Effects of computerised clinical decision support systems (CDSS) on nursing and allied health professional performance and patient outcomes: a systematic review of experimental and observational studies

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ABSTRACT
Objective Computerised clinical decision support systems (CDSS) are an increasingly important part of nurse and allied health professional (AHP) roles in delivering healthcare. The impact of these technologies on these health professionals’ performance and patient outcomes has not been systematically reviewed. We aimed to conduct a systematic review to investigate this.

Materials and methods The following bibliographic databases and grey literature sources were searched by an experienced Information Professional for published and unpublished research from inception to February 2021 without language restrictions: MEDLINE (Ovid), Embase Classic+Embase (Ovid), PsycINFO (Ovid), HMIC (Ovid), AMED (Allied and Complementary Medicine) (Ovid), CINAHL (EBSCO), Cochrane Central Register of Controlled Trials (Wiley), Cochrane Database of Systematic Reviews (Wiley), Social Sciences Citation Index Expanded (Clarivate), ProQuest Dissertations & Theses Abstracts & Index, ProQuest ASSIA (Applied Social Science Index and Abstract), ClinicalTrials.gov, WHO International Clinical Trials Registry (ICTRP), Health Services Research Projects in Progress (HSRProj), OpenClinical (www.OpenClinical.org), OpenGrey (www.opengrey.eu), Health.IT.gov, Agency for Healthcare Research and Quality (www.aHRQ.gov). Any comparative research studies comparing CDSS with usual care were eligible for inclusion.

Results A total of 36 106 non-duplicate records were identified. Of 35 included studies: 28 were randomised trials, three controlled-before-and-after studies, three interrupted-time-series and one non-randomised trial. There were ~1318 health professionals and ~67 595 patient participants in the studies. Most studies focused on nurse decision-makers (71%) or paramedics (5.7%). CDSS as a standalone Personal Computer/LAPTOP-technology was a feature of 88.7% of the studies; only 8.6% of the studies involved ‘smart’ mobile/handheld-technology.

Discussion CDSS impacted 38% of the outcome measures used positively. Care processes were better in 47% of the measures adopted; examples included, nurses’ adherence to hand disinfection guidance, insulin dosing, on-time blood sampling and documenting care. Patient care outcomes in 40.7% of indicators were better; examples included, lower numbers of falls and pressure ulcers, better glycaemic control, screening of malnutrition and obesity and triaging appropriateness.

Conclusion CDSS may have a positive impact on selected aspects of nurses’ and AHPs’ performance and care outcomes. However, comparative research is generally low quality, with a wide range of heterogeneous outcomes. After more than 13 years of synthesised research into CDSS in healthcare professions other than medicine, the need for better quality evaluative research remains as pressing.

INTRODUCTION
Nurses and allied health professionals’ (AHPs’) judgements and decisions commit financial, human and technical resources to care in health systems.1 To support decision-making and underpin new roles and ways of delivering services, such as nurse-led

Strengths and limitations of this study
- The review is based on a comprehensive literature search.
- This is the first systematic review of clinical decision support systems influence on nursing and allied health professional (AHP) performance and outcomes.
- AHPs are under-represented, with a primary focus on paramedics and physiotherapists.
- The number of studies, service users/patients and health professionals involved was sizeable, but outcomes were too heterogeneous to aggregate.
- The overall quality of comparative research represented by the included studies was poor.
primary care, computerised clinical decision support systems (CDSS) have been developed to tailor evidence-based advice provided to clinicians at the point of decision-making.

CDSS can improve professional performance by making the basis for decisions explicit; widening available information, encouraging more consistent decisions and thus reducing unwarranted variation in processes and patient outcomes. Negatively, CDSS could encourage a focus on unimportant problems, hinder care delivery and contribute to a widening of (digital) inequalities.

Reviews focusing mainly on doctors suggest CDSS effects on performance and outcomes are inconsistent, but improved care processes and reduced morbidity and mortality are possible. These reviews, however, often neglect the multidisciplinary nature of healthcare delivery and the decisions involved.

Previously synthesised studies of nurses’ use of CDSS suggest only limited impact on performance and health outcomes. Digital technology and research evidence have both developed significantly since this review was undertaken. In this review, we aim to examine the impact of CDSS on nurses’ and allied health professionals’ (AHPs) performance and patient outcomes.

**REVIEW METHODS**

Following best practice principles, we undertook a systematic review of research into CDSS targeting nurse and AHP decision-makers. The protocol was registered with PROSPERO (number: CRD42019147773).

**Literature searching**

Initial searches were conducted in November 2019 and updated on 12 February 2021. Searches were not restricted by language. See online supplemental table 1 for search terms.

We searched: MEDLINE (Ovid), Embase Classic+Embase (Ovid), PsycINFO (Ovid), Health Management Information Consortium (HMIC) (Ovid), AMED (Allied and Complementary Medicine) (Ovid), CINAHL, Cochrane Central Register of Controlled Trials (Wiley), Cochrane Database of Systematic Reviews (Wiley), Social Sciences Citation Index Expanded (Clarivate), ProQuest Dissertations and Theses Abstracts and Index, ProQuest ASSIA (Applied Social Science Index and Abstract), Clinical Trials.gov, WHO International Clinical Trials Registry (ICTRP), Health Services Research Projects in Progress (HSRProj), OpenClinical (www.OpenClinical.org), OpenGrey (www.opengrey.eu), Health IT.gov, Agency for Healthcare Research and Quality (www.ahrq.gov).

**Study inclusion and exclusion**

All titles and abstracts were imported into a reference management database (EndNote) and duplicates removed. Covidence review production toolkit (www.covidence.org) was used to manage screening, data extraction and organising of the review and ensure efficient production. After removing duplicate titles and abstracts, seven reviewers (A-MK, CT, HY, HK RR, SS and TFM) independently screened all titles and abstracts. TFM first-screened titles and abstracts for all studies, the other six authors then second-screened 16.7% of the studies each. Records with decision disagreements were revisited by two authors (TFM and CT) and resolved by consensus, a third reviewer (RR) was available for further disagreements although none occurred. Two reviewers (CT and TFM) independently assessed study relevance using Cochrane Collaboration’s Effective Practice and Organisation of Care (EPOC) criteria, and, conducted full-text screening. Any disagreements were resolved by consensus.

Comparative studies (randomised controlled trials (RCTs), non-randomised trials, controlled before–after (CBA) studies, interrupted time series (ITS) studies and repeated measures studies) comparing CDSS against usual care were eligible for inclusion.

**Participants**

Studies that evaluate the effects of CDSS used by nurses (including midwives) and AHPs and report professional performance and patient outcomes were eligible for inclusion.

**Interventions**

The eligible intervention in this review was the use of any form of CDSS to aid clinical decision making.

**Comparator**

The comparator was usual care, defined as clinical practice where clinical decision making is unsupported by CDSS.

**Outcomes**

Our primary outcome was adherence of nurses and AHPs to evidence-based recommendations. Secondary outcomes were diagnostic accuracy, time to reach judgement, adverse events, health professional satisfaction and system and/or implementation costs and benefits.

