

Flodgren, G, Rojas-Reyes, M, Cole, N and Foxcroft, D

Effectiveness of organisational infrastructures to promote evidence-based nursing practice.

Flodgren, G, Rojas-Reyes, M, Cole, N and Foxcroft, D (2012) Effectiveness of organisational infrastructures to promote evidence-based nursing practice. *Cochrane Database of Systematic Reviews*, 2 (CD002212).

Doi: 10.1002/14651858.CD002212.pub2

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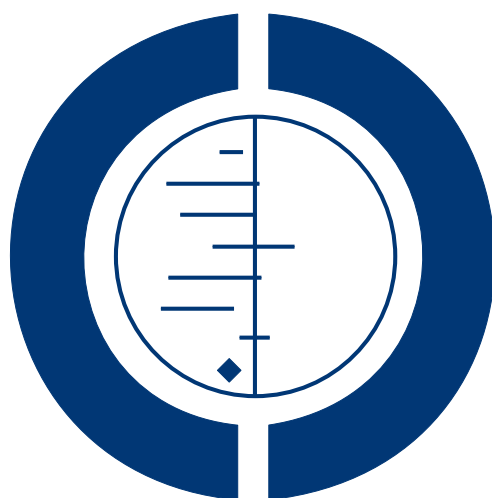
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[Intervention Review]

Effectiveness of organisational infrastructures to promote evidence-based nursing practice

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Editorial group: Cochrane Effective Practice and Organisation of Care Group.

Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 2, 2012.

Review content assessed as up-to-date: 7 March 2011.

Citation: Flodgren G, Rojas-Reyes MX, Cole N, Foxcroft DR. Effectiveness of organisational infrastructures to promote evidence-based nursing practice. *Cochrane Database of Systematic Reviews* 2012, Issue 2. Art. No.: CD002212. DOI: 10.1002/14651858.CD002212.pub2.

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ABSTRACT

Background

Nurses and midwives form the bulk of the clinical health workforce and play a central role in all health service delivery. There is potential to improve health care quality if nurses routinely use the best available evidence in their clinical practice. Since many of the factors perceived by nurses as barriers to the implementation of evidence-based practice (EBP) lie at the organisational level, it is of interest to devise and assess the effectiveness of organisational infrastructures designed to promote EBP among nurses.

Objectives

To assess the effectiveness of organisational infrastructures in promoting evidence-based nursing.

Search methods

We searched the Cochrane Effective Practice and Organisation of Care (EPOC) Group Specialised Register, the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, CINAHL, LILACS, BIREME, IBECs, NHS Economic Evaluations Database, Social Science Citation Index, Science Citation Index and Conference Proceedings Citation Indexes up to 9 March 2011.

We developed a new search strategy for this update as the strategy published in 2003 omitted key terms. Additional search methods included: screening reference lists of relevant studies, contacting authors of relevant papers regarding any further published or unpublished work, and searching websites of selected research groups and organisations.

Selection criteria

We considered randomised controlled trials, controlled clinical trials, interrupted times series (ITSs) and controlled before and after studies of an entire or identified component of an organisational infrastructure intervention aimed at promoting EBP in nursing. The participants were all healthcare organisations comprising nurses, midwives and health visitors.

Data collection and analysis

Two authors independently extracted data and assessed risk of bias. For the ITS analysis, we reported the change in the slopes of the regression lines, and the change in the level effect of the outcome at 3, 6, 12 and 24 months follow-up.

Main results

We included one study from the USA (re-analysed as an ITS) involving one hospital and an unknown number of nurses and patients. The study evaluated the effects of a standardised evidence-based nursing procedure on nursing care for patients at risk of developing healthcare-acquired pressure ulcers (HAPUs). If a patient's admission Braden score was below or equal to 18 (i.e. indicating a high risk of developing pressure ulcers), nurses were authorised to initiate a pressure ulcer prevention bundle (i.e. a set of evidence-based clinical interventions) without waiting for a physician order. Re-analysis of data as a time series showed that against a background trend of decreasing HAPU rates, if that trend was assumed to be real, there was no evidence of an intervention effect at three months (mean rate per quarter 0.7%; 95% confidence interval (CI) 1.7 to 3.3; $P = 0.457$). Given the small percentages post intervention it was not statistically possible to extrapolate effects beyond three months.

Authors' conclusions

Despite extensive searching of published and unpublished research we identified only one low-quality study; we excluded many studies due to non-eligible study design. If policy-makers and healthcare organisations wish to promote evidence-based nursing successfully at an organisational level, they must ensure the funding and conduct of well-designed studies to generate evidence to guide policy.

PLAIN LANGUAGE SUMMARY

Can organisational infrastructures be effective in promoting evidence-based nursing practice?

Nurses and midwives form the bulk of the clinical health workforce, and play a central role in all health service delivery. There is potential to improve health care quality if nurses routinely use the best available evidence in their clinical practice. Since many of the factors perceived by nurses as barriers to the implementation of evidence-based practice (EBP) lie at the organisational level, it is of interest to devise and assess the effectiveness of models to change healthcare organisations in order to promote the use of EBP among nurses successfully.

We defined organisational infrastructures as being “the underlying foundation or basic framework through which clinical care is delivered and supported”, which include for example: organisational policies, nurse development units and other types of organisational developments such as organisations developing and implementing evidence-based nursing procedures, standards or guidelines for clinical practice.

We searched the literature for robust evaluations of the effectiveness of organisational interventions in promoting EBP in nursing. We included one study from the USA which involved one hospital and for which the number of nurses was not reported. The study evaluated the effects of a standardised evidence-based nursing procedure on improved nursing care for patients at risk of developing healthcare-acquired pressure ulcers (HAPUs), as measured by the HAPU rate. If a patient's admission Braden score was lower than or equal to 18, nurses were authorised to initiate a prevention pressure ulcer care bundle, without a physician order. The Braden scale is a tool used to assess a patient's risk of developing pressure ulcers. An adult with a score below or equal to 18 is considered to have a high risk for developing a pressure ulcer.

Re-analysis of the HAPU data, as an interrupted time series, was suggestive of a trend in rates prior to intervention and, if that trend was assumed to be real, there was no evidence of an intervention effect at three months (mean rate per quarter 0.7%; 95% confidence interval (CI) 1.7 to 3.3; $P = 0.457$). Given the small percentages post intervention it was not statistically possible to extrapolate effects beyond three months.

Considering the importance placed on organisational change in promoting EBP in nursing, it is surprising that eight years after the previous empty Cochrane review was published, appropriately evaluated organisational infrastructure interventions are still lacking. If policy-makers and healthcare organisations wish to promote evidence-based nursing at an organisational level successfully, they must ensure the funding and conduct of well-designed studies to generate evidence to guide policy.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON [\[Explanation\]](#)

Evidence-based standardised nursing procedure to improve care of patients at risk of developing hospital-acquired pressure ulcers (HAPUs)

Patient or population: nurses, and patients admitted with a Braden score less than or equal to 18 (i.e. at risk of developing HAPUs)

Settings: one hospital

Intervention: evidence-based standardised nursing procedure

Comparison: N/A

Outcomes	Change in level effect (mean rate per quarter) (95% CI)*	No of participants (studies)	Quality of the evidence (GRADE)	Comments
HAPU rate	At 3 months: 0.7% (95% CI -1.7 to 3.3), P = 0.465	One hospital (1)	⊕○○○ very low quality*	Before the intervention there was a statistically significant (P = 0.046) decrease in mean HAPU rate by 1.1% per quarter. Given the small percentages post intervention it was not possible to extrapolate effects beyond 3 months.

* We downgraded the evidence on the basis of imprecision and the downward trend in HAPU rate found already in the pre-intervention period.

GRADE Working Group grades of evidence

High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low quality: We are very uncertain about the estimate.

BACKGROUND

Nurses, like other health professionals, do not always use the best available evidence in their clinical practice and hence patients do not always receive the best possible care (Grol 2003; Schuster 1998; Seddon 2001). Several large studies, investigating barriers to the implementation of evidence-based practice (EBP), emphasise the importance of changes in the infrastructures of healthcare organisations (e.g. policy and procedure changes) in order to achieve successful promotion of EBP in nursing (Atkinson 2008; Funk 1991; Horsley 1978; Pravikoff 2005). There is interest among healthcare providers and policy-makers in knowing how best to support evidence-based nursing at an organisational level, in order to improve

the effectiveness and quality of care.

Definitions

We define organisational infrastructures as “the underlying foundation or basic framework through which clinical care is delivered and supported” (Foxcroft 2003). Organisational infrastructures can take many forms. They include, for example: organisational policies, management frameworks (e.g. shared governance), skill mix (e.g. the proportion of different nursing grades, and levels of qualification, expertise and experience), nurse development

units, research and development support systems, clinical supervision programmes (e.g. formal organisation-wide mentoring programmes), clinical effectiveness structures and support systems, continuous quality improvement programmes and, for example, organisations developing evidence-based nursing procedures/standards/guidelines for clinical practice and implementing these. We adopted a commonly used definition of EBP which describes it as “a problem solving approach to clinical care that incorporates the conscientious use of current best evidence from well-designed studies, a clinician’s expertise, and patient values and preferences” (Melnik 2005; Sackett 2000).

Description of the condition

Most nurses do not routinely implement EBP (Pravikoff 2005), even though there is evidence that EBP improves patient outcomes (Heater 1988; Melnik 2005). The reasons why nurses do not always use the best evidence in their clinical practice are manifold and lie at different levels. Twenty years ago, Funk carried out a large study that involved the development and application of a tool for assessing barriers to nurses adopting EBP (Funk 1991). Drawing upon ideas by Rogers on innovation diffusion (Rogers 2003), he clustered barriers to research utilisation into four major themes: characteristics of the adopter; characteristics of the innovation; characteristics of the communication; and characteristics of the organisation. The results of Funk’s study highlighted two main barriers: nurses had insufficient authority to change patient care procedures, and there was a general lack of awareness of relevant research. The work by Funk, and the importance it places on organisational factors, complements an earlier American initiative, the ‘Conduct and Utilization of Research in Nursing’ (CURN) project (Horsley 1983), which focused specifically on the responsibility of the nursing department for the activities involved in making research-based practice changes. In taking an organisational view of the processes involved in practice change, the authors made it clear that they were not negating the positive impact of individual nurses (Horsley 1983). Indeed, they recognised that developments such as policy and procedure changes are of paramount importance and are “generally beyond the control of individuals *per se*” (Horsley 1983, p22). Recent studies agree with previous results, i.e. that organisational factors, such as insufficient authority to change practice, time constraints, lack of support for implementation of research findings (Atkinson 2008; Hutchison 2004; Fineout-Overholt 2005) and the “presence of other goals with higher priority” (Pravikoff 2005) are perceived by nurses as the greatest barriers to the implementation of EBP.

Description of the intervention

The process of knowledge translation is slow, i.e. the translation of research findings into practice (Balas 2000; Rogers 2003) and

therefore several nursing models aiming to speed up this process have been developed during the last two decades (see Table 1). The ARCC model (Advancing Research and Clinical Practice through Close Collaboration) (Melnik 2002), the Clinical Scholar Model (Schultz 2005) and the Iowa model (Titler 2002) are all organisational models. A central concept in the ARCC model is that of an EBP mentor, an advanced nurse with in-depth clinical knowledge and EBP skills, who provides mentorship in EBP implementation and outcomes management projects, thereby improving quality of care and patient outcomes. The Clinical Scholar Model reinforces the intellectual process of EBP, building a cadre of mentors who foster an environment in which staff nurses are encouraged to continuously ask questions, and for whom the Clinical Scholar is a role model (Schultz 2005). The Iowa model suggests a team-based approach in the implementation of EBP (Titler 1994). Other models, e.g. the Rosswurm and Larrabee model (Rosswurm 1999) and the Stetler model (Stetler 2001), may be used both at an individual and an organisational level. However, all these models have yet to be rigorously evaluated.

In addition to the nursing models, specific factors that may be used to speed up the knowledge translation process have been suggested (Melnik 2002; Melnik 2004; Omerly 1999; Schultz 2005). The factors, which may be used within healthcare organisations as well as within academic or research environments, have been summarised by Fineout-Overholt and colleagues (Fineout-Overholt 2005). These include EBP mentors in healthcare settings, partnerships between clinical and academic settings, EBP champions within the environment, clearly written research support, time and resources, and administrative support. Building on the ARCC model, the authors also suggest some specific strategies for accelerating the use of EBP: development and implementation of EBP rounds, plans for outcomes evaluation, evidence-based journal clubs, a written organisational philosophy, professional advancement systems, as well as awards for successful EBP implementation. These strategies, however, have not yet been evaluated.

Why it is important to do this review

Nurses and midwives form the bulk of the clinical health workforce and play a central role in all health service delivery (WHO 2006). There is therefore potential to improve health care quality if nurses routinely use the best available evidence in their clinical practice. Since many of the factors perceived by nurses as barriers to the implementation of EBP in patient care lie at the organisational level (Atkinson 2008; Funk 1991; Horsley 1978; Pravikoff 2005), it is of great interest to devise and assess the effectiveness of models to change healthcare organisations in order to promote the use of EBP among nurses successfully.

Many systematic reviews of the effectiveness of professional interventions on clinical practice have already been undertaken by the Cochrane Effective Practice and Organisation of Care (EPOC) Group. Although this work has included nursing, most of it

has not been specific to nursing (e.g. [Flodgren 2010](#); [McGowan 2009](#)). Among nursing-specific studies, one review evaluated the introduction of clinical practice guidelines in professions allied to medicine, but its focus was on professional interventions rather than organisational infrastructures ([Thomas 2009](#)). Another review focused on a single aspect of organisational infrastructures, i.e. on nursing record systems ([Urquhart 2009](#)). There is, therefore, a need to look more broadly at organisational infrastructures that promote EBP in nursing as a whole, and to summarise the existing evidence base in order to inform healthcare providers and policy-makers of the best ways to promote EBP at an organisational level.

This is an update of a Cochrane review first published in 2003 ([Foxcroft 2003](#)), which was empty.

OBJECTIVES

To assess the effectiveness of organisational infrastructures in promoting evidence-based nursing.

METHODS

Criteria for considering studies for this review

Types of studies

We included randomised controlled trials (RCTs), controlled clinical trials (CCTs), interrupted time series (ITSs) and controlled before and after studies (CBAs) evaluating the effectiveness of organisational infrastructures in promoting evidence-based nursing practice. We only included interrupted time series if they had a clearly defined point in time when the intervention occurred and three data points before and after the start of the intervention. We only included controlled before and after studies if they had contemporaneous data collection, appropriate choice of control site, and included a minimum of two intervention and two control sites.

