, pediatrics, and internal medicine, acceptance has been less than expected. Initially, this was understandable because of the small number of completed reviews. However, there has been a rapid proliferation of reviews in the Cochrane Library databases. The initial issue contained less than 100, compared with the most recent (July 2001; Issue 3), which contains 1,147 completed reviews and 915 protocols. (Our study evaluated the April 2000, Issue 2, which contained 795 completed reviews.)

The lack of acceptance may also be a result of the limitations inherent to the Cochrane Collaboration and the Cochrane Library databases. First, the Cochrane Collaboration's approach limits its scope. It only summarizes questions regarding therapy, not diagnosis. Current controversy regarding evidence-based medicine has focused on relevance and applicability of the limited "high level" evidence that exists.⁴⁻⁹ Second, as a product of a young, evolving organization, the CDSR's development is still relatively limited. Cochrane Review Groups are still being established, and a review takes up to 3 years from the registering of a title and publishing a protocol to completion. Because the Cochrane Collaboration leaves decisions on topics to be reviewed to the CRG member interests and funding opportunities, gaps remain in the medical domains covered. Third, there are few emergency physicians actively involved in driving the review process. And fourth, there are sometimes few randomized trials available that involve very common therapeutic interventions in the ED setting, making systematic reviews in these topics less definitive.

In addition, widespread "point-of-care" access to the Cochrane Library and other evidence-based medicine resources have been difficult to provide, making it a challenge to formally test how emergency physicians, in training and in practice, use an evidence-based approach to access and incorporate new clinical information. This exercise is an essential component of the "model curriculum" for emergency medicine that is currently in development.¹⁰

Another possible explanation for any continued lack of acceptance may be the perceived lack of relevant reviews

in a given practice domain. Our survey of the April 2000 issue of the Cochrane Library demonstrated that the CDSR contains 95 completed reviews directly relevant to emergency medical practice. These reviews are produced following rigorous methodology and are the most comprehensive summaries of evidence available. Nevertheless, given the wide scope of practice in emergency medicine, 95 is far from comprehensive coverage.

Despite these limitations, our study suggests that one of the Cochrane Library databases does provide systematic reviews relevant to emergency medical practice. More than one third of April 2000 CDSR completed reviews had some relevance to practice or discharge planning. Certain topics central to emergency medical care, including stroke, injuries, and respiratory conditions, were well represented. However, completed reviews in other areas such as cardiology and wound care were sparse.

The results of our study are subject to some limitations. First, the methodology to classify the reviews has not been validated. Differences in notion of "essential" vary among practitioners, sites, regions, and countries. For example, whereas interrater agreement was excellent for the screening step, it was only modest for final classification. Although in cases of disagreement final classification was determined by consensus, ongoing bias (eg, academic bias) may have affected review selection. Future studies should evaluate the utility of Cochrane systematic reviews to emergency physicians who practice exclusively in the nonteaching and/or community settings. Furthermore, because we reviewed only the 151 "likely" relevant summaries, we may have missed relevant reviews in the "possibly relevant" category.

Since our study was conducted, the CDSR has continued to evolve and expand. One hundred fifty new reviews have been added, including at least 4 new relevant reviews produced by the Airways Cochrane Review Group alone. Summaries of Cochrane reviews have been made more readily available for point-of-care use through MEDLINE to those with online access at <http://www4.ncbi.nlm.nih.gov/pubmed/>, as well as through an online searchable list of abstracts at the Cochrane Collaboration Web site at <http://www.update-software.com/abstracts/titlelist.htm>.

In summary, more than one third of April 2000 CDSR completed reviews had some relevance to practice or discharge planning. Reviews relevant to emergency medicine in cardiology and wound care are sparse. Increased emergency physician involvement in the Cochrane Collaboration would help to increase the number of reviews conducted on questions relevant to emergency medicine and would enhance the value of this evidence-

based medicine resource in patient care and health care provider education.

Author contributions: SDE and BHR conceived and designed the study, managed the data, and provided quality control. SDE, PCW, MDB, WHC, and BHR reviewed abstracted data. BHR and CHS provided statistical advice on study design and analyzed the data. SDE drafted the manuscript, and all authors contributed substantially to its revision. SDE assumes responsibility for the paper as a whole.

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