**Data extraction**

Data on study characteristics and outcomes were independently extracted by two reviewers (CT and TFM) using the EPOC standard data collection form.

**Quality assessment**

Study quality and risk of bias was assessed independently by CT and TFM using Cochrane Handbook for Systematic Reviews of Interventions and EPOC guidelines. Each potential source of bias was judged as high, low or unclear, and an overall ‘risk of bias’ classification (high, moderate or low) assigned to each included study. Studies with low risk of bias in all domains, or where bias was unlikely to fundamentally alter results, were treated as low risk. Studies with bias risk in at least one domain, or where bias might alter conclusions, were treated as unclear. Studies with a high risk of bias in at least one
domain, or with a serious bias likely to reduce the certainty of conclusions, were considered high risk.

**Data synthesis**

Findings were synthesised narratively, regardless of statistical analysis in the primary study. Studies were grouped by (i) similarity in focus or CDSS-type (knowledge based or machine learning), (ii) health professionals targeted, (iii) patient group, (iv) outcomes reported and (v) study design.

If not reported, we calculated absolute risks from the primary research. Risk differences and 95% CIs were then calculated from these. Because the CDSS, participants and underlying research questions were so heterogeneous no meta-analysis was undertaken.19

**RESULTS**

**Evidence quantity**

From 36,106 non-duplicate records identified, 35,858 records were excluded after title and abstract screening. Seven records were identified through forward citation searching. Full-text screening was undertaken on 255 records which led to 220 more records being excluded. Thirty-five studies were included in the review.20–51

**Study descriptions**

The 35 included studies comprised 28 RCTs (80%), three CBA studies (8.6%), three ITS (8.6%) and one non-randomised trial (2.8%). Thirty-two studies (91.4%) were peer-reviewed journal articles and three (8.6%) were PhD theses. The public sector funded 74.3% of studies; industry, 5.7%; 17.1% failed to declare funding and 2.9% were unfunded. Most studies were published after 2010 (n=29, 82.9%) with just two studies during 1997–1999 and 14 (40.0%) in 2000–2010. Sixteen studies (45.6%) were published after the last significant systematic review on CDSS for nurses’ performance and health outcomes.11

Circa 1318 health professionals and 67,595 patients were study participants, mainly in hospital-based studies (57.1%). Primary care accounted for 17.1% and nursing homes 11.4% of studies. Western health systems provided the dominant context: US (28.6%); UK (20.0%), Netherlands (17.2%), Czech Republic and Norway (5.7%) each; with single study representation (2.8%) from Belgium, Brazil, China, Ghana, Norway, Sweden, Turkey and one multicentre (Austria, Czech Republic, and UK) report. See table 1.

Only one study (of 35) reported explicit theory to guide implementation of the CDSS. Almost a third (28%) published their study protocol—none of which discussed theory-influenced implementation.

Nurses made up the target for the CDSS and control groups in 25 (71.4%) studies; paramedics in two (5.7%) studies. Five studies (14.3%) compared nurses in the intervention (CDSS) group with physicians in the control. Two studies (5.7%) recruited a combination of nurses and physiotherapists for CDSS and control groups. Thirty-one studies (88.7%) used a standalone (physically, even when integrated in an electronic health record) computer-based CDSS; three (8.6%) used handheld/mobile-based technologies and just one study (0.2%) used a web-based CDSS. CDSS were mostly designed with a single function in mind (eg, disease diagnosis), but some addressed multiple parts of clinical pathways (eg, disease diagnosis and disease management).

**Quality of identified evidence**

Except for three RCTs scored as ‘Unclear’, all studies were at ‘high’ overall risk of bias. On average, RCTs scored ‘Low’ risk of bias in five of nine domains; CBA studies were lower, with four domains; non-randomised studies scored ‘Low’ for a single domain. The three ITS studies were ‘Low’ risk of bias in six (of seven) domains. Evidence quality did not change over time (see online supplemental table 2).

**Effects of intervention**

Most studies reported more than two outcomes from a total of 124 individual outcomes reported (115 distinct types of measured outcomes). There were five distinct outcome groups:

- Care processes: aspects of patient data collection and management, and the process of patient management.
- Care outcomes: patient health outcomes (eg, fall and pressure ulcer prevention rate).
## Table 1  Baseline characteristics of included studies