We included studies in which the target of the intervention was a healthcare organisation or organisational units comprising of nurses or groups of healthcare professionals including nurses. We excluded professional interventions, which encompass strategies to provide professionals with information or training on appropriate practice.

Types of participants

We included healthcare organisations comprising nurses, midwives and health visitors in hospital and community settings. Studies where the infrastructure development was aimed at other health professional groups as well as nurses were only eligible for inclusion if evidence-based nursing practice outcomes were measured and reported separately.

Types of interventions

We included studies that evaluated an entire or identified component of an organisational infrastructure intervention aimed at promoting EBP in nursing. The organisational infrastructure could be embedded within a geographical unit (hospitals in a province or district), entire hospitals, wards or firms, nursing homes or sub-units, such as nursing teams in homes or hospitals.

We excluded infrastructure developments that were not delivered at an organisational level, for example where the unit of intervention/allocation was at an individual level. We characterised organisational infrastructure interventions according to the following typology.

- Management framework (e.g. shared governance)
- Skill mix (e.g. mix of different nursing grades, levels of qualification, expertise and experience)
- Information strategy (e.g. communication and knowledge policies and systems)
- Nurse development infrastructure (e.g. dedicated nurse development system)
- Research infrastructure (e.g. dedicated research and development support units)
- Quality enhancement systems (e.g. audit and feedback)
- Other (e.g. organisations developing evidence-based nursing procedures, standards or guidelines for clinical practice and implementing these)

Types of outcome measures

We considered studies as eligible for inclusion if they reported objective measures of EBP. Specifically, studies were eligible for inclusion if they reported one or more objective measures of EBP directly indicated by the following.

- (a) Increased use, in routine practice, of clinical interventions for which there is evidence of effectiveness.
- (b) Other process of care indicators where there is good evidence they relate to implementation of EBP and better health outcomes for patients.
- (c) Patient outcome or an accepted surrogate for outcome providing there is good evidence the outcome relates to the implementation of EBP.
- (d) Healthcare resource utilisation including: frequency and length of hospital stay, number of re-admissions, prescriptions, tests and investigations ordered, referrals, use of emergency and other health services.

Where any of (a) to (d) was satisfied, outcome (e) could be considered in the review.

(e) Costs of development and delivery of organisational interventions and any associated monetary benefits.

Search methods for identification of studies

Electronic searches

We developed new search strategies for this update because the strategy published in 2003 ([Appendix 1](#)) omitted a number of key concepts. Strategies for English language databases ([Appendix 2](#)) were developed by information specialists M Fiander and N Roberts; author MX Rojas developed strategies for Spanish language resources ([Appendix 3](#)). We wrote and ran two versions (A and B) of the MEDLINE strategy. For the next update of this review, we will combine strategies A and B into a single strategy in order to improve precision and sensitivity.

Since the search strategies for this update changed significantly from those in the original review, we conducted retrospective searches of MEDLINE and EMBASE (e.g. from 1948 and 1950, respectively). Searches in other databases were limited from 1990 forward. We applied no language limits. We used two methodological search filters to limit retrieval to appropriate study designs in Strategy A: the Cochrane Highly Sensitive Search Strategy for identifying randomised trials in MEDLINE: sensitivity- and precision-maximising version (*Cochrane Handbook for Systematic Reviews of Interventions* 6.4d ([Handbook 2011](#))) and the Cochrane EPOC Group Methodological Filter version 2.2; Strategy B used only portions of these filters, but the full filters per Strategy A are recommended for future updates.

- The Cochrane EPOC Group Specialised Register (Reference Manager)
- The Cochrane Central Register of Controlled Trials (Wiley) (*The Cochrane Library* 2011, Issue 4)
- MEDLINE (OVID) (1948 to present)
- EMBASE (OVID) (1947 to present)
- CINAHL: Cumulative Index to Nursing and Allied Health Literature (EbscoHost) (1980 to present)
- NHS Economic Evaluation Database (Wiley) (*The Cochrane Library* 2011, Issue 4)
- Science Citation Index Expanded (SCI-EXPANDED) (1945 to present)
- Social Sciences Citation Index (SSCI) (1956 to present)
- Arts & Humanities Citation Index (A&HCI) (1975 to present)
- Conference Proceedings Citation Index - Science (CPCI-S) (1990 to present)
- Conference Proceedings Citation Index - Social Science & Humanities (CPCI-SSH) (1990 to present)

- Biblioteca Virtual en Salud - BIREME (Virtual Library of Health) (June 2011)

- Literatura Latinoamericana y del Caribe en Ciencias de la Salud - LILACS (Latin American and Caribbean Health Sciences Literature) (June 2011)

- Índice Bibliográfico Español en Ciencias de la Salud - IBECs (Bibliography Spanish index in Health Science) (June 2011)

Searching other resources

N Roberts, G Flodgren and MX Rojas conducted a search of grey literature sites, nursing organisational websites, professional bodies and international institutions (see [Appendix 3](#)). We searched the reference lists of included studies and contacted authors of relevant papers regarding any further published or unpublished work.

Data collection and analysis

Selection of studies

We downloaded all titles and abstracts retrieved by the electronic searches into the reference management database EndNote and removed duplicates. One review author screened all titles identified by the main search, excluding all studies which clearly did not meet the inclusion criteria. We produced a long-list of titles and abstracts and two review authors screened this independently. We obtained the full text of potentially relevant papers. We resolved disagreements by discussion between authors or if needed arbitration by a third person.

Data extraction and management

Two review authors independently extracted data from included studies using a modified Cochrane EPOC Group data extraction form ([EPOC 2009](#)). We resolved disagreements by discussion between review authors or if needed arbitration by a third person. Any study identified as potentially eligible after reviewing it in full text but subsequently excluded is documented in the [Characteristics of excluded studies](#) table.

Assessment of risk of bias in included studies

Two review authors independently assessed the risk of bias of the included ITS study using the criteria suggested by the Cochrane EPOC Group ([EPOC 2009](#)). For the included ITS study we used the following criteria: a) was the intervention independent of other changes; b) was the shape of the intervention effect pre-specified; c) was the intervention unlikely to affect data collection; d) was knowledge of the allocated interventions adequately prevented during the study; e) were incomplete outcome data adequately

addressed; f) was the study free from selective outcome reporting; g) was the study free from other risks of bias? We resolved disagreements by discussion between review authors or if needed arbitration by a third person.

Measures of treatment effect

For the included ITS study we reported the main outcomes in natural units and two effect sizes: the change in the level of outcome immediately after the introduction of the intervention and the change in the slopes of the regression lines. Both of these estimates are necessary for interpreting the results of each comparison. For example, there could have been no change in the level immediately after the intervention, but there could have been a significant change in slope. We also reported the level effects for six months and yearly post intervention points within the post intervention phase.

Assessment of heterogeneity

Since only one study was found for inclusion in this review, we performed no meta-analysis. If, in future updates, meta-analysis is possible we will explore heterogeneity between studies by comparing descriptions of the study populations, interventions and outcomes. In addition we will visually assess the forest plots and quantify heterogeneity with the I^2 statistic (Egger 1997; Higgins 2008).

Data synthesis

Since only one study was included in this review, we have described the results within the text of this review. The main (only) outcome is presented in [Summary of findings for the main comparison](#).

We extracted data for the healthcare-acquired pressure ulcer (HAPU) rate from graphs using MS Paint (Microsoft Windows). We performed the re-analysis of the ITS study using a time series approach that accounts for time features such as seasonality and serial correlation where appropriate, e.g. time series regression. We performed the statistical analysis using Stata 11 Statistical Software (StataCorp).

The 'Summary of findings' table includes information regarding the magnitude of the effect of the intervention and the quality of evidence for interventions to prevent the development of HAPUs. In future updates, we will carry out a meta-analysis only if we have a sufficient number of studies that are homogeneous regarding population, interventions, comparisons and outcomes. If we do not find enough studies for a meta-analysis, we will report the review as a descriptive narrative. For studies that are sufficiently homogenous in terms of setting, design and intervention, we will use a fixed-effect model. Where there is evidence of heterogeneity, we will apply a random-effects model. We will perform data synthesis using Review Manager 5 (RevMan 2008).

Subgroup analysis and investigation of heterogeneity

In future updates, should more eligible studies be found, we will interpret heterogeneity in relation to: type of organisational infrastructure intervention, setting and participants. Where sufficient data are available, we will perform subgroup analyses to compare outcomes for these categories.

Sensitivity analysis

In future updates, should more eligible studies be found for the primary meta-analysis, we will undertake a sensitivity analysis to investigate how the pooled intervention effect is affected by the inclusion of RCTs at an unclear or high risk of bias.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#); [Characteristics of studies awaiting classification](#).

Results of the search

The searches of the main electronic databases led to the identification of 11,256 titles, the additional search of the Latin and Ibero-American databases yielded 215 titles, and the manual searches of the home pages of the organisational bodies retrieved 1060 titles. In total we identified 12,531 titles. After the independent examination by the review authors, we retrieved 16 papers that were potentially eligible for the review. After the full-text assessment we found only one study, presented in a conference abstract, that met the Cochrane EPOC Group quality criteria for non-randomised studies and the inclusion criteria of the review. We obtained additional graphical data from this study, in the form of a Powerpoint presentation, through Google. The included study is presented in more detail in the [Characteristics of included studies](#) table. A description of full-text studies retrieved and reasons for their exclusion are presented in the [Characteristics of excluded studies](#) table.

Included studies

Study design, participants and settings

We found only one low-quality study (re-analysed as an ITS) from the USA for inclusion in this review. The study involved the Washington hospital in Fremont, serving the whole of California. The number of nurses recruited to the study was not reported. No details of hospital or participant characteristics, or the number of patients affected by the study were provided.

Targeted behaviour

The study evaluated the effects of a standardised evidence-based nursing procedure on nursing care provided to patients at risk of healthcare-acquired pressure ulcers (HAPUs), as measured by the HAPU rate. If a patient's admission Braden score (Bergstrom 1987) was equal to or lower than 18 they were judged to be at risk of developing pressure ulcers.

The Braden scale is a tool used to assess a patient's risk of developing pressure ulcers by examining six criteria: sensory perception, the degree to which the skin is exposed to moisture, the individual's level of activity, the individual's ability to change positions, nutrition and the exposure to situations that can result in friction and shear to the skin. Each category is rated on a scale of 1 to 4, excluding the 'friction and shear' category which is rated on a 1 to 3 scale. This combines for a possible total of 23 points, with a higher score meaning a lower risk of developing a pressure ulcer. An adult with a score below 18 is considered to have a high risk for developing a pressure ulcer.

Nurses were authorised to initiate a pressure ulcer prevention bundle (i.e. a set of three to five evidence-based interventions/practices that when used together may result in significant improvement in patient outcomes), without waiting for a physician order (Shih 2010). Strategies were developed to increase compliance in the implementation of the evidence-based nursing procedures to reduce the HAPU rate.

Outcomes

One outcome was reported by Shih 2010: the quarterly HAPU rate.

We contacted the main author twice by e-mail to request additional information, but received no reply.

Data collection

HAPU data were collected by quarterly CALNOC (Collaborative Alliance for Nursing Outcomes) pressure ulcer prevalence study. CALNOC is a nursing quality database which measures patient outcomes to advance standards in patient care (<https://www.calnoc.org/globalPages/mainpage.aspx>). The main outcome (HAPU rate) was measured from January 2008 to September 2008 (pre-intervention period) and from October 2008 to March 2010 (post intervention period).

Description of the intervention

After reviewing the literature, an evidence-based standardised nursing procedure was developed and implemented using different strategies to improve its use (i.e. staff education through posters, one to one peer teaching, elevator speech and documentation audits). The nursing procedure authorised nurses to initiate a pressure ulcer prevention bundle if a patient's Braden admission score

was below or equal to 18 (Bergstrom 1987), without waiting for a physician order. The pressure ulcer prevention bundle consisted of: (i) turning every two hours, (ii) utilising an air mattress overlay, (iii) assessing the patient's pre-albumin level, (iv) initiating a wound care referral and/or a dietitian referral, and (v) ordering heel pressure relief devices and/or wheel chair cushion. Nurses were authorised to initiate these preventive actions without waiting for a physician order.

Excluded studies

In total, we excluded 15 studies after full copies of papers were obtained and scrutinised (Alexander 2011; Anonymous 2009; Artz 2011; Callaghan 1998; Gracias 2008; Hampton 2005; Johnson 2011; Kavanagh 2006; Lee 2009; Lenz 2009; Levin 2011; McKinley 2007; Scheide 2007; White 2010; Whitney 2006). The reasons for exclusion are presented in the [Characteristics of excluded studies](#) table.

Risk of bias in included studies

For the one included study (Shih 2010) we judged the risk of bias as 'unclear' for most of the criteria due to the absence of information provided in the abstract (see 'Risk of bias' table within the [Characteristics of included studies](#) table). For one item there was high risk of bias: already before the intervention there was a statistically significant decrease in HAPU rate and therefore the intervention cannot be considered independent of other changes. One item was not applicable: the intervention effect was not pre-specified, since nothing was mentioned about what effect (a step change or change in slope) was expected for the outcome measure (HAPU rate). However, as the study authors did not specify this analysis, and the data were re-analysed by the review authors, this criteria cannot be reasonably applied.

Effects of interventions

See: [Summary of findings for the main comparison](#)

Re-analysis of the HAPU data as an interrupted time series showed no statistically significant difference in slopes between the regression lines for the pre-intervention period (January 2008 to September 2008) and the post intervention period (October 2008 to March 2010) (mean rate per quarter 0.73%; 95% confidence interval (CI) -0.37 to 1.84; $P = 0.151$).

The re-analysis was suggestive of a trend in rates prior to intervention (-1.1 %; 95% CI -2.1 to -0.03; $P = 0.046$) and, if that trend is assumed to be real, there was no evidence of an intervention effect at three months (mean rate 0.7%; 95% CI -1.7 to 3.3; $P = 0.465$). Given the small percentages post intervention it was not statistically possible to extrapolate effects beyond three months.

The results for the HAPU rate are summarised in [Summary of findings for the main comparison](#).

DISCUSSION

Summary of main results

We performed an extensive search of the literature for studies evaluating the effectiveness of organisational infrastructures to promote evidence-based nursing, including RCTs, ITSs, CBAs and CCTs. However, we found only one study from the USA that met our inclusion criteria (Shih 2010). Shih and colleagues evaluated the effects of introducing an evidence-based standardised nursing procedure at one hospital, aimed at improving the care provided to patients at risk of developing healthcare-acquired pressure ulcers (HAPUs). The results for the one participating hospital showed no evidence of an intervention effect at three months after implementation of the intervention.

Considering the importance placed on organisational change in promoting evidence-based nursing, it is surprising that eight years after the previous empty Cochrane review was published, appropriately evaluated organisational infrastructure interventions are still lacking. If policy-makers and healthcare organisations wish to promote evidence-based nursing at an organisational level successfully, they must ensure the funding and conduct of well-designed studies to generate evidence to guide policy.

Overall completeness and applicability of evidence

The evidence is incomplete and of very limited generalisability. With only one included study it is impossible to draw any clear conclusions about the effectiveness of organisational infrastructures in promoting evidence-based nursing. Shih et al reported only one outcome measure, the HAPU rate, when evaluating the effectiveness of the evidence-based standardised nursing procedure (Shih 2010). No outcomes related to processes of care, to health care resource utilisation (e.g. length of stay), unintended/adverse effects (e.g. sepsis, mortality) or costs were reported.

A better description of the implementation strategies, the number of participating nurses and patients, as well as hospital and participant characteristics would have been useful not only for the interpretation of results, but to understand how the intervention was implemented.

Within the excluded studies there are many examples of researchers using inappropriate study designs in their attempts to evaluate the effectiveness of different organisational infrastructure interventions. Either the study includes too few intervention and control groups for it to be judged as eligible, or too few pre-intervention and post intervention data points to allow for an appropriate time series analysis. Some studies were not eligible due to only reporting self reported outcomes. Since the previous review was published in 2003, a number of new conceptual nursing models on organisational processes to promote evidence-based practice

(EBP) have been added to the existing list of non-evaluated nursing models (Di Censo 2005; Melnyk 2005; Stetler 2001; Titler 2002). The problem is thus not a lack of nursing models, or lack of studies aiming to evaluate the effects of different organisational interventions based on these models, but that the studies are at a high risk of bias or have not been designed to generate effectiveness data.

Quality of the evidence

The little evidence we included in this review is at risk of bias. The re-analysed ITS scored unclear on the ITS risk of bias criteria, in part because the authors never intended it to be analysed as an ITS, but also because of the little information provided in the conference abstract.

Potential biases in the review process

The extensive search strategy was carefully scrutinised and adapted to existing terminology by experienced information technologists and we searched a large number of databases and relevant web sites for relevant organisational bodies. One author sifted all references identified by the electronic searches, excluding papers that clearly were not eligible, while two review authors assessed all potentially eligible titles and abstracts against the eligibility criteria independently to ensure no important references were missed.

AUTHORS' CONCLUSIONS

Implications for practice

We found only one eligible paper for inclusion in the review and therefore the review question remains unanswered. Healthcare organisations considering implementing and evaluating interventions aimed at changing organisational infrastructure should consider using a robust design (e.g. interrupted time series), preferably with at least two intervention and control sites, and at least three data points before and three data points after the intervention (i.e. complying with the Cochrane EPOC group quality criteria).

Implications for research

We only identified one eligible study, which was eligible only after the data were re-analysed as a time series. We excluded many studies due to inappropriate study design. If policy-makers and healthcare organisations wish to promote evidence-based nursing at an organisational level successfully, they must ensure that well-designed studies evaluate the effectiveness of these interventions. Below we outline key aspects of study design to be considered.

- Randomised controlled trials (RCTs), the 'gold standard' study design, should be used when possible
- Controlled before and after studies (CBAs) should include at least two intervention and two control sites
- Interrupted time series (ITSs) should have at least three data points before and three data points after the intervention to permit a time series analysis
- ITSs should include at least two intervention sites
- All studies should include objective outcome measures when evaluating the effectiveness of an intervention and not only self reported outcomes. Examples of key outcomes include: nosocomial infection rates, hospital length of stay, sepsis, mortality and costs.

ACKNOWLEDGEMENTS

For the present review update we wish to acknowledge Nia Roberts and Michelle Fiander for revising and running the electronic searches. We also wish to acknowledge Adriana Buitrago for her assistance with sifting the search results from the Latin and Ibero-American databases and Ly-Mee Yu for re-analysing the data from the included study. This update was funded by a National Institute for Health Research (NIHR) Cochrane Programme Grant 'Effective Practice and Organisation of Care in the NHS'.

For the previous version of the review the acknowledgements were as follows:

Particular thanks go to colleagues who have commented on protocols and draft reports and have provided additional information and resources: Carole Estabrooks (University of Alberta), Paul Fullbrook (University of Bournemouth), John Gabbay (University of Southampton), Linda Johnson (University of Melbourne) and Heather Waterman (University of Manchester). We are also grateful for the helpful comments from referees: Alba Di' Censo, Peter Griffiths and Merrick Zwarenstein.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Shih 2010

Methods	<p>Study design: ITS (an uncontrolled before and after study that we re-analysed as an interrupted time series)</p> <p>Data: data on HAPU rate between January 2008 and March 2010 were collected by quarterly CALNOC (Collaborative Alliance for Nursing Outcomes) pressure ulcer prevalence study. CALNOC is a nursing quality database which measures patient outcomes to advance patient care excellence (https://www.calnoc.org/globalPages/mainpage.aspx)</p> <p>Statistical methods: not described</p>
Participants	<p>Participants:</p> <ul style="list-style-type: none"> (i) All nurses at one medical-surgical unit (number of participating nurses unknown) (ii) All nurses at one hospital (number of participating nurses unknown) (iii) Patients at risk of developing HAPUs (number of participating patients unknown) <p>Country: US</p> <p>Targeted behaviour: preventive care of patients at risk of developing HAPUs (with an admission Braden score ≤ 18)</p>
Interventions	<p>Description of the intervention:</p> <ul style="list-style-type: none"> - After literature synthesis an evidence-based standardised nursing procedure (including a pressure ulcer prevention bundle) was developed and implemented - Strategies used to improve the implementation of the intervention consisted of staff education through posters, one to one peer teaching, elevator speech and documentation audits - If the patient's admission Braden score was ≤ 18, a prevention bundle could be initiated: nurses were authorised to initiate these preventive actions without waiting for a physician order <p>The Braden scale is a tool used to assess a patient's risk of developing pressure ulcers by examining 6 criteria: sensory perception, the degree to which the skin is exposed to moisture, the individual's level of activity, the individual's ability to change positions, nutrition and the exposure to situations that can result in friction and shear to the skin. Each category is rated on a scale of 1 to 4, excluding the 'friction and shear' category which is rated on a 1 to 3 scale. This combines for a possible total of 23 points, with a higher score meaning a lower risk of developing a pressure ulcer and vice versa. An adult with a score below 18 is considered to have a high risk for developing a pressure ulcer</p> <p><u>The pressure ulcer prevention bundle consisted of:</u> (i) turning every 2 hours, (ii) utilising an air mattress overlay, (iii) assessing the patient's pre-albumin level, (iv) initiating a wound care referral and/or a dietitian referral, and (v) ordering heel pressure relief devices and/or wheel chair cushion</p>
Outcomes	<p>Quarterly data on HAPU rate were retrieved from graphs included in a Powerpoint presentation found on the Internet (http://www.beaconcollaborative.org/assets/files/2010%20Annual%20Exchange/0410%20Everything%20You%20Always%20Wanted%20to%20Know%20About%20HAPU%20Prevention%20Garcia%20Shih(2).pdf), see Table 2 and Table 3</p> <p>The results for the HAPU data are summarised in the Summary of findings for the main comparison</p>

Shih 2010 (Continued)

Notes	According to the authors the HAPU rate was significantly decreased on the medical-surgical unit from an average 6.07% pre-intervention to 0.62% a year later. Re-analysis of the data retrieved from the graph was, however, not possible	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not stated in the abstract
Other bias	Low risk	No evidence of other risk of bias
Was the intervention independent of other changes?	High risk	Already before the intervention there was a statistically significant (P = 0.046) decrease in HAPU rate of 11 cases per 1000 patients per quarter, and therefore the intervention cannot be considered independent of other changes
Was the shape of the intervention effect pre-specified?	Low risk	The data was re-analysed by the review authors and therefore the risk for this item must be considered low
Was the intervention unlikely to affect data collection?	Unclear risk	Not stated in the paper
Was knowledge of the allocated interventions adequately prevented in the study?	Unclear risk	Not specified in the paper
Were incomplete outcome data adequately addressed?	Unclear risk	Not specified in the paper

CALNOC: Collaborative Alliance for Nursing Outcomes

HAPU: healthcare-acquired pressure ulcer

ITS: interrupted time series

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Alexander 2011	Uncontrolled BA study, not re-analysable as a time series (no graph)
Anonymous 2009	Could not be found
Artz 2011	Descriptive reliability study
Callaghan 1998	CBA study with only 1 intervention and 1 control site. Not re-analysable as a time series
Dufault 1995	Poor design: retrospective case study with no controls or comparison group
Fitch 1992	Poor design: retrospective case study with no controls or comparison group
Gracias 2008	Uncontrolled BA study that could not be re-analysed as a time series
Greenwood 1998	Poor design: retrospective case study with no controls or comparison group
Hampton 2005	Uncontrolled BA study. Not re-analysable as a time series (bundle intervention)
Johnson 2011	Descriptive study
Kavanagh 2006	Uncontrolled BA study that could not be re-analysed as a time series
Lee 2009	Diagnosis not treatment was the focus of this RCT study. No reference to the evidence-based features of the tool
Lenz 2009	Uncontrolled BA study that could not be re-analysed as a time series
Levin 2011	Only self reported outcomes in this RCT study
Martin 1994	Poor design: retrospective case study with no controls or comparison group
McKinley 2007	Nurses were not targeted separately and could not be separated from the rest of the staff
Robinson 1997	Poor design: retrospective case study with no controls or comparison group
Rutledge 1995	Poor design: retrospective case study with no controls or comparison group
Scheide 2007	Uncontrolled BA study that could not be re-analysed as a time series
Sperhac 1994	Poor design: retrospective case study with no controls or comparison group
White 2010	Only self reported outcomes were reported in this RCT study
Whitney 2006	Could not be found

RCT: randomised controlled trial
BA: before and after study

Characteristics of studies awaiting assessment *[ordered by study ID]*

Farmer 2011

Methods	Unclear
Participants	Unclear
Interventions	Use of nursing practice reviews
Outcomes	Unclear
Notes	

DATA AND ANALYSES

This review has no analyses.

ADDITIONAL TABLES

Table 1. Conceptual models, simplified (-> is a process step indicated in the model)

Authors	Brief description
Horsley 1978	Identify clinical problem -> Find and appraise research evidence -> Evaluate relevance of evidence for local context -> Design practice innovation and devise implementation plan -> Clinical trial (evaluation) of the innovation -> Review evidence from evaluation -> If innovation is positive then devise plan to extend and disseminate to other areas
Funk 1989	Find and appraise literature -> Effective communication -> Effective facilitation of utilisation
Goode 1992	Organisational commitment -> Change agents -> Planned change process -> Outcome (research-based practice)
Burrows 1995	Review current practice -> Motivation to change -> Identify relevant evidence and appraise -> Implement in practice
Kitson 1996	Evidence -> Context -> Successful implementation -> Facilitation
Jack 1997	Facilitation/education -> Quality assurance/audit -> Conducting research -> Guidelines -> Evidence-based practice -> Dissemination
Rosswurm 1999	The Rosswurm and Larrabee Model: assess needs of stakeholders -> Build relationships and make connection between nursing intervention and outcome -> Synthesise the gathered evidence -> Plan for the evidence-based change in practice -> Implement the plan and evaluate the implementation -> Maintain the change
Stetler 2001	The Stetler Model (replaces the previous Stetler Model (Stetler 1994)) Preparation (gather evidence, look for confounding influences) -> Validation (appraise and synthesise evidence) -> Comparative evaluation/Decision-making (determine the ability of evidence to answer the question) -> Translation/application (if there is sufficient evidence, implement it either formally or informally) -> Evaluation (evaluate whether evidence implementation sufficiently addressed the given issue)
Melnik 2002	The ARCC Model (Advancing Research and Clinical Practice through Close Collaboration): the central concept in the ARCC model is that of an evidence-based practice (EBP) mentor, an advanced nurse with in-depth EBP and clinical knowledge and skills who provides mentorship in EBP and facilitates improvement in clinical care and patient outcomes through EBP implementation and outcomes management projects Promoting EBP among both advanced practice and staff nurses locally and nationally -> Establishing a cadre of EBP mentors to facilitate EBP in healthcare organisations -> Disseminating and facilitating use of the best evidence from well-designed studies to advance an evidence-based approach to clinical care -> Conducting an annual EBP conference -> Conducting studies to evaluate the effectiveness of the ARCC model on the process and outcomes of clinical care and -> Conducting studies to evaluate the effectiveness of the EBP implementation strategies
Titler 2002	The Iowa model (Titler 2002) replaces the previous model (Titler 1994): Generate the question from either a problem or new knowledge -> Determine relevance to organisational priorities -> Develop a team to gather and appraise evidence -> Determine if the evidence answers the question -> If there is sufficient evidence, pilot the

Table 1. Conceptual models, simplified (-> is a process step indicated in the model) (Continued)

	change in practice -> If there is insufficient evidence, generate evidence through research -> If change is initiated based on the evidence, deem appropriateness of change to practice
Di Censo 2005	Asking the question -> Compiling the evidence -> Planning a change -> Integrating skills and experience
Schultz 2005	The Clinical Scholar Model: this model reinforces the intellectual process of EBP, building a cadre of mentors who foster an environment in which staff nurses are encouraged to continuously ask questions. Clinical scholars are bedside clinicians who challenge nurses practices through inquiry, observation, analysis and synthesis of internal data and published evidence, application of synthesised evidence, and evaluation of subsequent outcomes. Clinical scholars serve as role models in the ownership of their clinical practice. Inherent in the model is the final step, dissemination of findings from the projects and research accomplished by the clinic scholar team to team members and the healthcare public. Intrinsic to the model are collaboration, consultation and mentorship by a nurse scientist through every step of the educational and application processes

Table 2. Quarterly HAPU rate at a 40-bed medical-surgical ward

Time periods	Quarterly reported HAPU rate (%)
Q1 2008	7.56
Q 2 2008	3.93
Q 3 2008	4.53
Q 4 2008 (intervention)	0
Q 1 2009	1.89
Q 2 2009	0
Q 3 2009	0
Q 4 2009	0
Q 1 2010	0

Table 3. Quarterly reported HAPU rate at Washington hospital

Time periods	Quarterly reported HAPU rate (%)
Q1 2008	4.92
Q 2 2008	3.08
Q 3 2008	2.76

Table 3. Quarterly reported HAPU rate at Washington hospital (Continued)

Q 4 2008 (intervention)	2.46
Q 1 2009	2.24
Q 2 2009	0.70
Q 3 2009	0.74
Q 4 2009	1.30
Q 1 2010	0.60

APPENDICES

Appendix I. MEDLINE strategy (used in original review)

1. randomized controlled trial.pt.
2. randomized controlled trials.sh.
3. controlled clinical trial.pt.
4. random allocation.sh.
5. double blind method.sh.
6. single blind method.sh.
7. clinical trial.pt.
8. exp clinical trials/
9. (clin\$ adj3 trial\$).ti,ab.
10. ((singl\$ or doubl\$ or trebl\$ or tripl\$) adj3 (blind\$ or mask\$)).ti,ab.
11. random\$.ti,ab.
12. quasi?experiment\$.ti,ab.
13. research design.sh.
14. comparative study.sh.
15. cross-over studies.sh.
16. matched-pair analysis.sh.
17. meta-analysis.pt.
18. meta-analysis.sh.
19. meta?anal\$.ti,ab.
20. (systematic adj (overview\$ or review\$)).ti,ab.
21. evaluation studies.sh.
22. program evaluation.sh.
23. efficiency, organizational.sh.
24. longitudinal studies.sh.
25. follow up studies.sh.
26. prospective studies.sh.
27. (control\$ or prospectiv\$ or volunteer\$).ti,ab.