<table>
<thead>
<tr>
<th>Author and year</th>
<th>Country</th>
<th>Design</th>
<th>Setting</th>
<th>Study duration</th>
<th>Healthcare professionals (HP)</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beeckman et al.2013</td>
<td>Belgium</td>
<td>RCT</td>
<td>Nursing homes</td>
<td>5 months</td>
<td>Nurses and physios</td>
<td>Risk of pressure ulcers; HP knowledge and attitude</td>
</tr>
<tr>
<td>Bennet et al.2016</td>
<td>UK</td>
<td>ITS</td>
<td>Emergency department, district general hospital</td>
<td>1 year</td>
<td>Nurses</td>
<td>Triage prioritisation; pain assessment and management; management of neutropenic sepsis</td>
</tr>
<tr>
<td>Blaha et al.2009</td>
<td>Czech Republic</td>
<td>RCT</td>
<td>ICU postelective cardiac surgery university hospital</td>
<td>48 hours</td>
<td>Nurses</td>
<td>Intensive care glycaemic control/diabetes</td>
</tr>
<tr>
<td>Byrne2005</td>
<td>USA</td>
<td>CBA</td>
<td>Nursing homes</td>
<td>33 months</td>
<td>Nurses</td>
<td>Falls and pressure ulcer reduction (assessment and prevention)</td>
</tr>
<tr>
<td>Canbolat et al.2019</td>
<td>Turkey</td>
<td>Non-RT</td>
<td>ICU university general hospital</td>
<td>22 months</td>
<td>Nurses (and physicians)</td>
<td>ICU glycaemic control</td>
</tr>
<tr>
<td>Cavalcanti et al.2009</td>
<td>Brazil</td>
<td>RCT</td>
<td>ICU general hospital</td>
<td>19 months</td>
<td>Nurses</td>
<td>ICU glycaemic control</td>
</tr>
<tr>
<td>Cleveringa et al.2008</td>
<td>Netherlands</td>
<td>RCT</td>
<td>Primary care practices</td>
<td>1 year</td>
<td>Nurses (and physicians)</td>
<td>Management and prevention of diabetes (and CV risk factors)</td>
</tr>
<tr>
<td>Cleveringa et al.2010</td>
<td>Netherlands</td>
<td>RCT</td>
<td>Primary care practices</td>
<td>1 year</td>
<td>Nurses</td>
<td>Management and prevention of diabetes (and CV risk factors)</td>
</tr>
<tr>
<td>Cortez2014</td>
<td>USA</td>
<td>RCT</td>
<td>Academic medical centre oncology clinics</td>
<td>11 weeks</td>
<td>Nurses</td>
<td>Management of cancer symptoms</td>
</tr>
<tr>
<td>Dalaba2015</td>
<td>Ghana</td>
<td>CBA</td>
<td>Primary care health centres</td>
<td>2 years</td>
<td>Nurses</td>
<td>Maternal care</td>
</tr>
<tr>
<td>Dowding et al.2012</td>
<td>USA</td>
<td>ITS</td>
<td>General hospitals</td>
<td>6 years</td>
<td>Nurses</td>
<td>Risk assessment, falls and pressure ulcer prevention</td>
</tr>
<tr>
<td>Duclos et al.2015</td>
<td>France</td>
<td>RCT</td>
<td>Paediatric wards in a university hospital</td>
<td>2 years</td>
<td>Dieticians</td>
<td>Nutritional care in malnourished children</td>
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<tr>
<td>Dumont et al.2012</td>
<td>USA</td>
<td>RCT</td>
<td>ICU wards in a regional referral hospital</td>
<td>4 months</td>
<td>Nurses</td>
<td>Glycaemic control</td>
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<tr>
<td>Dykes et al.2009</td>
<td>USA</td>
<td>RCT</td>
<td>Urban hospitals</td>
<td>6 months</td>
<td>Nurses</td>
<td>Fall prevention</td>
</tr>
<tr>
<td>Dykes et al.2020</td>
<td>USA</td>
<td>ITS</td>
<td>Academic medical centres</td>
<td>42 months</td>
<td>Nurses</td>
<td>Fall prevention</td>
</tr>
<tr>
<td>Fitzmaurice et al.2003</td>
<td>UK</td>
<td>RCT</td>
<td>Primary care/general practice</td>
<td>1 year</td>
<td>Nurses</td>
<td>Oral anticoagulation care</td>
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<tr>
<td>Forberg et al.2016</td>
<td>Sweden</td>
<td>RCT</td>
<td>Paediatric university hospital</td>
<td>3 months</td>
<td>Nurses</td>
<td>Management of peripheral venous catheters in paediatrics</td>
</tr>
<tr>
<td>Fossum et al.2011</td>
<td>Norway</td>
<td>CBA</td>
<td>Nursing homes</td>
<td>2 years</td>
<td>Nurses</td>
<td>Preventative behaviours and management of nutrition</td>
</tr>
<tr>
<td>Geurts et al.2017</td>
<td>Netherlands</td>
<td>RCT</td>
<td>University paediatric hospital</td>
<td>2 years</td>
<td>Nurses</td>
<td>Management of (re) hydration in children</td>
</tr>
<tr>
<td>Hovorka et al.2007</td>
<td>Czech Republic</td>
<td>RCT</td>
<td>Cardiac Surgery, University Hospital</td>
<td>48 hours</td>
<td>Nurses</td>
<td>Glycaemic control</td>
</tr>
<tr>
<td>Kroth et al.2006</td>
<td>USA</td>
<td>RCT</td>
<td>University Hospital</td>
<td>9 months</td>
<td>Nurses</td>
<td>Body temperature assessment</td>
</tr>
<tr>
<td>Lattimer et al.1998</td>
<td>UK</td>
<td>RCT</td>
<td>Primary care practices</td>
<td>1 year</td>
<td>Nurses and physicians</td>
<td>Emergency call assessment</td>
</tr>
<tr>
<td>Lattimer et al.2000</td>
<td>UK</td>
<td>RCT</td>
<td>Primary care practices</td>
<td>1 year</td>
<td>Nurses and physicians</td>
<td>Cost analysis of emergency call assessments</td>
</tr>
<tr>
<td>Lee et al.2009</td>
<td>USA</td>
<td>RCT</td>
<td>School of Nursing (University)</td>
<td>8 months</td>
<td>Nurses</td>
<td>Obesity management</td>
</tr>
<tr>
<td>Lv et al.2019</td>
<td>China</td>
<td>RCT</td>
<td>Community healthcare centres</td>
<td>1 year</td>
<td>Nurses</td>
<td>Chronic asthma management</td>
</tr>
</tbody>
</table>

Continued
► Health professionals’ knowledge, beliefs and behaviours: outcomes that relate to the health professionals themselves (eg, changed attitude and perception due to CDSS use).
► Adverse events: safety issues that could arise due to the use of CDSS (eg, morbidity).
► Economic costs and consequences: outcomes that relate to direct costs, savings, or cost-effectiveness of CDSS.

### Care process
CDSS was better than usual care for 16 of 34 (47.0%) care process outcomes. Care delivery was worse (n=5, 14.7%) or no different for 13 (38.2%) processes. See online supplemental table 3.

### Adherence to guidelines
The four RCTs reporting nurses’ adherence to guidelines examined 10 outcomes. Only one trial reported baseline and follow-up data for both arms, CDSS users had better adherence to hand disinfection guidelines (risk difference=6.7%; 95% CI: 4.9% to 8.5%); but were less likely to follow guidelines on disposable glove use (risk difference=−1.4%; 95% CI: −2.2 to −0.5%) and daily inspections of Peripheral Venous Catheters (risk difference=−5.2%; 95% CI: −7.2 to −3.3%).

Two trials showed nurses using CDSS had better compliance with guidelines on insulin dosing (risk difference=22%; 95% CI: 19% to 25%) and on-time blood sampling (risk difference=4.7%; 95% CI: 2.0% to 7.4%). They deviated less from protocols (mean score difference out of 10=−2.6; 95% CI: −4.5 to −0.71) and concurred more with recommended insulin doses (than trainee doctors).

### Patient assessment, diagnosis and treatment practices
Five RCTs and one ITS reported 18 indicators of patient assessment and treatment quality. Pain assessment quality (pain score use and appropriateness of choices) of emergency department patients improved by 62.7% (95% CI: 59.6% to 65.8%) and investigation of inpatient paediatric malnutrition aetiology was 21.2% higher (95% CI: 15.9% to 26.5%) with CDSS. However, optimal IV antibiotics administration for sepsis was lower reduced by 5.9% (95% CI: −8.3 to −3.5). Laboratory tests (electrolytes level acid–base balance test) and nutrition supplements (oral Rehydration Solution and intravenous rehydration) were no more likely to be ordered for paediatric inpatients by CDSS-enabled nurses.

There were marginally fewer wrongly recorded temperatures in hospital inpatients among CDSS-enabled nurses (risk difference=−0.8%, 95% CI: −0.9 to −0.6). Vital signs recording in patients attended by paramedics were also not significantly different.

### Documenting care
One ITS and a randomised trial reported five documentation-focused indicators. Falls (risk ratio=1.4, 95% CI: 0.03 to 73.7) and hospital acquired pressure ulcer risk assessments (risk ratio=9.1, 95% CI: 1.95 to 42.5) were higher with CDSS. As was nutritional
care planning, food and fluid intake recording and treatment by nurses.52

Referrals
Paramedics using CDSS were more likely to refer patients to a community falls than send them to the emergency department (risk difference=4.7%, 95% CI: 1.1 to 8.3).48

Patient care outcomes
CDSS improved patient care outcomes in 22 of 54 (40.7%) indicators and worsened them for one outcome indicator (2.0%). See online supplemental table 4.

Blood glucose control
Six RCTs22 25 26 37 42 44 and one non-randomised trial24 reported 19 indicators of glycemic control, but only two reported baseline and follow-up values.22 26 Blood glucose levels were better managed by ICU nurses using CDSS (mean=−2.2, SD=1.12) compared with paper-based Mathias (mean=−1.2, SD=0.66) and Bath (mean=−1.5, SD=0.78) protocols.22 Glycated haemoglobin (A1C)<7%, systolic blood pressure <140 and total cholesterol <4.5 mmol/L were higher by 4.6% (95% CI: 2.7 to 6.5), 10.2% (95% CI: 7.9 to 12.5) and 3.7% (95% CI: 1.2 to 6.2), respectively, in patients receiving care from CDSS-enabled nurses compared.

Trials reporting only follow-up data suggest better blood glucose control by CDSS-using nurses across a range of indicators: proportion in target range (risk difference=32.9%; 95% CI: 20.0 to 46.0), occasions within the target glycemic range (80–110 mg/dL) (risk difference=33.0%, 95% CI: 20.5 to 45.4), occasions over the target glycemic range (>110 mg/dL) (risk difference=31.0%, 95% CI: −43.7 to −18.2) and improvement of glycemic control for 48 hours (risk difference=40.0%, 95% CI: 27.4 to 52.6).

Blood coagulation management
One RCT reported three indicators of blood coagulation management in primary care.26 Nurses using CDSS had significantly more tests in range (risk difference=4.0%, 95% CI: 0.4 to 7.6) than doctors without CDSS. However, the improvement from baseline was lower among nurses (risk difference=−1.9% (95% CI: −3.1 to −0.7), ‘International Normalised Ratio (INR) Results within Range Point Prevalence’ were not significantly different between the two groups and again, nurses using CDSS improved less than physicians without CDSS (risk difference=−2.6%, 95% CI: −5.3 to −0.1). There was no significant difference between groups in ‘Time Spent within INR Target Range’ (risk difference=7.0%, 95% CI: −0.7 to 14.7).

Antenatal and peripartum care
The CBA study examining antenatal and peripartum care in community settings25 suggested CDSS-using midwives reduced delivery complications (per 1000 attendances) compared with usual care (risk difference=2.4%, 95% CI: 1.1 to 3.7).

Managing patients with chronic comorbid diseases
Two RCTs examined three indicators of successfully managing patients with complex chronic multimorbid health conditions in care homes,43 and with asthma.35 showed no significant differences between CDSS users and non-users for emergency room usage, hospitalisation and complexity of medication regimens.

Obesity screening
The RCT examining outpatient obesity screening by trainee nurses found CDSS-users had more ‘encounters with obesity-related diagnosis’ (risk difference=10.3%, 95% CI: 8.0 to 12.5) and fewer ‘encounters with missed obesity-related missed diagnosis’ (risk difference=41.0%, 95% CI: 48.8 to 35.0) than trainee nurses without CDSS.31

Fall and pressure ulcer prevention and management
Two RCTs,20 31 two CBA studies23 35 and two ITS30 54 focused on fall or pressure ulcer prevention and management. In a single trial,20 pressure ulcer prevalence decreased more during the CDSS-enabled follow-up period (risk difference=−6.3%, 95% CI: −10.2 to −2.4), a result which was reversed in one of the CBA studies (risk difference=4.2%, 95% CI: 0.2 to 8.2).35 The other CBA studies revealed no significant differences between CDSS using and non-using nurses trying to prevent falls and pressure ulcers.23 In the ITS study, fall rate (risk ratio=0.91, 95% CI: 0.75 to 1.12) and hospital acquired pressure ulcer occurrence (risk ratio=0.47, 95% CI: 0.25 to 0.85) were significantly lower with CDSS.30

Triage
Three RCTs30 40 48 and one ITS study21 evaluated CDSS impact on triage judgements. Health professionals using CDSS made fewer calls to general practitioners (GP) for telephone advice (risk difference=−34.2%, 95% CI: −36.0 to −33.0), had fewer patients visited at home by duty GPs (risk difference=5.5%, 95% CI: −6.9 to −4.2) and fewer hospital admissions within 3 days (risk difference=−0.98%, 95% CI: −1.8 to −0.2) of the judgement. There were no differences in ‘patients left at scene without conveyance to emergency department’ (risk difference=5.2%, 95% CI: −1.7 to 12.1). The ITS study reported the proportion of correct (sic) triage prioritisation judgements was higher among CDSS-users (risk difference=24.7%; 95% CI: 18.8 to 30.6).

Quality of life and patients’ satisfaction
Two RCTs examined CDSS impact on quality of life and patient satisfaction.27 40 Patients in CDSS-using groups gained more life years (average difference in years=0.14, 95% CI: −0.12 to 0.40), more healthy years (average difference in years=0.04, 95% CI: −0.07 to 0.14) but reported lower quality of life and satisfaction. None of these differences were statistically significant.

Health professionals’ knowledge, beliefs, and behaviour
CDSS effects on knowledge, beliefs and behaviours of health professionals30 26 32 47 were the focus of four RCTs.
using 12 indicators. CDSS increased ‘Positive knowledge change’ (risk difference=6.5%; 95% CI: 0.8 to 13.2), ‘positive attitude change’ (risk difference=12.7%, 95% CI: 5.9 to 19.5), ‘research utilisation’ (risk difference=9%; 95% CI: 3.3 to 14.7), nurses’ satisfaction (difference in satisfaction out of 10=3.6, 95% CI: 2.4 to 4.8) and perceived deviations from protocols (mean difference out of 10=−4.7, 95% CI: −6.1 to −3.3). Conversely, there was no significant impact on behaviours, intentions, perceived behavioural control, subjective and moral norms, barriers and research utilisation of CDSS-using nurses and physiotherapists (online supplemental table 5).

**Adverse events**
CDSS are not risk free, and three RCTs used four indicators to examine adverse events. Cardiovascular events in patients with diabetes (risk difference=−11.0%, 95% CI: −18.0 to −4.0) and deaths in primary care patients (risk difference=−5.7%, 95% CI: −10.1 to −1.7) were lower in CDSS-using groups of professionals. Serious adverse reactions in primary care patients and deaths in patients recently fallen and attended by paramedics were no less likely (online supplemental table 6).

**Economic costs and consequences**
Four RCTs used 20 indicators to report economic costs and consequences of CDSS. Costs of managing cardiovascular disease were lower in CDSS users (cost difference=−€587.00, 95% CI: −880.00 to −294.00). Diabetes care cost more (cost difference=€326.00, 95% CI: 315.00 to 318.00); took longer per care task (‘mean length of job cycle time’ difference in minutes=8.9; 95% CI: 2.3 to 15.3) to generate an additional quality adjusted life-year (QALY) costing €38243.00 (online supplemental table 7).