28. time series.ti,ab.
29. before and after.ti.ab.
30. or/1-29
31. (ANIMAL not HUMAN).sh.
32. 29 not 30
33. nurs\$.ti,ab.
34. research\$.ti,ab.
35. 33 and 34
36. explode "nursing-research"/ all subheadings
37. "clinical-nursing-research"/ all subheadings
38. "research-personnel"/ all subheadings
39. evidence.ti,ab.
40. utili?ation.ti,ab.
41. evidence-based.ti,ab.
42. research-based.ti,ab.
43. or/35-42
44. "nursing-research-organization-and-administration"/ all subheadings
45. "organization-and-administration"/ all subheadings
46. "nursing-administration-research"/ all subheadings
47. "organizational-innovation"/ all subheadings
48. infrastructure\$.ti,ab.
49. support\$.ti,ab.
50. structur\$.ti,ab.
51. organi?ation\$.ti,ab.
52. policy.ti,ab.
53. policies.ti,ab.
54. clinical supervis\$.sh.
55. professional practice/st
56. system\$.ti,ab.
57. strateg\$.ti,ab.
58. development.ti,ab.
59. or/44-58
60. 32 and 43 and 59
61. nucleic acids research.jn.
62. protein engineering.jn.
63. gene.jn.
64. european journal of biochemistry.jn.
65. genome research.jn.
66. genome.jn.
67. genomics.jn.
68. human mutation.jn.
69. human gene therapy.jn.
70. journal of biological chemistry.jn.
71. journal of clinical microbiology.jn.
72. journal of molecular biology.jn.
73. neuron.jn.
74. analytical biochemistry.jn.
75. journal of clinical laboratory analysis.jn.
76. molecular & general genetics.jn.
77. molecular biology & evolution.jn.
78. or/61-77
79. 60 not 78

Appendix 2. Search strategies for 2011 update

MEDLINE Strategy A

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present>

Search Strategy:

1 Evidence-Based Nursing/ (772)
2 ((evidence or evidence-based or EBM or EBN or EBP) adj2 (nursing or nurse or nurses)).ti,ab. (834)
3 or/1-2 [EBN--combine with Filters] (1527)

4 Evidence-based practice/ or Evidence-Based Medicine/ or Evidence-Based Emergency Medicine/ (42687)
5 (evidence-base? or evidence informed).ti,ab. (40991)
6 ((EBM or EBN or EBP) adj2 (care or healthcare or nursing or patient care or practice? or practitioner?)).ti,ab. (581)
7 (evidence adj3 (adopt\$ or application or apply\$ or diffusion or implement\$ or practice or uptake or utili?ation or utili?e? or utili?ing)).ab. (8823)
8 (knowledge adj2 (adopt\$ or application or apply\$ or DIFFUSION or implement\$ or uptake or transfer\$ or translat\$ or utili?ation or utili?e? or utili?ing)).ti,ab. (3802)
9 (BEST PRACTICE or BEST PRACTICES).ti,ab. (6400)
10 (research adj3 (implement\$ or TRANSLATIONAL or uptake or utili?ation or utili?e? or utili?ing)).ti,ab. (6495)
11 research.hw. and diffusion.ti,ab. (45751)
12 (research adj3 (implement\$ or TRANSLATIONAL or uptake or utili?ation or utili?e? or utili?ing)).ti,ab. (6495)
13 (research adj2 practice).ti,ab. (9218)
14 (PRACTICE and MODEL).ti. or (PRACTICE adj3 MODEL?).ab. (3553)
15 or/4-14 [Evidence Based Practice & Synonyms] (139449)
16 evidence.ti,ab. (885713)
17 (quality adj2 (care or healthcare or improv\$ or initiat\$ or program? or programme?)).ti,ab. (72027)
18 Quality Improvement/ (137)
19 "Quality of Health Care"/ (47348)
20 "Quality assurance, health care"/ (42627)
21 Benchmarking/ (8178)
22 Quality Indicators, health care/ (7117)
23 or/16-22 [Quality Terms] (1025910)
24 Nursing/ or exp Specialties, Nursing/ or Nursing, Practical/ (166775)
25 Nursing Staff/ or Nursing Staff, Hospital/ (48837)
26 Nursing services/ or Nursing services, hospital/ (15052)
27 Nurses/ or Nurse Administrators/ or Nurse Anesthetists/ or Nurse Clinicians/ or Nurse Midwives/ or Nurse Midwives/ or Nurses, Male/ (50856)
28 Nurse's Role/ (28393)
29 Models, Nursing/ (10099)
30 (nursing or nurse or nurses).ti. (183067)
31 (midwif\$ or midwives or health visitor\$).ti,ab. (14876)
32 ((nurse or nurses or nursing) adj2 (acute care or administrator? or administrative or anesthetist? or clinical or clinician? or emergency or hospital or IMPLEMENT\$ or manager? or practical or practitioner? or primary care or specialist? or triage)).ab. or (nurse-led or nurse driven).ti,ab. (20321)
33 or/24-32 [Nurses/Nursing/Nursing Staff] (353263)
34 nursing research/ or clinical nursing research/ or nursing administration research/ or nursing education research/ or nursing evaluation research/ or nursing methodology research/ (41589)
35 ((nurse or nurses or nursing) adj2 research).ti,ab. (7588)
36 or/34-35 [Nursing Research] (45121)
37 Health Services Administration/ or "Organization and Administration"/ or Hospital administration/ or health facility administration/ (45008)

38 Centralized hospital services/ or hospital restructuring/ or hospital shared services/ (7214)

39 health planning organizations/ or health care coalitions/ or health planning councils/ or “state health planning and development agencies”/ (3503)

40 Health policy/ or Health care reform/ (62505)

41 clinical governance/ or “constitution and bylaws”/ or decision making, organizational/ or efficiency, organizational/ (24770)

42 governing board/ or trustees/ or institutional management teams/ (7978)

43 management audit/ or benchmarking/ or models, organizational/ (22241)

44 organizational culture/ or organizational innovation/ or organizational objectives/ (40496)

45 Capacity building/ or Program development/ (18203)

46 “Diffusion of Innovation”/ or Knowledge Management/ (11087)

47 Technology Transfer/ or Translational Research/ (2275)

48 “organization & administration”.fs. (319415)

49 organi?ational.ti.ab. (26197)

50 organi?ation\$.hw. (150636)

51 (organi?ation? adj3 (change or changes or changing or collaborat\$ or development or impact or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or policy or policies or strategy or strategies or strategic or structur\$ or support\$ or system?)).ti.ab. (20231)

52 (policy or policies).ti.ab.hw. (168850)

53 (decentral\$ or governance or jurisdiction? or roster\$ or stewardship? or structural or team\$ or ((nurse or change? or changing) adj2 (direct\$ or initiat\$ or role or roles))).ti.ab. [REMOVED EMPOWER] (417954)

54 (administrative or administrator?).ti. (6301)

55 administration.hw. (339290)

56 ((administrative or administrator?) adj4 (change or changes or changing or collaborat\$ or development or impact or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or policy or policies or strategy or strategies or strategic or structur\$ or support\$ or system?)).ab. (3336)

57 (policy adj4 (change or changes or changing or collaborat\$ or development or impact or IMPLEMENT\$ or influenc\$ or infrastruc-ture? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or NURSING or NURSE? or strategy or strategies or strategic or structur\$ or support\$ or system?)).ab. [Use this instead of policy tiab?] (14228)

58 (governance or jurisdiction? or roster\$ or team\$ or structural or organizational or self-direct\$ or (nurse adj2 (direct\$ or initiat\$))).ti.ab. (424016)

59 (stewardship or decentral\$ or reform? or reforming).ti.ab. (30007)

60 or/37-59 [Org/Admin Terms] (1286491)

61 career mobility/ or employee incentive plans/ or job description/ or personnel administration, hospital/ or personnel delegation/ or “personnel staffing and scheduling”/ or staff development/ or workload/ or workplace/ (59619)

62 Professional Autonomy/ or Professional role/ (13261)

63 ((professional\$ or nurse? or nursing) adj2 (autonomy or independence or self-reliance)).ti.ab. (862)

64 EMPOWER\$.ti.ab. (8985)

65 (TASK SHIFT\$ or SKILL MIX\$ or TASK SUBSTITUT\$).ti.ab. (612)

66 ((ROLE? adj2 CHANG\$) or (NURSE? adj2 (DOCTOR? or PHYSICIAN?) adj4 SUBSTITUT\$)).ti.ab. (3319)

67 (professional adj2 development).ti.ab. (3754)

68 or/61-67 [Personnel Management--organizational] (86087)

69 (randomized controlled trial or controlled clinical trial).pt. or random\$.ti.ab. or trial.ti. (726829)

70 controlled.ti. (76360)

71 ((study adj3 aim?) or “our study”).ab. (342266)

72 versus.ti.ab. (317261)

73 (clinical trial or controlled clinical trial or multicenter study).pt. (552590)

74 (control adj3 (area or cohort? or compare? or condition or design or group? or intervention? or participant? or study)).ab. (363190)

75 (controlled adj4 (study or trial)).ti.ab. (103047)

76 (multicentre or multicenter or multi-centre or multi-center).ti. (21512)

77 or/69-76 (1750146)

78 exp animals/ not humans.sh. (3548210)

79 "comment on".cm. or systematic review.ti. or literature review.ti. or editorial.pt. or meta-analysis.pt. or news.pt. or review.pt. (2359589)

80 77 not (or/78-79) [EPOC Trial Filter 1.0] (1389348)

81 intervention?.ti. or (intervention? adj6 (clinician? or collaborat\$ or community or complex or DESIGN\$ or doctor? or educational or family doctor? or family physician? or family practitioner? or financial or GP or general practice? or hospital? or impact? or improv\$ or individuali?e? or individuali?ing or interdisciplin\$ or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or personali?e? or personali?ing or pharmacies or pharmacist? or pharmacy or physician? or practitioner? or prescrib\$ or prescription? or primary care or professional\$ or provider? or regulatory or regulatory or tailor\$ or target\$ or team\$ or usual care)).ab. (110614)

82 (hospital\$ or patient?).hw. and (study or studies or care or health\$ or practitioner? or provider? or physician? or nurse? or nursing or doctor?).ti,hw. (605229)

83 demonstration project?.ti,ab. (1677)

84 (pre-post or "pre test\$ or pretest\$ or posttest\$ or "post test\$ or (pre adj5 post)).ti,ab. (46438)

85 (pre-workshop or post-workshop or (before adj3 workshop) or (after adj3 workshop)).ti,ab. (424)

86 (pre-train\$ or post-train\$ or pre-intervention or post-intervention).ti,ab. [Added] (5901)

87 (before adj10 (after or during)).ti,ab. (293554)

88 ("quasi-experiment\$" or quasiexperiment\$ or "quasi random\$" or quasirandom\$ or "quasi control\$" or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).ti,ab,hw. [ML] (80239)

89 ("time series" adj2 interrupt\$).ti,ab,hw. [ML] (564)

90 (time points adj3 (over or multiple or three or four or five or six or seven or eight or nine or ten or eleven or twelve or month\$ or hour? or day? or "more than")).ab. (5895)

91 pilot.ti,ab. [added AB] (65669)

92 Pilot projects/ [ML] (64176)

93 action research.ti,ab. [Added] (1641)

94 "comment on".cm. or review.ti,pt. or randomized controlled trial.pt. [ML] (2407427)

95 (animal model? or animal experiment? or animal study? or animal trial? or canine or feline or bovine or cow or cows or mice or dog or dogs or cat or cats or rabbit? or rat or rats or veterinar\$).ti,hw. (2907425)

96 exp animals/ not humans.sh. [ML] (3548210)

97 *experimental design/ or *pilot study/ or quasi experimental study/ [EM] (16229)

98 ("quasi-experiment\$" or quasiexperiment\$ or "quasi random\$" or quasirandom\$ or "quasi control\$" or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).ti,ab. [EM] (80239)

99 ("time series" adj2 interrupt\$).ti,ab. [EM] (564)

100 (animal model? or animal experiment? or animal study? or animal trial? or canine or feline or bovine or cow or cows or mice or dog? or cat or cats or rabbit? or rat or rats or veterinar\$).ti,hw. or animal.hw. [EM extended title words to hw] (3063545)

101 (editorial or letter or note or "review" or trade or survey).pt. [EM] (2568022)

102 meta-analysis/ or systematic review/ or "literature review".ti. or "systematic review".ti. or (meta-analy\$ or metaanalyt\$).ti. [EM] (54003)

103 (or/81-93) not (or/94-96) [EPOC Filter non Trial ML 4.0] (877141)

104 (or/81-87,90-91,93,97-99) not (or/100-102) [EPOC Filter non Trial EM 4.0] (943727)

105 Deleted Line

106 3 and (or/80,103) [Evidence Based Nursing and Filters] (496)

107 15 and (or/33,36) and (or/80,103) [Evidence Based Practice & Nursing or Nursing Research & Filters] (3565)

108 106 or 107 [Set A ML1.6] (3740)

109 23 and (or/33,36) and (or/60,68) and 80 [QI Terms & Nurs/NursResearch & OrgAdmin/Personnel & Trial Filter] (1372)

110 109 not 108 [Set B ML1.6] (1067)

111 (2000* or 2001* or 2002* or 2003* or 2004* or 2005* or 2006* or 2007* or 2008* or 2009* or 2010* or 2011*).ed. or (2000* or 2001* or 2002* or 2003* or 2004* or 2005* or 2006* or 2007* or 2008* or 2009* or 2010* or 2011*).ep. or (2000* or 2001* or 2002* or 2003* or 2004* or 2005* or 2006* or 2007* or 2008* or 2009* or 2010* or 2011*).dp. (8585999)

112 (1990* or 1991* or 1992* or 1993* or 1994* or 1995*).ed. or (1990* or 1991* or 1992* or 1993* or 1994* or 1995*).ep. or (1990* or 1991* or 1992* or 1993* or 1994* or 1995*).dp. (2590636)

113 (1996* or 1997* or 1998* or 1999*).ed. or (1996* or 1997* or 1998* or 1999*).ep. or (1996* or 1997* or 1998* or 1999*).dp. (2637530)

114 108 and (or/111-113) [Set A ML1.6 1990-2011] (3619)

115 110 and (or/111-113) [Set B ML1.6 1990-2011] (1044)

Note for future searches: ML Strategy A saved in OVID Medline as version 1.6.