**DISCUSSION**

**Summary of main results**
Our systematic review suggests that CDSS may improve some aspects of nurses’ and AHPs’ performance and care outcomes. Thirty-eight percent (38%) of indicators were better. Of 35 included studies, 26 (74.3%) reported CDSS-influenced care as better than care without CDSS on at least one outcome. In contrast, eight studies (22.8%) showed no significant difference between CDSS and usual care, with seven studies suggesting CDSS were less effective than usual care for at least one outcome.

**Care processes**
Processes of care were better if CDSS was in use in almost half the studies, 16 of 34 (47%); a headline that masks a very wide range of absolute improvement: from 0.7% to 62.7%. Hand disinfection protocol adherence, insulin dosing, blood sampling at the right time and documented care were all better in CDSS users. This should be contrasted with the five (16.1%) outcomes where CDSS provided no advantages over usual care. Both sets of findings are mitigated further by the considerable uncertainty in trying to estimate a holistic picture: the effects in 13 care process indicators (41.9%) were not estimable; either because studies lacked power (lower than minimum acceptable of 80%) to detect a difference in the comparison groups, or appropriate confidence intervals were not reported or could not be calculated from information published.

**Patient care outcomes**
CDSS was associated with significantly better patient care outcomes across a broad range of 22 of 54 (40.7%) indicators (absolute difference between 4.6% and 42.9%). Just one indicator (1.8%) suggested no significant difference. Nurses using CDSS had better blood glucose control in emergency care patients (in five out of seven studies involved) and nurses and physiotherapists using CDSS were associated with better fall risk and pressure ulcer management. Triage was improved in nurses using CDSS in emergency call centres and paramedics faced with ‘emergency falls’ in older patients.

**Health professionals’ knowledge, beliefs, and behaviour**
Improved knowledge, beliefs and behaviour occurred in three of 12 indicators (25%). Nurse and physiotherapist CDSS-users had more knowledge and better attitudes compared with non-users. Compared with usual care, nurses utilised more research, were more satisfied at work, and perceived a greater need to follow protocols if they used CDSS.

**Adverse events**
CDSS generated fewer adverse events across two of four indicators (50%). CDSS-using nurses had fewer cardiovascular events and reported deaths in their primary care patients compare to similar patients seen by doctors not using CDSS.

**Economic costs and consequences**
CDSS did not significantly increase costs, or save money. Costs per QALY was €38243.00 in one study—higher than the widely accepted willingness-to-pay threshold of €20000 per QALY and the UK de facto threshold of £30000 per QALY to be considered cost-effective by the National Institute for Health and Care Excellence.

**Comparison with other studies or reviews**
Only one previous review has examined the effects of CDSS on nursing performance and patient outcomes. Twenty new primary studies have been published since this review; but inconsistent outcomes and weaknesses in study designs and methods remain. Given the importance of implementation in effectiveness, it was noteworthy that most studies lacked a theoretical foundation for the implementation of CDSS. Similarly, many studies did not report using guidelines for designing, conducting/evaluating and reporting CDSS-use. Of 35 included studies, just one used an explicit implementation model/theory
at design stage. None of the studies discussed their findings with reference to implementation science/theory.

In their review of 100 trials—principally with doctors—Garg et al reported improved performance in 64% and better patient outcomes in 13% of studies. Our results suggest greater improvement may be possible for nursing work in particular (47% of process indicators and 41% of outcomes). Garg et al transformed improvement into a binary (yes/no) indicator and did not quantify the outcome improvements—making the clinical significance of improvements hard to ascertain.

Bright et al reviewed RCTs of CDSS with a range of health professional decision-makers (doctors, nurses and AHPs). They reported improvements in processes of care (OR=1.55, 95% CI: 1.38 to 1.74) and morbidity (RR=0.88, 95% CI: 0.80 to 0.96), but no impact on mortality (OR=0.79, 95% CI: 0.54 to 1.15) or safety/adverse events (RR=1.01, 95% CI: 0.90 to 1.14). However, outcomes measured were too heterogeneous for meta-analysis. The criteria for comparison groups were relaxed; the ‘intervention’ sometimes included paper-based decision support and alternative CDSS systems were used as a comparator in some studies. Our review required there to be an indication for the use of CDSS and a comparator that ruled out CDSS-use as part of ‘usual care’. While we found improvements are possible from CDSS, comparison with Bright et al’s findings would be unreliable.

Moja et al’s findings would be unreliable. Moreover, although we have used a comprehensive list of databases in our search, the possibility of missing studies due to search terms cannot be ruled-out.

CONCLUSIONS
CDSS can benefit nurse and (some) AHP delivered performance and patient outcomes. CDSS can improve adherence to guidelines and enhance patient care. Ruling out emergency patients, glycaemic control and screening of malnutrition and obesity all represent appropriate targets for CDSS. These conclusions require cautious interpretation: they are based on mainly low-quality studies, with heterogeneous outcomes and indicators.

To improve the quality of studies and consistency of outcomes, future research should satisfy two key requirements. First, system designers and evaluators should consider appropriate implementation theory/models (examples include Normalisation Process Theory and the NASSS framework) given the planned technology and associated work to encourage sustained adoption. Second, study reporting is varied, poor quality and lacking essential detail for implementation; guidelines for conducting and reporting CDSS should be a feature of the publication of findings. This would make synthesis easier and more informative. Guidelines for CDSS reporting in general already exist, it is difficult to conceive why they cannot be applied to nursing and AHP-focused CDSS.

Strengths and limitations
Our review, while based on a comprehensive literature search, is a function of that literature. Consequently, we have highlighted primarily the impact of CDSS on nurses rather than AHPs. With the exception of paramedics and physiotherapists, other AHPs are poorly represented. Evidence quality was poor and has not improved significantly since 2009. While the number of studies (35), service users/patients (~67 000) and health professionals (~1318) involved were sizeable, outcomes were too heterogeneous for aggregation. Inconsistencies in the effects of CDSS on target health professionals’ performance and patient outcomes remain unresolved.
REFERENCES


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18. Cochrane Effective Practice and Organisation of Care (EPOC). Suggested risk of bias criteria for EPOC reviews. EPOC resources for review authors, 2017. Available: https://epoc.cochrane.org/resources/epoc-resources-review-authors


41. Lee N-J, Chen ES, Currie LM, et al. The effect of a mobile clinical decision support system on the diagnosis of obesity and...


SUPPLEMENTARY MATERIAL LIST

Supplementary Table 1: Search strategies, to February 12, 2021

Supplementary Table 2: Risk of Bias assessment justifications using Effective Practice Organisation of Care (EPOC)’s tool

Supplementary Table 3: Summary of patient care process results

Supplementary Table 4: Summary of patient care outcomes results

Supplementary Table 5: Summary of Health professionals’ knowledge, beliefs and behaviour results

Supplementary Table 6: Summary of adverse events results

Supplementary Table 7: Summary of economic costs and consequences results
Supplementary Table 1: Search strategies

1. Ovid MEDLINE(R) ALL, 1946 to February 12, 2021 Search Strategy

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or/7-29 (1674343)

6 and 30 (66042)

exp Decision Making, Computer-Assisted/ (149528)

Decision Support Systems, Clinical/ (8302)

(computer assisted adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab,kf. (1545)

(computer aided adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab,kf. (1545)

(decision adj2 support adj2 (system* or tool*)).ti,ab,kf. (9917)

(decision making adj2 (system* or tool*)).ti,ab,kf. (2560)

Expert Systems/ (3420)

(expert adj2 system*).ti,ab,kf. (3613)

Reminder Systems/ (3568)

((computer* or electronic* or CDSS) adj2 (reminder* or alert*)).ti,ab,kf. (1210)

((medication or medicine or treatment or therapy) adj2 (reminder* or alert*)).ti,ab,kf. (857)

reminder system*.ti,ab,kf. (875)

Medical Order Entry Systems/ (2303)

((computer* or electronic*) adj2 order entry).ti,ab,kf. (1874)

(computer adj2 decision support*).ti,ab. (412)

CPOE.ti,ab,kf. (1139)

or/32-47 (177952)

31 or 48 [all computerised clinical decision support systems terms] (228840)

Allied Health Personnel/ (11925)

Allied Health Occupations/ (587)

Physical Therapist Assistants/ (16)

Physical Therapy Specialty/ (2889)

Speech-Language Pathology/ (3172)
55  Occupational Therapy/ (13482)
56  Nutritionists/ (1290)
57  dietetics/ (7837)
58  Anesthesiologists/ (1163)
59  podiatry/ (2273)
60  exp Osteopaths/ (321)
61  osteopathic physicians/ (321)
62  anesthesiologist*.ti,ab,kf. (22810)
63  podiatrist*.ti,ab,kf. (910)
64  prosthethist*.ti,ab,kf. (397)
65  chiropodist*.ti,ab,kf. (132)
66  orthoptist*.ti,ab,kf. (319)
67  orthotist*.ti,ab,kf. (220)
68  osteopath*.ti,ab,kf. (5983)
69  radiographer*.ti,ab,kf. (1803)
70  art therapist*.ti,ab,kf. (89)
71  drama therapist*.ti,ab,kf. (3)
72  music therapist*.ti,ab,kf. (368)
73  (allied adj2 health adj2 (profession* or worker* or personnel or occupation* or staff)).ti,ab,kf. (3421)
74  ((physical or occupational or language or speech or physio*) adj2 therap*).ti,ab,kf. (50227)
75  physiotherapist*.ti,ab,kf. (8544)
76  dietetic*.ti,ab,kf. (9828)
77  dietitian*.ti,ab,kf. (6580)
78  nutritionist*.ti,ab,kf. (3020)
79  Patient care team/ (66483)
80  ((multidisciplinary or multi-disciplinary or multi-professional or multi-professional or interdiscipliary or interprofessional) adj2 team*).ti,ab,kf. (32126)
81  Emergency Medical Technicians/ (5756)
82  Emergency Medical Services/ (43736)
83  Ambulances/ (6210)
Air Ambulances/ (2874)
paramedic*.ti,ab,kf. (8537)
HEMS.ti,ab,kf. (767)
ems.ti,ab,kf. (13017)
emt.ti,ab,kf. (25232)
prehospital.ti,ab,kf. (13136)
pre-hospital.ti,ab,kf. (4836)
first responder*.ti,ab,kf. (2449)
emergency medical technician*.ti,ab,kf. (1168)
emergency services.ti,ab,kf. (4115)
ambulance*.ti,ab,kf. (11269)
field triage.ti,ab,kf. (275)
out-of-hospital.ti,ab,kf. (11317)
(nurse or nurses or nursing).ti,ab,kf. (462330)
exp nurses/ (89638)
exp nursing staff/ (67063)
Midwifery/ (19460)
(midwif* or midwiv*).ti,ab,kf. (25895)
or/50-101 [allied health professionals or nurses or midwives] (836031)
49 and 102 [all CDSS and allied health professionals or nurses or midwives] (9549)

2. Embase Classic+Embase 1947 to February 12, 2021 Search Strategy

exp Decision Making/ (399525)
decision support techniques/ (20092)
(decision* adj2 making).ti,ab,kw. (218454)
(decision* adj2 support*).ti,ab,kw. (32940)
(decision* adj2 aid*).ti,ab,kw. (9487)
or/1-5 (504731)
exp Computer/ (159861)
exp information system/ (166084)
exp information science/ (113984)
Internet/ (112888)
Software/ (79162)
mobile phone/ (17899)
smartphone/ (15041)
Mobile Application/ (13261)
exp Telemedicine/ (47236)
electronic medical record system/ (1535)
exp Electronic Health Record/ (21723)
computer*.ti,ab,kw. (407323)
electronic*.ti,ab,kw. (350647)
(internet or web or online or on-line).ti,ab,kw. (418206)
/software or computer program*.ti,ab,kw. (321717)
(automate* or automation).ti,ab,kw. (197239)
pda or pdas).ti,ab,kw. (18450)
personal digital assistant*.ti,ab,kw. (1217)
(app or apps).ti,ab,kw. (43764)
(application* adj2 mobile*).ti,ab,kw. (6399)
(iPad* or iPhone* or smartphone* or smart phone* or smart device* or android phone* or cellphone* or cell phone* or mobile phone*).ti,ab,kw. (38430)
/tablet adj2 (pc or device* or comput*).ti,ab,kw. (2528)
((hand held or handheld) adj2 (pc or device* or comput*)).ti,ab,kw. (3833)
(telehealth or telecare or telemedicine or ehealth or mhealth).ti,ab,kw. (35247)
or/7-30 (1897765)
6 and 31 (80108)
exp decision support system/ (27016)
clinical decision support system/ (3594)
(computer assisted adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab,kw. (2316)
(computer aided adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab,kw. (5577)

(decision adj2 support adj2 (system* or tool*)).ti,ab,kw. (13211)

(decision making adj2 (system* or tool*)).ti,ab,kw. (3662)

Expert System/ (5507)

(expert adj2 system*).ti,ab,kw. (5205)

Reminder System/ (2730)

((computer* or electronic* or CDSS) adj2 (reminder* or alert*)).ti,ab,kw. (1848)

((medication or medicine or treatment or therapy) adj2 (reminder* or alert*)).ti,ab. (1362)

reminder system*.ti,ab,kw. (1189)

_physician order entry system/ (284)

((computer* or electronic*) adj2 order entry).ti,ab,kw. (2801)

CPOE.ti,ab,kw. (1715)

(computer* adj2 decision support*).ti,ab,kw. (1907)

or/33-48 (56905)

32 or 49 [All computerised clinical decision support systems terms] (106747)

Occupation/ (52894)

physiotherapist assistant/ (83)

physiotherapist/ (23150)

speech disorder/ (27422)

Occupational Therapy/ (25731)

dietitian/ (13219)