Medline Strategy B

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present>

1 Evidence-Based Nursing/ (762)

2 (Evidence-based practice/ or Evidence-Based Medicine/ or Evidence-Based Emergency Medicine/) and ((nurse or nurses or nursing).ti,hw. or exp Nurses/ or exp Specialties, Nursing/ or exp Nursing Staff/) (4979)

3 ((evidence or evidence-based or EBM or EBN or EBP) adj2 (nursing or nurse or nurses)).ti,ab. (833)

4 or/1-3 [Evidence Based-Nursing combine with filters only] (6069)

5 Nursing/ or exp Specialties, Nursing/ or Nursing, Practical/ (166579)

6 Nursing Staff/ or Nursing Staff, Hospital/ (48777)

7 Nursing services/ or Nursing services, hospital/ (15051)

8 Nurses/ or Nurse Administrators/ or Nurse Anesthetists/ or Nurse Clinicians/ or Nurse Midwives/ or Nurse Midwives/ or Nurses, Male/ (50779)

9 Nurse's Role/ (28293)

10 Models, Nursing/ (10074)

11 (nursing or nurse or nurses).ti. (182912)

12 (midwife\$ or midwives or health visitor\$).ti,ab. (14846)

13 ((nurse or nurses or nursing) adj2 (acute care or administrator? or administrative or an?esthetist? or clinical or clinician? or emergency or hospital or IMPLEMENT\$ or manager? or practical or practitioner? or primary care or specialist? or triage)).ab. or (nurse-led or nurse driven).ti,ab. (20236)

14 or/5-13 [Nurses/Nursing/Nursing Staff] (352874)

15 nursing research/ or clinical nursing research/ or nursing administration research/ or nursing education research/ or nursing evaluation research/ or nursing methodology research/ (41490)

16 ((nurse or nurses or nursing) adj2 research).ti,ab. (7581)

17 or/15-16 [Nursing Research] (45023)

18 Health Services Administration/ or "Organization and Administration"/ or Hospital administration/ or health facility administration/ (44996)

19 Centralized hospital services/ or hospital restructuring/ or hospital shared services/ (7213)

20 health planning organizations/ or health care coalitions/ or health planning councils/ or "state health planning and development agencies"/ (3501)

21 Health policy/ or Health care reform/ (62384)

22 clinical governance/ or "constitution and bylaws"/ or decision making, organizational/ or efficiency, organizational/ (24730)

23 governing board/ or trustees/ or institutional management teams/ (7978)

24 management audit/ or benchmarking/ or models, organizational/ (22203)

25 organizational culture/ or organizational innovation/ or organizational objectives/ (40430)

26 Capacity building/ or Program development/ (18133)

27 "Diffusion of Innovation"/ or Knowledge Management/ (11072)

28 Technology Transfer/ or Translational Research/ (2268)

29 "organization & administration".fs. (318957)

30 organi?ational.ti,ab. (26135)

31 organi?ation\$.hw. (150472)

32 (organi?ation? adj3 (change or changes or changing or collaborat\$ or development or impact or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or policy or policies or strategy or strategies or strategic or structur\$ or support\$ or system?)).ti,ab. (20193)

33 policy.hw. (87621)

34 (policy or policies or (nurse adj4 managed) or (quality adj2 improvment) or (QI adj2 (initiative? or program\$ or nurse? or nursing or hospital\$))).ti,ab. (110781)

35 (decentral\$ or empower\$ or governance or jurisdiction? or roster\$ or stewardship? or structural or team\$ or ((nurse or change? or changing) adj2 (direct\$ or initiat\$ or role or roles))).ti,ab. (425182)

36 (administrative or administrator?).ti. (6300)

37 administration.hw. (339006)

38 ((administrative or administrator?) adj4 (change or changes or changing or collaborat\$ or development or impact or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or policy or policies or strategy or strategies or strategic or structur\$ or support\$ or system?)).ab. (3328)

39 (policy adj4 (change or changes or changing or collaborat\$ or development or impact or IMPLEMENT\$ or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or NURSING or NURSE? or strategy or strategies or strategic or structur\$ or support\$ or system?)).ab. [Use this instead of policy tiab?] (14196)[THIS LINE IS REDUNDANT GIVEN Line 34 above and WILL BE REMOVED FROM FUTURE VERSIONS OF THE STRATEGY]

40 (governance or jurisdiction? or roster\$ or team\$ or structural or organizational or self-direct\$ or (nurse adj2 (direct\$ or initiat\$))).ti,ab. (423379)

41 (stewardship or decentral\$ or reform? or reforming).ti,ab. (29950)

42 or/18-41 [Org/Admin Terms] (1286785)

43 career mobility/ or employee incentive plans/ or job description/ or personnel administration, hospital/ or personnel delegation/ or "personnel staffing and scheduling"/ or staff development/ or workload/ or workplace/ (59544)

44 Professional Autonomy/ or Professional role/ (13222)

45 ((professional\$ or nurse? or nursing) adj2 (autonomy or independence or self-reliance)).ti,ab. (862)

46 (professional adj2 development).ti,ab. (3743)

47 or/43-46 [Personnel Management--organizational] (74243)

48 (evidence-base? or evidence informed).ti. (13651)

49 ((EBM or EBN or EBP) adj2 (care or healthcare or nursing or patient care or practice? or practitioner?)).ti,ab. (575)

50 evidence-base?.ab. (32388)

51 (evidence adj3 (adopt\$ or application or apply\$ or implement\$ or practice or uptake or utili?ation or utili?e? or utili?ing)).ab. (8574)

52 (knowledge adj2 (adopt\$ or application or apply\$ or implement\$ or uptake or transfer\$ or translat\$ or utili?ation or utili?e? or utili?ing)).ti,ab. (3722)

53 (best practice? adj3 (adopt\$ or application or apply\$ or implement\$ or translat\$ or transfer\$ or translat\$ or uptake)).ti,ab. (460)

54 (research adj3 (implement\$ or uptake or utili?ation or utili?e? or utili?ing)).ti,ab. (3813)

55 (research adj2 practice).ti,ab. (9204)

56 or/48-55 [Evidence terms] (58706)

57 (randomized controlled trial or controlled clinical trial).pt. or randomized.ab. or placebo.ab. or clinical trials as topic.sh. or randomly.ab. or trial.ti. (721409)

58 exp animals/ not humans.sh. (3545906)

59 "comment on".cm. or systematic review.ti. or literature review.ti. or editorial.pt. or meta-analysis.pt. or news.pt. or review.pt. or Case Study.ti. or case report.ti. or questionair\$.ti. [REMOVED LETTER This line is not found in Cochrane Handbook; added by TSC to exclude irrelevant publication types] (2480785)

60 57 not (or/58-59) [Cochrane RCT Filter 6.4.d Sens/Precision Maximizing] (558963)

61 intervention?.ti. or (intervention? adj6 (clinician? or collaborat\$ or community or complex or DESIGN\$ or doctor? or educational or family doctor? or family physician? or family practitioner? or financial or GP or general practice? or hospital? or impact? or improv\$ or individuali?e? or individuali?ing or interdisciplin\$ or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or personali?e? or personali?ing or pharmacies or pharmacist? or pharmacy or physician? or practitioner? or prescrib\$ or prescription? or primary care or professional\$ or provider? or regulatory or regulatory or tailor\$ or target\$ or team\$ or usual care)).ab. (110392)

62 (collaborativ\$ or collaboration? or tailored or personali?ed).ti,ab. [added v2.0] (74661)

63 (exp hospitals/ or exp Hospitalization/ or exp Patients/ or exp Nurses/ or exp Nursing/) and (study.ti. or evaluation studies as topic/) [changed for v2.0 based on analysis of Mesh found on CBA & ITS not found by Filter 1.6] (30807)

64 demonstration project?.ti,ab. (1675)

65 (pre-post or "pre test\$" or pretest\$ or posttest\$ or "post test\$" or (pre adj5 post)).ti,ab. (46337)

66 (preimplement\$ or pre-implement\$ or post-implement\$ or postimplement\$).ti,ab. (531)

67 (pre-workshop or post-workshop or (before adj3 workshop) or (after adj3 workshop)).ti,ab. (422)

68 trial.ti. or ((study adj3 aim?) or "our study").ab. (430840)

69 (before adj10 (after or during)).ti,ab. (293343)

70 ("quasi-experiment\$" or quasiexperiment\$ or "quasi random\$" or quasirandom\$ or "quasi control\$" or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).ti,ab,hw. [ML] (80157)

71 ("time series" adj2 interrupt\$).ti,ab,hw. [ML] (560)

72 (time points adj3 (over or multiple or three or four or five or six or seven or eight or nine or ten or eleven or twelve or month\$ or hour? or day? or "more than")).ab. (5889)

73 pilot.ti. (28385)

74 Pilot projects/ [ML] (64052)

75 (clinical trial or multicenter study).pt. [ML removed RCT--redundant v2.0] (541931)

76 (multicentre or multicenter or multi-centre or multi-center).ti. (21490)

77 random\$.ti,ab. or controlled.ti. (574025)

78 (control adj3 (area or cohort? or compar? or condition or group? or intervention? or participant? or study)).ab. not (controlled clinical trial or randomized controlled trial).pt. [ML remove DESIGN changed truncation on Compare] (253049)

79 "comment on".cm. or systematic review.ti. or literature review.ti. or editorial.pt. or letter.pt. or meta-analysis.pt. or news.pt. or review.pt. or Case study.ti. [to exclude irrelevant publication types] (2810896)

80 exp animals/ not humans.sh. [ML] (3545906)

81 *experimental design/ or *pilot study/ or quasi experimental study/ [EM] (16209)

82 ("quasi-experiment\$" or quasiexperiment\$ or "quasi random\$" or quasirandom\$ or "quasi control\$" or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).ti,ab. [EM] (80157)

83 ("time series" adj2 interrupt\$).ti,ab. [EM] (560)

84 (animal model? or animal experiment? or animal study? or animal trial? or canine or feline or bovine or cow or cows or mice or dog? or cat or cats or rabbit? or rat or rats or veterinar\$).ti. or (animal or veterinary).hw. [EM] (1519719)

85 (editorial or letter or note or "review" or trade or survey).pt. [EM] (2565983)

86 meta-analysis/ or systematic review/ or "literature review".ti. or "systematic review".ti. or (meta-analy\$ or metaanalyt\$).ti. [EM] (53863)

87 (or/61-69,72-73,76-77,81-83) not (or/84-86) [EPOC Methods Filter EM 2.2] (1236202)

88 (or/61-78) not (or/79-80) [EPOC Methods Filter ML 2.2] (1531060)

89 Deleted Line

90 14 and (or/42,47,56) and 60 [Nursing & Org/Admin/Personnel/Evidence & RCT] (2137)

91 14 and (or/42,47) and 56 and 88 [Nursing & Org/Admin/Personnel & EBN & EPOC] (852)

92 17 and 56 and (or/42,47) and (or/60,88) [Nursing Research & EBN & OrgAdmin/HR & Filters] (520)

93 4 and (or/60,88) [EBN & Filters] (811)

94 or/90-93 [Results ML1.4 Strategy] (3339)

95 (2002\$ or 2003\$ or 2004\$ or 2005\$ or 2006\$ or 2007\$ or 2008\$ or 2009\$ or 2010\$ or 2011\$).ep,ed,yr. [Entry Date/ E-Pub/ Year 2002 forward] (7467051)

96 (1990\$ or 1991\$ or 1992\$ or 1993\$ or 1994\$ or 1995\$ or 1996\$ or 1997\$ or 1998\$ or 1999\$ or 2000\$ or 2001\$).ep,ed,yr. [Entry Date/ E-Pub/Year 1990-2001] (5721902)

98 94 and 95 [Results ML1.4 Strategy 2002-2011] (2337)

99 94 not 98 [Results ML1.4 1948 to 2001] (1002)

Note for future searches: ML Strategy B saved in OVID Medline as version 1.4.