Anesthesiologist/ (7231)

osteopathic physician/ (356)

radiographer/ (634)

podiatrist/ (831)

anesthesiologist*.ti,ab,kw. (34979)

podiatrist*.ti,ab,kw. (1315)

prosthetist*.ti,ab,kw. (635)

chiropodist*.ti,ab,kw. (179)
orthoptist*.ti,ab,kw. (620)
orthotist*.ti,ab,kw. (419)
osteopath*.ti,ab,kw. (8365)
 radiographer*.ti,ab,kw. (4001)
 art therapist*.ti,ab,kw. (266)
 drama therapist*.ti,ab,kw. (20)
 music therapist*.ti,ab,kw. (607)
(allied adj2 health adj2 (profession* or worker* or personnel or occupation* or staff)).ti,ab,kw. (5338)
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physiotherapist*.ti,ab,kw. (18271)
dietetic*.ti,ab,kw. (14409)
dietitian*.ti,ab,kw. (10785)
nutritionist*.ti,ab,kw. (5156)
Patient care/ (310700)
multi-disciplinary team/ (10246)
collaborative care team/ (903)
((multidisciplinary or multi-disciplinary or multiprofessional or multi-professional or interdisciplinary or interprofessional) adj2 team*).ti,ab,kw. (57679)
rescue personnel/ (8059)
emergency health service/ (105109)
ambulance/ (14751)
air medical transport/ (2965)
paramedical personnel/ (14896)
paramedic*.ti,ab,kw. (13029)
HEMS.ti,ab,kw. (1067)
ems.ti,ab,kw. (19120)
emt.ti,ab,kw. (36500)
prehospital.ti,ab,kw. (18282)
pre-hospital.ti,ab,kw. (8656)
first responder*.ti,ab,kw. (3260)
Supplemental material

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Supplemental material

3. PsycINFO 1806 to February 12, 2021 Search Strategy:

1  exp Decision Making/ (124412)
2  Decision Support Systems/ (3377)
3  (decision* adj2 making).ti,ab. (93578)
4  (decision* adj2 support*).ti,ab. (5773)
5  (decision* adj2 aid*).ti,ab. (1934)
6  or/1-5 (168090)
7  exp Computers/ (43893)
8  exp information systems/ (48548)
9  exp information/ (44565)
10  Internet/ (29404)
11  computer software/ (10412)
12  mobile Phones/ (4735)
13  smartphones/ (1843)
14  mobile applications/ (1082)
15  Mobile devices/ (2634)
16  exp Telemedicine/ (9383)
Health Information Technology/ (304)
Electronic Health Records/ (880)
computer*.ti,ab. (91287)
electronic*.ti,ab. (33377)
(internet or web or online or on-line).ti,ab. (145714)
software or computer program*.ti,ab. (31224)
(automate* or automation).ti,ab. (14470)
(pda or pdas).ti,ab. (937)
personal digital assistant*.ti,ab. (440)
(app or apps).ti,ab. (7624)
(application* adj2 mobile*).ti,ab. (1392)
(iPad* or iPhone* or mobile phone or smartphone* or smart phone* or smart device* or android phone* or cellphone* or cell phone*).ti,ab. (10036)
tablet adj2 (pc or device* or comput*).ti,ab. (680)
((hand held or handheld) adj2 (pc or device* or comput*)).ti,ab. (813)
(telehealth or telecare or telemedicine or ehealth or mhealth).ti,ab. (4475)
or/7-31 (362180)
6 and 32 (21605)
Decision Support Systems/ (3377)
Computer Assisted Diagnosis/ (1589)
computer assisted adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab. (273)
computer aided adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab. (179)
decision adj2 support adj2 (system* or tool*).ti,ab. (2189)
decision making adj2 (system* or tool*).ti,ab. (1022)
Expert Systems/ (5732)
expert adj2 system*.ti,ab. (1376)
((medication or medicine or treatment or therapy) adj2 (reminder* or alert*)).ti,ab. (202)
reminder system*.ti,ab. (125)
((computer* or electronic*) adj2 order entry).ti,ab. (94)
(computer* adj2 decision support*).ti,ab. (183)
CPOE.ti,ab. (46)
or/33-46 [CDSS terms] (30902)
Allied Health Personnel/ (1109)
Physical Therapists/ (536)
Physical Therapy/ (2987)
Speech therapists/ (1229)
Speech Language Pathology/ (1088)
Occupational Therapists/ (2346)
anesthesiologist*.ti,ab. (457)
podiatrist*.ti,ab. (47)
prosthetist*.ti,ab. (23)
orthoptist*.ti,ab. (17)
[chiropodist*.ti,kw.] (0)
[orthotist*.ti,kw.] (0)
[osteopath*.ti,kw.] (0)
radiographer*.ti,ab. (81)
art therapist*.ti,ab. (1375)
drama therapist*.ti,ab. (75)
music therapist*.ti,ab. (1337)
(allied adj2 health adj2 (profession* or worker* or personnel or occupation* or staff)).ti,ab. (1123)
((physical or physio* or occupational or language or speech) adj2 therap*).ti,ab. (18118)
physiotherapist*.ti,ab. (1346)
dietetic*.ti,ab. (610)
dietitian*.ti,ab. (756)
nutritionist*.ti,ab. (417)
Interdisciplinary Treatment Approach/ (7399)
((multidisciplinary or multi-disciplinary or multiprofessional or multi-professional or interdisciplinary or interprofessional) adj2 team*).ti,ab. (8106)

Search Strategy:

1. exp Decision Making/ (5606)
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3. (decision* adj2 support*).ti,ab. (871)
4. (decision* adj2 aid*).ti,ab. (276)
5. or/1-4 (10211)
6. exp Computers/ (2133)
7. exp information systems/ (4916)
exp medical Informatics/ (67)
Internet/ (1342)
Software/ (0)
telephone/ (110)
Telemedicine/ (1328)
computerised medical records systems.ti,ab. (0)
Medical Records/ (1946)
computer*.ti,ab. (6305)
electronic*.ti,ab. (4484)
(internet or web or online or on-line).ti,ab. (5066)
/software or computer program*.ti,ab. (1593)
(automate* or automation).ti,ab. (605)
(pda or pdas).ti,ab. (56)
personal digital assistant*.ti,ab. (32)
(app or apps).ti,ab. (130)
(application* adj2 mobile*).ti,ab. (32)
(iPad* or iPhone* or smartphone* or smart phone* or smart device* or android phone* or cell phone*).ti,ab. (146)
/tablet adj2 (pc or device* or comput*).ti,ab. (16)
((hand held or handheld) adj2 (pc or device* or comput*)).ti,ab. (61)
(telehealth or telecare or telemedicine or mhealth or ehealth).ti,ab. (1453)
or/6-27 (22729)
5 and 28 (1239)
(computer assisted adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab. (25)
(computer aided adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab. (17)
(decision adj2 support adj2 (system* or tool*)).ti,ab. (347)
(decision making adj2 (system* or tool*)).ti,ab. (107)
Expert Systems/ (107)
(expert adj2 system*).ti,ab. (131)
((computer* or electronic* or CDSS) adj2 (reminder* or alert*)).ti,ab. (48)

reminder system*.ti,ab. (44)

((computer* or electronic* or CDSS) adj2 (reminder* or alert*)).ti,ab. (48)