EMBASE Strategy A

EMBASE Classic+EMBASE <1947 to 2011 March 14>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present>

Note: Deleted lines represent search terms not used in the final results set

1 evidence based nursing/ (1504)
 2 evidence based practice/ or evidence based medicine/ or evidence based practice center/ (119628)
 3 exp nurse/ (150064)
 4 nursing staff/ (63030)
 5 (nurse or nurses or nursing).ti,hw. (912670)
 6 2 and (or/3-5) (11132)
 7 ((evidence or evidence-based or EBM or EBN or EBP) adj2 (nursing or nurse or nurses)).ti,ab. (1669)
8 or/1,6-7 [Evidence Based Nursing combine with filters only] (13245)
 9 to 13 [deleted lines]
 14 exp *Nurse/ or *Nursing Staff/ (138683)
 15 exp *nursing discipline/ (66887)
 16 *nursing diagnosis/ (3512)
 17 *nurse attitude/ [used for nurse's role] (11878)
 18 exp *nursing theory/ (5740)
 19 (nursing or nurse or nurses).ti. (371445)
 20 (midwif\$ or midwives or health visitor?).ti,ab. (31008)
 21 ((nurse or nurses or nursing) adj2 (acute care or administrator? or administrative or an? esthetist? or clinical or clinician? or emergency or hospital or IMPLEMENT\$ or manager? or practical or practitioner? or primary care or specialist? or triage)).ab. or (nurse-led or nurse driven).ti,ab. (43633)
22 or/14-21 [Nurses/Nursing/Nursing Staff] (521017)
 23 [Deleted Line]
 24 nursing research/ or clinical nursing research/ or ethnonursing research/ or nursing administration research/ or nursing evaluation research/ or nursing methodology research/ (71256)
 25 exp *nursing research/ [Same as unfocussed line in terms of narrower concepts] (24417)
 26 ((nurse or nurses or nursing) adj2 research).ti,ab. (15373)
27 or/25-26 [Nursing Research] (33466)
 28 - 37 [deleted lines]
 38 *"organization and management"/ (16578)
 39 *hospital service/ or *health service/ (59502)
 40 *hospital organization/ (27608)
 41 *health care organization/ (36742)
 42 *health care policy/ (43512)
 43 *health care planning/ (28373)
 44 *health care quality/ or *performance measurement system/ or *"quality of nursing care"/ (73121)
 45 information dissemination/ (15932)
 46 organi?ational.ti,ab. (58191)
 47 organi?ation\$.hw. (692702)
 48 (organi?ation? adj3 (change or changes or changing or collaborat\$ or development or impact or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or policy or policies or strategy or strategies or strategic or structur\$ or support\$ or system?)).ti,ab. (43936)
 49 (policy or policies or (nurse adj4 managed) or (quality adj2 improvment) or (QI adj2 (initiative? or program\$ or nurse? or nursing or hospital\$))).ti,ab. (241875)
 50 (decentral\$ or empower\$ or governance or jurisdiction? or roster\$ or stewardship? or structural or team\$ or ((nurse or change? or changing) adj2 (direct\$ or initiat\$ or role or roles))).ti,ab. (922615)
 51 (administrative or administrator?).ti. (13514)
 52 ((administrative or administrator?) adj4 (change or changes or changing or collaborat\$ or development or impact or influenc\$ or infrastructure? or interprofession\$ or inter-profession\$ or intervention? or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or policy or policies or strategy or strategies or strategic or structur\$ or support\$ or system?)).ab. (7527)
 53 (governance or jurisdiction? or roster\$ or team\$ or structural or organizational or self-direct\$ or (nurse adj2 (direct\$ or initiat\$))).ti,ab. (919180)
 54 (stewardship or decentral\$ or reform? or reforming).ti,ab. (64555)

55 **or/38-54 [Org/Admin]** (2019149)
56 to 60 [deleted]
61 *career mobility/
62 *personnel management/ (37829)
63 *Work environment/ or *Work schedule/ or *Work Capacity/ (10995)
64 *work/ or *working time/ or *workload/ or *workplace/ (36599)
65 (career mobility or employee incentive plan? or job description?).ti,ab. (1891)
66 ((professional\$ or nurse? or nursing) adj2 (autonomy or independence or self-reliance)).ti,ab. (1828)
67 ((staff or professional) adj2 development).ti,ab. (11328)
68 **or/61-67 [HR/ Personnel concepts]** (103376)
69 [deleted]
70 (evidence-base? or evidence informed).ti. (29655)
71 ((EBM or EBN or EBP) adj2 (care or healthcare or nursing or patient care or practice? or practitioner?)).ti,ab. (1214)
72 evidence-base?.ab. (72424)
73 (evidence adj3 (adopt\$ or application or apply\$ or implement\$ or practice or uptake or utili?ation or utili?e? or utili?ing)).ab. (18940)
74 (knowledge adj2 (adopt\$ or application or apply\$ or implement\$ or uptake or transfer\$ or translat\$ or utili?ation or utili?e? or utili?ing)).ti,ab. (8189)
75 (best practice? adj3 (adopt\$ or application or apply\$ or implement\$ or translat\$ or transfer\$ or translat\$ or uptake)).ti,ab. (1006)
76 (research adj3 (implement\$ or uptake or utili?ation or utili?e? or utili?ing)).ti,ab. (8262)
77 (research adj2 practice).ti,ab. (20160)
78 **or/70-77 [Evidence Keywords]** (130442)
79 to 102 Deleted ML terms
103 controlled clinical trial/ or controlled study/ or randomized controlled trial/ (3913306)
104 (book or conference paper or editorial or letter or review).pt. not randomized controlled trial/ [Per BMJ Clinical Evidence filter] (6021780)
105 (random sampl\$ or random digit\$ or random effect\$ or random survey or random regression).ti,ab. not randomized controlled trial/ [Per BMJ Clinical Evidence filter] (71020)
106 (animal\$ not human\$).sh,hw. (6995748)
107 **103 not (or/104-106) [EMBASE RCT Filter BMJ]** (2664461)
108 intervention?.ti. or (intervention? adj6 (clinician? or collaborat\$ or community or complex or DESIGN\$ or doctor? or educational or family doctor? or family physician? or family practitioner? or financial or GP or general practice? or hospital? or impact? or improv\$ or individuali?e? or individuali?ing or interdisciplin\$ or multicomponent or multi-component or multidisciplin\$ or multi-disciplin\$ or multifacet\$ or multi-facet\$ or multimodal\$ or multi-modal\$ or personali?e? or personali?ing or pharmacies or pharmacist? or pharmacy or physician? or practitioner? or prescrib\$ or prescription? or primary care or professional\$ or provider? or regulatory or regulatory or tailor\$ or target\$ or team\$ or usual care)).ab. (245192)
109 (collaborativ\$ or collaboration? or tailored or personali?ed).ti,ab. [added v2.0] (168605)
110 (exp hospitals/ or exp Hospitalization/ or exp Patients/ or exp Nurses/ or exp Nursing/) and (study.ti. or evaluation studies as topic/) (114633)
111 demonstration project?.ti,ab. (3689)
112 (pre-post or “pre test\$” or pretest\$ or posttest\$ or “post test\$” or (pre adj5 post)).ti,ab. (106857)
113 (preimplement\$ or pre-implement\$ or post-implement\$ or postimplement\$).ti,ab. (1225)
114 (pre-workshop or post-workshop or (before adj3 workshop) or (after adj3 workshop)).ti,ab. (927)
115 trial.ti. or ((study adj3 aim?) or “our study”).ab. (975386)
116 (before adj10 (after or during)).ti,ab. (672150)
117 Deleted ML terms
118 (“time series” adj2 interrupt\$).ti,ab,hw. [ML] (1210)
119 (time points adj3 (over or multiple or three or four or five or six or seven or eight or nine or ten or eleven or twelve or month\$ or hour? or day? or “more than?)).ab. (13044)
120 pilot.ti. (62588)
121 Deleted ML terms (109237)
122 Deleted ML terms (541931)
123 (multicentre or multicenter or multi-centre or multi-center).ti. (46871)

124 random\$.ti,ab. or controlled.ti. (1275462)
 125 Deleted ML terms
 126 Deleted ML terms
 127 Deleted ML terms
 128 *experimental design/ or *pilot study/ or quasi experimental study/ [EM] (19158)
 129 (“quasi-experiment\$” or quasiexperiment\$ or “quasi random\$” or quasirandom\$ or “quasi control\$” or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).ti,ab. [EM] (185051)
 130 (“time series” adj2 interrupt\$).ti,ab. [EM] (1210)
 131 (animal model? or animal experiment? or animal study? or animal trial? or canine or feline or bovine or cow or cows or mice or dog? or cat or cats or rabbit? or rat or rats or veterinarian\$.ti. or (animal or veterinary).hw. [EM] (6085795)
 132 (editorial or letter or note or “review” or trade or survey).pt. [EM] (6081042)
 133 meta-analysis/ or systematic review/ or “literature review”.ti. or “systematic review”.ti. or (meta-analy\$ or metaanalyt\$).ti. [EM] (151258)
 134 (or/108-116,119-120,123-124,128-130) not (or/131-133) [EPOC Methods Filter 2.2 for EMBASE] (2672478)
 135 [Deleted]

Line Combinations

136 22 and (or/55,68,78) and 107 [Nurses & Org/Admin/HR/EBN & RCT] (2767)
 137 22 and (or/55,68) and 78 and 134 [Nurses & Org/Admin/HR & EBN & EPOC Filter] (1103)
 138 27 and 78 and (or/55,68) and (or/107,134) [NursResearch & EBN & Org/Admin./HR & Filters] (389)
 139 8 and (or/107,134) [EBN & Filters] (2182)
 140 or/136-139 (5371)
 141 (or/136-139) not ((literature or systematic or integrat\$) adj2 review).ti. (5339)
 142 to 245 [deleted]
 246 remove duplicates from 141 (5508)
 247 from 246 keep 1-2184 [EM Results with ML Dups Removed in OVID Interface] (2184)

Note for future searches: em Strategy A saved in OVID Medline as version 1.4

CINAHL strategy

(Ebscohost 1980 to current)
 S84 S79 or S80 or S81 or S82
 S83 S79 or S80 or S81 or S82
 S82 S13 and (S40 or S44) and S53 and S78
 S81 S13 and S16 and (S40 or S44) and S53 and S78
 S80 S13 and (S40 or S44 or S53) and (S57 or S73 or S74 or S75)
 S79 S4 and S78
 S78 S54 or S55 or S56 or S57 or S58 or S59 or S60 or S61 or S62 or S63 or S64 or S65 or S66 or S67 or S68 or S69 or S70 or S71 or S72 or S73 or S74 or S75 or S76 or S77
 S77 TI ((time points n3 over) or (time points n3 multiple) or (time points n3 three) or (time points n3 four) or (time points n3 five) or (time points n3 six) or (time points n3 seven) or (time points n3 eight) or (time points n3 nine) or (time points n3 ten) or (time points n3 eleven) or (time points n3 twelve) or (time points n3 month*) or (time points n3 hour*) or (time points n3 day*) or (time points n3 “more than”)) or AB ((time points n3 over) or (time points n3 multiple) or (time points n3 ...
 S76 TI ((control w3 area) or (control w3 cohort*) or (control w3 compar*) or (control w3 condition) or (control w3 group*) or (control w3 intervention*) or (control w3 participant*) or (control w3 study)) or AB ((control w3 area) or (control w3 cohort*) or (control w3 compar*) or (control w3 condition) or (control w3 group*) or (control w3 intervention*) or (control w3 participant*) or (control w3 study))
 S75 TI (multicentre or multicenter or multi-centre or multi-center) or AB random*
 S74 TI random* OR controlled
 S73 TI (trial or (study n3 aim) or “our study”) or AB ((study n3 aim) or “our study”)
 S72 TI (pre-workshop or preworkshop or post-workshop or postworkshop or (before n3 workshop) or (after n3 workshop)) or AB (pre-workshop or preworkshop or post-workshop or postworkshop or (before n3 workshop) or (after n3 workshop))

S71 TI (demonstration project OR demonstration projects OR preimplement* or pre-implement* or post-implement* or postimplement*) or AB (demonstration project OR demonstration projects OR preimplement* or pre-implement* or post-implement* or postimplement*)

S70 (intervention n6 clinician*) or (intervention n6 community) or (intervention n6 complex) or (intervention n6 design*) or (intervention n6 doctor*) or (intervention n6 educational) or (intervention n6 family doctor*) or (intervention n6 family physician*) or (intervention n6 family practitioner*) or (intervention n6 financial) or (intervention n6 GP) or (intervention n6 general practice*) Or (intervention n6 hospital*) or (intervention n6 impact*) Or (intervention n6 improv*) or (intervention n6 ...

S69 TI (collaborativ* or collaboration* or tailored or personalised or personalized) or AB (collaborativ* or collaboration* or tailored or personalised or personalized)

S68 TI pilot

S67 (MH "Pilot Studies")

S66 AB "before-and-after"

S65 AB time series

S64 TI time series

S63 AB (before* n10 during or before n10 after) or AU (before* n10 during or before n10 after)

S62 TI ((time point*) or (period* n4 interrupted) or (period* n4 multiple) or (period* n4 time) or (period* n4 various) or (period* n4 varying) or (period* n4 week*) or (period* n4 month*) or (period* n4 year*)) or AB ((time point*) or (period* n4 interrupted) or (period* n4 multiple) or (period* n4 time) or (period* n4 various) or (period* n4 varying) or (period* n4 week*) or (period* n4 month*) or (period* n4 year*))

S61 TI ((quasi-experiment* or quasiexperiment* or quasi-random* or quasirandom* or quasi control* or quasicontrol* or quasi* W3 method* or quasi* W3 study or quasi* W3 studies or quasi* W3 trial or quasi* W3 design* or experimental W3 method* or experimental W3 study or experimental W3 studies or experimental W3 trial or experimental W3 design*)) or AB ((quasi-experiment* or quasiexperiment* or quasi-random* or quasirandom* or quasi control* or quasicontrol* or quasi* W3 method* or quasi* W3 s ...

S60 TI pre w7 post or AB pre w7 post

S59 MH "Multiple Time Series" or MH "Time Series"

S58 TI ((comparative N2 study) or (comparative N2 studies) or evaluation study or evaluation studies) or AB ((comparative N2 study) or (comparative N2 studies) or evaluation study or evaluation studies)

S57 MH Experimental Studies or Community Trials or Community Trials or Pretest-Posttest Design + or Quasi-Experimental Studies + Pilot Studies or Policy Studies + Multicenter Studies

S56 TI (pre-test* or pretest* or posttest* or post-test*) or AB (pre-test* or pretest* or posttest* or "post test*") OR TI (preimplement** or pre-implement*) or AB (pre-implement* or preimplement*)

S55 TI (intervention* or multiintervention* or multi-intervention* or postintervention* or post-intervention* or preintervention* or pre-intervention*) or AB (intervention* or multiintervention* or multi-intervention* or postintervention* or post-intervention* or preintervention* or pre-intervention*)

S54 (MH "Quasi-Experimental Studies")

S53 S45 or S46 or S47 or S48 or S49 or S50 or S51 or S52

S52 TI research n2 practice or AB research n2 practice

S51 TI research* n3 implement* or AB research* n3 implement* or TI research* n3 uptake or AB research* n3 uptake or TI research* n3 utili* or AB research* n3 utili*

S50 TI best practice* n3 adopt* or AB best practice* n3 adopt* or TI best practice* n3 application or AB best practice* n3 application or TI best practice* n3 apply or AB best practice* n3 apply or TI best practice* n3 implement* or AB best practice* n3 implement* or TI best practice* n3 practice or AB best practice* n3 practice or TI best practice* n3 uptake or AB best practice* n3 uptake or TI best practice* n3 utili* or AB best practice* n3 utili*

S49 TI knowledge n3 adopt* or AB knowledge n3 adopt* or TI knowledge n3 application or AB knowledge n3 application or TI knowledge n3 apply or AB knowledge n3 apply or TI knowledge n3 implement* or AB knowledge n3 implement* or TI knowledge n3 practice or AB knowledge n3 practice or TI knowledge n3 uptake or AB knowledge n3 uptake or TI knowledge n3 utili* or AB knowledge n3 utili*

S48 TI evidence n3 adopt* or AB evidence n3 adopt* or TI evidence n3 application or AB evidence n3 application or TI evidence n3 apply or AB evidence n3 apply or TI evidence n3 implement* or AB evidence n3 implement* or TI evidence n3 practice or AB evidence n3 practice or TI evidence n3 uptake or AB evidence n3 uptake or TI evidence n3 utili* or AB evidence n3 utili*

S47 TI ebm n2 care or AB ebm n2 care or TI ebm n2 healthcare or AB ebm n2 healthcare or TI ebm n2 nursing or AB ebm n2 nursing or TI ebm n2 patient care or AB ebm n2 patient care or TI ebm n2 practice* or AB ebm n2 practice* or TI ebm n2 practitioner* or

AB ebm n2 practitioner* or TI ebn n2 care or AB ebn 2 care or TI ebn n2 healthcare or AB ebn n2 healthcare or TI ebn n2 nursing or AB ebn n2 nursing or TI ebn n2 patient care or AB ebn n2 patient care or TI ebn n2 practice* or AB ebn n2 practice* or ...

S46 AB evidence-base or evidence-based

S45 TI evidence-base or evidence-based or evidence informed

S44 S41 or S42 or S43

S43 TI Professional n2 autonomy or AB Professional n2 autonomy or TI Professional n2 independence or AB Professional n2 independence or TI Professional n2 self-reliance or AB Professional n2 self-reliance or TI nurs* n2 autonomy or AB nurs* n2 autonomy or TI nurs* n2 independence or AB nurs* n2 independence or TI nurs* n2 self-reliance or AB nurs* n2 self-reliance

S42 (MH "Professional Role") OR (MH "Nursing Role") OR (MH "Professional Autonomy")

S41 (MH "Career Mobility+") OR (MH "Professional Development") OR (MH "Employee Incentive Programs") OR (MH "Job Description") OR (MH "Personnel Staffing and Scheduling+") OR (MH "Staff Development+") OR (MH "Workload") OR (MH "Personnel Management") OR (MH "Work Environment")

S40 S17 or S18 or S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27 or S28 or S29 or S30 or S31 or S32 or S33 or S34 or S35 or S36 or S37 or S38 or S39

S39 TI (stewardship or decentral* or reform or reforms or reforming) or AB (stewardship or decentral* or reform or reforms or reforming)

S38 TI governance or AB governance or TI jurisdiction or AB jurisdiction or TI roster* or AB roster* or TI stewardship* or AB stewardship* or TI structural or AB structural or TI team* or AB team* or TI organi?ational or AB organi?ational or TI self-directed OR AB self-directed or TI nurse n2 direct* or AB nurse* n2 direct* or TI nurse n2 initiative or AB nurse n2 initiative

S37 TI policy n3 influence* or AB policy n3 influence* or TI policy n3 infrastructure* or AB policy n3 infrastructure* or TI policy n3 interprofession* or AB policy n3 interprofession* or TI policy n3 inter-profession* or AB policy n3 inter-profession* or TI policy n3 intervention* or AB policy n3 intervention* or TI policy n3 multicomponent or AB policy n3 multicomponent or TI policy n3 multi-component* or AB policy n3 multi-component* or TI policy n3 multidisciplin* or AB policy n3 multidisciplin* ...

S36 TI administrat* n3 influence* or AB administrat* n3 influence* or TI administrat* n3 infrastructure* or AB administrat* n3 infrastructure* or TI administrat* n3 interprofession* or AB administrat* n3 interprofession* or TI administrat* n3 inter-profession* or AB administrat* n3 inter-profession* or TI administrat* n3 intervention* or AB administrat* n3 intervention* or TI administrat* n3 multicomponent or AB administrat* n3 multicomponent or TI administrat* n3 multi-component* or AB administrat* ...

S35 MW administration

S34 TI administrative or administration

S33 TI decentral* or AB decentral* or TI empower* or AB empower* or TI governance or AB governance or TI jurisdiction or AB jurisdiction or TI roster* or AB roster* or TI stewardship* or AB stewardship* or TI structural or AB structural or TI team* or AB team* or TI nurse n2 direct* or AB nurse* n2 direct* or TI nurse n2 initiative or AB nurse n2 initiative or TI nurse n2 role or AB nurse n2 role or TI nurse n2 roles or AB nurse n2 roles or TI change n2 direct* or AB change* n2 direct* or TI chan ...

S32 TI policy n2 initiative* or AB policy n2 initiative* or TI policies n2 initiative* or AB policies n2 initiative* or TI policy n2 program* or AB policy n2 program* or TI policies n2 program* or AB policies n2 program* or TI policy n2 nurs* or AB policy n2 nurs* or TI policies n2 nurs* or AB policies n2 nurs* or TI policy n2 hospital* or AB policy n2 hospital* or TI policies n2 hospital* or AB policies n2 hospital* or TI nurse managed n2 initiative* or AB nurse managed n2 initiative* or TI nurse-m ...

S31 MW policy

S30 (TI organi?ation* n3 influence* or AB organi?ation* n3 influence* or TI organi?ation* n3 infrastructure* or AB organi?ation* n3 infrastructure* or TI organi?ation* n3 interprofession* or AB organi?ation* n3 interprofession* or TI organi?ation* n3 inter-profession* or AB organi?ation* n3 inter-profession* or TI organi?ation* n3 intervention* or AB organi?ation* n3 intervention* or TI organi?ation* n3 multicomponent or AB organi?ation* n3 multicomponent) or (TI organi?ation* n3 multi-component* ...

S29 MW organi?ation*

S28 TI organi?ational or AB organi?ational

S27 (MW "am")

S26 (MH "Knowledge Management") OR (MH "Diffusion of Innovation")

S25 (MH "Program Development") or TI capacity building or AB capacity building

S24 (MH "Organizational Culture") OR (MH "Organizational Objectives") OR (MH "Organizational Change")

S23 (MH "Audit") OR (MH "Benchmarking")

S22 (MH "Governing Board")

S21 (MH "Decision Making, Organizational") OR (MH "Organizational Efficiency") OR (MH "Clinical Governance")

S20 (MH "Health Care Reform" or MH "Health Policy")

S19 (MH "State Allied Health Organizations" or MH "Health Systems Agencies")

S18 (MH "Shared Services, Health Care" or MH "Hospital Restructuring")
 S17 (MH "Health Services Administration" or MH "Health Facility Administration")
 S16 S14 or S15
 S15 TI nurs* n2 research* or AB nurs* n2 research*
 S14 (MH "Nurse Researchers" or MH "Clinical Nursing Research" or MH "Research, Nursing")
 S13 S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12
 S12 AB nurs* n2 practitioner* or AB nurs* n2 primary care or AB nurs* n2 specialist* or AB nurs* n2 triage or AB nurse-led or TI nurse-led or AB nurse-driven or TI nurse-driven or AB nurse driven or TI nurse driven or AB nurse led or TI nurse led
 S11 AB nurs* n2 acute care or AB nurs* n2 administrator* or AB nurs n2 administrative or AB nurs n2 anaesthetist* or AB nurs* n2 anesthetist* or AB nurs* n2 clinical or AB nurs* n2 clinician* or AB nurs* n2 emergency or AB nurs* n2 hospital or AB nurs n2 implement* or AB nurs* n2 manager* or AB nurs* n2 practical
 S10 TI (midwif* or midwives or health visitor*) or AB (midwif* or midwives or health visitor*)
 S9 TI nursing or nurse or nurses
 S8 (MH "Nursing Models, Theoretical+")
 S7 (MH "Nursing Role")
 S6 (MH "Nurse-Midwifery Service") OR (MH "Nursing Service")
 S5 (MH "Nurses+")
 S4 S1 or S2 or S3
 S3 TI evidence* n2 nurs* or AB evidence* n2 nurs* or TI ebm n2 nurs* or AB ebm n2 nurs* or TI ebp n2 nurs* or AB ebp n2 nurs* or TI ebn n2 nurs* or AB ebn n2 nurs*
 S2 (MH "Nursing Practice, Evidence-Based") OR (MH "Nursing Practice, Research-Based")
 S1 ((MH "Nurses+") or TI (nurse or nurses or nursing) or MW (nurse or nurses or nursing)) and ((MH "Professional Practice, Evidence-Based") OR (MH "Medical Practice, Evidence-Based") OR (MH "Occupational Therapy Practice, Evidence-Based") OR (MH "Physical Therapy Practice, Evidence-Based") OR (MH "Professional Practice, Research-Based") OR (MH "Medical Practice, Research-Based") OR (MH "Occupational Therapy Practice, Research-Based") OR (MH "Physical Therapy

Cochrane Library search strategy

The Cochrane Register of Controlled Trials (CENTRAL) & NHS Economic Evaluation Database (Wiley), The Cochrane Library 2011, Issue 4

#1 MeSH descriptor Evidence-Based Nursing explode all trees
 #2 (evidence* or evidence-based or ebm or ebn or ebp) near5 (nurse or nurses or nursing):ti,ab,kw
 #3 (#1 OR #2) in Title, Abstract or Keywords
 #4 ((nurse or nurses or nursing or midwife or midwives or health visitor*) near3 research*):ti,ab,kw
 #5 MeSH descriptor Nursing Research explode all trees
 #6 (administrat* or organization* or organisation* or policy or policies or planning or governance or audit* or benchmark* or innovat* or "knowledge management"):ti,ab,kw
 #7 MeSH descriptor Organization and Administration explode all trees
 #8 (#6 OR #7) in Title, Abstract or Keywords
 #9 ((professional or nurs*) near2 (role* or autonomy or independence or self-reliance or development)):ti,ab,kw
 #10 MeSH descriptor Professional Autonomy explode all trees
 #11 MeSH descriptor Professional Role, this term only
 #12 MeSH descriptor Nurse's Role explode all trees
 #13 (#9 OR #10 OR #11 OR #12) in Title, Abstract or Keywords
 #14 ((evidence* or knowledge* or "best practice" or research) near3 (adopt* or application or apply or implement* or translat* or transfer* or uptake or utili*)):ti,ab,kw
 #15 ((#4 OR #5) AND (#8 OR #13 OR #14))
 #16 (#3 OR #15) in Title, Abstract or Keywords

Citation indexes strategy

Science Citation Index Expanded (SCI-EXPANDED) -1945 to present; Social Sciences Citation Index (SSCI) -1956 to present; Arts & Humanities Citation Index (A&HCI) -1975 to present; Conference Proceedings Citation Index - Science (CPCI-S) -1990 to present; Conference Proceedings Citation Index - Social Science & Humanities (CPCI-SSH) -1990 to present (Web of Knowledge)

7 #5 OR #4 OR #3 OR #2 OR #1 Refined by: Document Type=(MEETING ABSTRACT OR PROCEEDINGS PAPER)Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

6 #5 OR #4 OR #3 OR #2 OR #1 Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

5 Topic=((nurse OR nurses OR nursing OR midwife OR midwives OR health visitor* OR health visiting) SAME research*) AND Topic=((evidence* or knowledge* or "best practice" or research) SAME (adopt* or application or apply or implement* or translat* or transfer* or uptake or utili*)) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

4 Topic=((nurse OR nurses OR nursing OR midwife OR midwives OR health visitor* OR health visiting) SAME research*) AND Topic=((professional or nurs*) SAME (role* or autonomy or independence or self-reliance or development))) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

3 Topic=((nurse OR nurses OR nursing OR midwife OR midwives OR health visitor* OR health visiting) SAME research*) AND Topic=(administrat* or organisation* or organisation* or policy or policies or planning or governance or audit* or benchmark* or innovat* or "knowledge management") Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

2 Topic=((evidence based practice" OR "evidence-based practice" OR "evidence based medicine" OR "evidence-based medicine" OR "evidence based health care" OR "evidence-based health care" OR "evidence based healthcare" OR "evidence-based healthcare" OR ebp OR ebm OR ebhc) SAME nurs*) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

1 Topic=((evidence or evidence-based) SAME nurs*) Databases=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH Timespan=1990-2011

BIREME strategy

We used combinations of text words and DeCS/Mesh terms that included:

Enfermería, enfermer\$ "Atención de Enfermería", "Cuidado de Enfermería", mh:"Investigación Educacional en Enfermería", "Investigación Metodológica en Enfermería", "Investigación en Enfermería", "Investigación en Enfermería de Práctica Clínica", "Investigación en Evaluación de Enfermería", mh:"Enfermería Basada en la Evidencia", mh:"Investigación Traslacional", "Investigación Empírica", mh:"Investigadores", "Investigador Clínico", mh:"/organización", "Toma de Decisiones Organizacionales", "Eficiencia Organizacional", "Modelos Organizacionales", "Afilación Organizacional", "Cultura Organizacional", "Innovación Organizacional", "Objetivos Organizacionales", "Desarrollo de Programa", "Soporte de la Investigación", "Creación de Capacidad", "Infraestructura", mh:"Personal de Enfermería", mh:"Servicios de Enfermería", mh:"Servicio de Enfermería en Hospital", mh:"Modelos de Enfermería", mh:"Práctica Basada en la Evidencia.

Appendix 3. Additional resources searched

Sources of grey literature:

National Research Register Archive - <http://www.nihr.ac.uk/Pages/NRRArchive.aspx>

Searched 21 April 2011 by Information Specialist N Roberts

Exact phrase = evidence based nursing OR All of these words = evidence based nursing

UK Clinical Research Network Portfolio Database (UKCRN) - <http://public.ukcrn.org.uk/search/>

Searched 21 August 2011 by Information Specialist N Roberts

Title = nursing OR nurse OR nurses OR Research summary = "evidence based nursing"

OpenSIGLE - <http://www.greynet.org/opensiglerepository.html>

Searched 21 April 2011 by Information Specialist N Roberts

Title = "evidence based nursing"

Keyword = "evidence based nursing"

Title = nursing AND Keyword = evidence based AND keyword = (organisation OR organisational OR culture OR capacity OR implement OR implementation OR innovation OR innovate OR administration OR administrative OR structure OR infrastructure OR Policy OR policies OR strategy OR strategic OR strategies OR system OR systems OR utilisation OR utilization OR utilise OR utilize OR application OR apply OR applied OR uptake OR dissemination OR disseminate OR adoption OR adopt OR quality OR staff development OR training OR "knowledge management" OR governance OR benchmark OR benchmarking OR collaborate OR collaboration OR multidisciplinary OR multi-disciplinary OR interdisciplinary OR inter-disciplinary OR team OR teamwork OR interprofessional OR inter-professional OR role OR autonomy OR empowerment)

Title = nurse AND keyword = ("evidence based" OR "evidence base")

Title = nurses AND keyword = ("evidence based" OR "evidence base")

Title = nursing AND keyword = ("evidence based" OR "evidence base")

Title = (nurse OR nurses OR nursing) AND Title = research

The following organisational and institutional websites were searched in June 2011 by using the phrase "evidence based nursing" and/or browsed using the individual website navigation facility.

1. Rev@enf (<http://www.revenf.bvs.br/>)
2. Escuela Universitaria de enfermería, Fisioterapia y Podología - ENFISPO (University College of Nursing, Physiotherapy and Podology) (<http://www.ucm.es/centros/webs/euenfer/>)
3. Universidad Complutense de Madrid (<http://www.ucm.es/>) (any available)
4. EBN online - Edición Española Evidence based Nursing (<http://www.enfermeria21.com/publicaciones/ebn>)
5. The Nursing and Midwifery Office (WHO) (http://www.who.int/hrh/nursing_midwifery/en/)
6. Global Advisory Group on Nursing and Midwifery (GAGNM) (http://www.who.int/hrh/nursing_midwifery/networks/en/)
7. The Global Network of WHO Collaborating Centres for Nursing and Midwifery Development (GNWHOCC) (<http://www.parlatore.com.br/whocc/index.php>)
8. International Catholic Committee of Nurses and Medico-social Assistants (<http://www.ciciams.org/>)
9. International Confederation of Midwives (ICM) (<http://www.internationalmidwives.org/>)
10. International Council of Nurses (ICN) (<http://www.icn.ch/>)
11. International Federation of Red Cross and Red Crescent Societies (<http://www.ifrc.org/>)
12. International Society of Nurses in Cancer Care (<http://www.isncc.org/>)
13. Sigma Theta Tau International Honour Society of Nursing (<http://www.nursingsociety.org/default.aspx>)
14. Royal College of Nursing (www.rcn.org.uk)
15. Cochrane nursing field (<http://cncf.cochrane.org>)
16. Nursing and Midwifery Council (<http://www.nmc-uk.org/>)
17. WHO (<http://www.who.int/topics/nursing/en/>)
18. Pan American Health Organization - PAHO (<http://new.paho.org/>)
19. World Health organization Library database - WHOLIS (<http://www.who.int/library/databases/en/>)
20. CIBERINDEX (<http://www.index-f.com/>; <http://www.index-f.com/oebc/inicio.php>)
21. DIGITA AUDITORIUM (<http://www.index-f.com/para/revista.php>)
22. University of Granada Nursing in Spain (<http://www.ugr.es/pages/estudios/titulaciones/enfermeria>)
23. Fundación Santa Fe Hospital in Colombia (<http://www.fsfb.org.co/node/315>)
24. Colombian Nursing Association (<http://www.anec.org.co/>)
25. Nursing Compendium (<http://www.compendioidenfermeria.com/la-enfermeria-basada-en-la-evidencia-ebe/>)
26. Nursing in Cardiology (<http://www.enfermeriaencardiologia.com/grupos/electrofisiologia/investiga/evidencia.htm>; <http://enfeps.foroactivo.com/t272-v-reunion-internacional-sobre-ebe-granada-espana>)

Appendix 4. Data extraction form

Cochrane Effective Practice and Organisation of Care Group (EPOC)^[1]

Modified EPOC Group Data Abstraction Form

Effectiveness of organisational infrastructure change to promote evidence based nursing practice

Data collection

Name of review author:

Date:

Study reference:

Quick eligibility screening questions:

i) Does the intervention target the healthcare organisation (including nurses, midwives or health visitors)?

- ii) Is the aim of the intervention to change an entire or identified component of an organisational infrastructure and thereby improve evidence-based nursing practice?
- iii) Are the assessed outcomes objective measures of evidence-based practice or other processes of care, patient outcomes or health resource utilisation?

If not - EXCLUDE!

1. Inclusion criteria

1.1 Study design

1.1.1 RCT designs

1.1.2 CCT designs

1.1.3 CBA designs

- a) Contemporaneous data collection
- b) Appropriate choice of control site/activity
- c) At least two intervention and two control sites

1.1.4 ITS designs

- a) Clearly defined point in time when the intervention occurred
- b) At least 3 data points before and 3 after the intervention

1.2 Methodological inclusion criteria

- a) The objective measurement of performance/provider behaviour or health/patient outcomes
- b) Relevant and interpretable data presented or obtainable

N.B. A study must meet the minimum criteria for EPOC scope, design and methodology for inclusion in EPOC reviews. If it does not, COLLECT NO FURTHER DATA.

2. Interventions

2.1 Type of intervention

(State all interventions for each comparison/study group)

Group 1:

Group 2:

Group 3:

2.2 Control(s)

3. Type of targeted behaviour (state more than one where appropriate)

4. Participants

4.1 Characteristics of participating providers

4.1.1 Profession

4.1.2 Level of training

4.1.3 Clinical specialty

4.1.4 Age

4.1.5 Time since graduation (or years in practice)

4.2 Characteristics of participating patients

4.2.1 Clinical problem

4.2.2 Other patient characteristics

- a) Age
- b) Gender
- c) Ethnicity
- d) Other (specify)

4.2.3 Number of patients included in the study

- a) Episodes of care
- b) Patients
- c) Providers
- d) Practices
- e) Hospitals
- f) Communities or regions

5. Setting

5.1 Reimbursement system

5.2 Location of care

5.3 Academic status

5.4 Country

5.5 Proportion of eligible providers (or allocation units)

6. Methods

6.1 Unit of allocation

6.2 Unit of analysis

6.3 Power calculation

6.4 'Risk of bias' assessment

(If the trial is an ITS go directly to 6.4.2 for the 'Risk of bias' assessment)

6.4.1 Risk of bias assessment for randomised controlled trials (RCTs), controlled clinical trials (CCTs) and controlled before and after studies (CBAs)

- a) Was the allocation sequence adequately generated? (cut and paste from the paper verbatim)

Score YES	If a random component in the sequence generation process is described (e.g. referring to a random numbers table)	
Score NO	If a non-random method is used (e.g. performed by date of submission)	
Score UNCLEAR	If not specified in the paper	

b) Was the allocation adequately concealed?

Score YES	If the unit of allocation was by institution, team or professional and allocation was performed at all units at the start of the study; or if the unit of allocation was by patient or episode of care and there was some kind of centralised randomisation scheme; an on-site computer system or if sealed opaque envelopes were used	
Score NO	If none of the above mentioned methods were used (or if a CBA)	
Score UNCLEAR	If not specified in the paper	

c) Were baseline outcome measurements similar?

Score YES	If performance or patient outcomes were measured prior to the intervention, and no important differences were present across study groups	
Score NO	If important differences were present and not adjusted for in analysis**	
Score UNCLEAR	If RCTs have no baseline measure of outcome**	

d) Were baseline characteristics similar?

Score YES	If baseline characteristics of the study and control providers are reported and similar	
Score NO	If there is no report of characteristics in the text or tables or if there are differences between control and intervention providers	
Score UNCLEAR	If it is not clear in the paper (e.g. characteristics are mentioned in the text but no data were presented)	

e) Were incomplete outcome data adequately addressed?

Score YES	If missing outcome variables were unlikely to bias the results (e.g. the proportion of missing data was similar in the intervention and the control group, or the proportion of missing data was less than the effect size, i. e. unlikely to overturn the study results)	
Score NO	If missing data were likely to bias the results	
Score UNCLEAR	If not specified in the paper (do not assume 100% follow-up unless stated explicitly)	

f) Was knowledge of the allocated interventions adequately addressed?*

Score YES	If the authors state explicitly that primary outcome variables were assessed blindly, or the outcomes are objective, e.g. length of hospital stay	
Score NO	If the outcomes were not assessed blindly	
Score UNCLEAR	If not specified in the paper	

g) Was the study adequately protected against contamination?

Score YES	If allocation was by community, institution or practice and it is unlikely that the control group received the intervention	
Score NO	If it is likely that the control group received the intervention (e.g. if patients rather than professionals were randomised)	
Score UNCLEAR	If professionals were allocated within a clinic or practice and it is possible that communication between intervention and control professionals could have occurred (e.g. physicians within practices were allocated to intervention or control)	

h) Was the study free from selective outcome reporting?

Score YES	If there is no evidence that outcomes were selectively reported (e.g. all relevant outcomes in the methods section are reported in the results section)	
Score NO	If some important outcomes are subsequently omitted from the results	
Score UNCLEAR	If not specified in the paper	

i) Was the study free from other risks of bias?

Score YES	If no evidence of other risks of bias	
Score NO		
Score UNCLEAR		

* If some primary outcomes were imbalanced at baseline, assessed blindly or affected by missing data and others were not, each primary outcome can be scored separately.

**If 'UNCLEAR' or 'No', but there are sufficient data in the paper to do an adjusted analysis (e.g. baseline adjustment analysis or intention-to-treat analysis) the criteria should be re-scored to 'Yes'.

6.4.2 Risk of bias assessment for interrupted time series (ITS) designs

Note: If the ITS study has ignored secular (trend) changes and performed a simple t-test of the pre versus post intervention periods without further justification, the study should not be included in the review unless reanalysis is possible.

a) Was the intervention independent of other changes? (cut and paste from the paper verbatim)

Score YES	If there are compelling arguments that the intervention occurred independently of other changes over time and the outcome was not influenced by other confounding variables/historic events during study period	
Score NO	If reported that intervention was not independent of other changes in time <i>If events/variables identified, note what they are</i>	
Score UNCLEAR	If not specified in the paper	

b) Was the shape of the intervention effects pre-specified?

Score YES	If point of analysis is the point of intervention OR a rational explanation for the shape of intervention effect was given by the author(s). Where appropriate, this should include an explanation if the point of analysis is NOT the point of intervention	
Score NO	If it is clear that the condition above is not met	
Score UNCLEAR	If not specified in the paper	

c) Was the intervention unlikely to affect data collection?

Score YES	If reported that intervention itself was unlikely to affect data collection (for example, sources and methods of data collection were the same before and after the intervention)	
Score NO	If the intervention itself was likely to affect data collection (for example, any change in source or method of data collection reported)	

(Continued)

Score UNCLEAR	If not stated in the paper	
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d) Was knowledge of the allocated interventions adequately prevented during the study?***

Score YES	If the authors state explicitly that the primary outcome variables were assessed blindly, or the outcomes are objective, e.g. length of hospital stay. Primary outcomes are those variables that correspond to the primary hypothesis or question as defined by the authors	
Score NO	If the outcomes were not assessed blindly	
Score UNCLEAR	If not specified in the paper	

e) Were incomplete outcome data adequately addressed?***

Score YES	If missing outcome measures were unlikely to bias the results (e.g. the proportion of missing data was similar in the pre- and post-intervention periods or the proportion of missing data was less than the effect size, i. e. unlikely to overturn the study result)	
Score NO	If missing data were likely to bias the results	
Score UNCLEAR	If not specified in the paper (do not assume 100% follow-up unless stated explicitly)	

f) Was the study free from selective outcome reporting?

Score YES	If there is no evidence that outcomes were selectively reported (e.g. all relevant outcomes in the methods section are reported in the results section)	
Score NO	If some important outcomes are subsequently omitted from the results	
Score UNCLEAR	If not specified in the paper	

g) Was the study free from other risks of bias?

Score YES	If no evidence of other risks of bias, e.g. should consider if seasonality is an issue (i.e. if January to June comprises the pre-intervention period and July to December the post, could the 'seasons' have caused a spurious effect)	
Score NO		
Score UNCLEAR		

*** If some primary outcomes were assessed blindly or affected by missing data and others were not, each primary outcome can be scored separately.

6.5 Consumer involvement

6.6 Funding

6.7 Conflict of interest

7. Prospective identification by investigators of barriers to change

8. Intervention

8.1 Description of the intervention (cut and paste from paper verbatim):

8.2 Recipient

8.3 Timing

- a) Frequency/number of events
- b) Duration of the intervention

9. Outcomes

9.1 Description of the main outcome measure(s).

- a) Healthcare organisational change (e.g. organisational performance)
- b) Health professional behaviour
- c) Patient outcomes-
- c) Economic variables (only if reported)
- Costs of the intervention

- Changes in direct healthcare costs as a result of the intervention

- Changes in non-healthcare costs as a result of the intervention

- Costs associated with the intervention are linked with provider or patient outcomes in an economic evaluation

9.2 Length of post intervention follow-up period

9.3 Identify a possible ceiling effect

- a) Identified by investigator
- b) Identified by review author

10. Results (use extra page if necessary)

Outcome	Intervention	Control	Diff (%)	P value

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WHAT'S NEW

Last assessed as up-to-date: 7 March 2011.

Date	Event	Description
12 January 2012	New citation required but conclusions have not changed	New authors, other revisions as described above.
6 October 2011	New search has been performed	A new search strategy was developed. We used revised methods of the Cochrane Effective Practice and Organisation of Care (EPOC) Group to assess the risk of bias of included studies. We expanded the search to include Latin and Ibero-American databases

HISTORY

Protocol first published: Issue 3, 2000

Review first published: Issue 4, 2003

Date	Event	Description
20 October 2008	Amended	Converted to new review format.
25 August 2003	New citation required and conclusions have changed	Substantive amendment.

CONTRIBUTIONS OF AUTHORS

For the present review update the contributions of authors were as follows:

GF sifted the titles and abstracts from the main electronic database search; GF and SS applied the eligibility criteria on selected titles. MR and AB sifted and assessed the titles identified by the searches of the Latin and Ibero-American databases. GF and MR extracted data and assessed the risk of bias of included studies. GF drafted the review and all review authors read and commented on drafts and the final version.

For the previous version of the review the contributions of authors were as follows:

DF had the initial idea and obtained funding from the National Health Service (NHS) Research and Development programme. DF and NC conducted the review and co-wrote the final report and Cochrane review using Review Manager software.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- Oxford Brookes University, UK.
- Portsmouth NHS R&D Consortium, UK.
- Oxford NHS R&D Consortium, UK.

External sources

- NHS Executive, UK.
- NIHR Cochrane EPOC Programme Grant, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Efficiency, Organizational; Evidence-Based Nursing [*methods]; Nursing Care [*standards]; Outcome and Process Assessment (Health Care) [standards]; Pressure Ulcer [prevention & control]

MeSH check words

Humans