((computer* or electronic*) adj2 order entry).ti,ab. (58)

(computer* adj2 decision support*).ti,ab. (114)

CPOE.ti,ab. (26)

or/29-41 [all CDSS terms] (1714)

Allied Health Personnel/ (0)

Physical Therapy Speciality/ (0)

Physiotherapists/ (350)

Speech-Language Pathology/ (0)

Occupational Therapists/ (542)

podiatrists/ (59)

anesthesiologist*.ti,ab. (11)

podiatrist*.ti,ab. (37)

prosthetist*.ti,ab. (19)

chiroprist*.ti,ab. (76)

orthoptist*.ti,ab. (23)

orthotist*.ti,ab. (15)

osteopath*.ti,ab. (93)

radiographer*.ti,ab. (178)

art therapist*.ti,ab. (5)

drama therapist*.ti,ab. (2)

music therapist*.ti,tw. (15)

(allied adj2 health adj2 (profession* or worker* or personnel or occupation* or staff)).ti,ab. (368)

((physical or physio* or occupational or language or speech) adj2 therap*).ti,ab. (2010)

physiotherapist*.ti,ab. (671)

dietetic*.ti,ab. (187)

dietitian*.ti,ab. (130)
nutritionist*.ti,ab. (28)
Patient care team/ (139)
((multidisciplinary or multi-disciplinary or multiprofessional or multi-professional or interdisciplinary or interprofessional) adj2 team*).ti,ab. (1676)
exp emergency medical services/ (0)
paramedic*.ti,ab. (395)
HEMS.ti,ab. (11)
ems.ti,ab. (51)
emt.ti,ab. (3)
prehospital.ti,ab. (58)
pre-hospital.ti,ab. (137)
first responder*.ti,ab. (28)
emergency medical technician*.ti,ab. (8)
emergency services.ti,ab. (514)
ambulance*.ti,ab. (1710)
field triage.ti,ab. (1)
out-of-hospital.tw. (292)
nurses/ (12920)
nursing staff/ (12920)
(nurse or nurses or nursing).ti,ab. (39541)
midwifery/ (665)
(midwif* or midwiv*).ti,ab. (4553)
or/43-85 [allied health professionals or nurses or midwives] (50288)
42 and 86 [all CDSS terms and allied health professionals or nurses or midwives] (291)

5. AMED (Allied and Complementary Medicine) 1985 to October 2019Search Strategy:

1 exp Decision Making/ (4522)
2 (decision* adj2 making).ti,ab. (2826)
3 (decision* adj2 support*).ti,ab. (217)
(decision* adj2 aid*).ti,ab. (92)
or/1-4 (6218)
exp Computers/ (1765)
exp information systems/ (150)
exp medical Informatics/ (775)
Internet/ (1242)
Software/ (450)
telephone/ (377)
Telemedicine/ (985)
computerised medical records systems.ti,ab. (0)
Medical Records/ (383)
computer*.ti,ab. (4200)
electronic*.ti,ab. (2339)
(internet or web or online or on-line).ti,ab. (6503)
(software or computer program*).ti,ab. (1436)
(automate* or automation).ti,ab. (399)
(pda or pdas).ti,ab. (77)
personal digital assistant*.ti,ab. (26)
(app or apps).ti,ab. (175)
(application* adj2 mobile*).ti,ab. (39)
(iPad* or iPhone* or smartphone* or smart phone* or smart device* or android phone* or cellphone* or cell phone*).ti,ab. (225)
(tablet adj2 (pc or device* or comput*).ti,ab. (29)
((hand held or handheld) adj2 (pc or device* or comput*)).ti,ab. (40)
(telehealth or telecare or telemedicine or mhealth or ehealth).ti,ab. (555)
or/6-27 (16500)
5 and 28 (443)
(computer assisted adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab. (18)
(computer aided adj2 (decision* or diagnos* or therap* or support or treatment? or management)).ti,ab. (13)
(decision adj2 support adj2 (system* or tool*)).ti,ab. (41)
(decision making adj2 (system* or tool*)).ti,ab. (62)
Expert Systems/. (12)
(expert adj2 system*).ti,ab. (46)
((computer* or electronic* or CDSS) adj2 (reminder* or alert*)).ti,ab. (7)
reminder system*.ti,ab. (3)
((computer* or electronic* or CDSS) adj2 (reminder* or alert*)).ti,ab. (7)
((computer* or electronic*) adj2 order entry).ti,ab. (0)
(computer* adj2 decision support*).ti,ab. (8)
CPOE.ti,ab. (0)
or/29-41 [all CDSS terms] (593)
Allied Health Personnel/. (659)
Physical Therapy Speciality/. (2201)
Physiotherapists/. (1476)
Speech-Language Pathology/. (237)
Occupational Therapists/. (1076)
podiatrists/. (36)
anesthesiologist*.ti,ab. (64)
podiatrist*.ti,ab. (172)
prosthetist*.ti,ab. (84)
chiropractist*.ti,ab. (32)
orthoptist*.ti,ab. (1)
orthotist*.ti,ab. (63)
osteopath*.ti,ab. (1733)
radiographer*.ti,ab. (18)
art therapist*.ti,ab. (179)
drama therapist*.ti,ab. (10)
music therapist*.ti,tw. (115)
(allied adj2 health adj2 (profession* or worker* or personnel or occupation* or staff)).ti,ab. (285)
((physical or physio* or occupational or language or speech) adj2 therap*).ti,ab. (14459)
62 physiotherapist*.ti,ab. (2897)
63 dietetic*.ti,ab. (133)
64 dietitian*.ti,ab. (74)
65 nutritionist*.ti,ab. (39)
66 Patient care team/ (1786)
67 ((multidisciplinary or multi-disciplinary or multiprofessional or multi-professional or interdisciplinary or interprofessional) adj2 team*).ti,ab. (1129)
68 exp emergency medical services/ (420)
69 paramedic*.ti,ab. (78)
70 HEMS.ti,ab. (1)
71 ems.ti,ab. (96)
72 emt.ti,ab. (65)
73 prehospital.ti,ab. (32)
74 pre-hospital.ti,ab. (13)
75 first responder*.ti,ab. (9)
76 emergency medical technician*.ti,ab. (8)
77 emergency services.ti,ab. (24)
78 ambulance*.ti,ab. (45)
79 field triage.ti,ab. (0)
80 out-of-hospital.tw. (10429)
81 nurses/ (1071)
82 nursing staff/ (213)
83 (nurse or nurses or nursing).ti,ab. (9441)
84 midwifery/ (120)
85 (midwif* or midwiv*).ti,ab. (239)
86 or/43-85 [allied health professionals or nurses or midwives] (41793)
87 42 and 86 [all CDSS terms and allied health professionals or nurses or midwives] (186)

6. CINAHL EBSCO Search Strategy
<table>
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<th>#</th>
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<td>(MH &quot;Midwives+&quot;)</td>
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<td>TI &quot;drama therapist*&quot; OR AB &quot;drama therapist*&quot;</td>
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<td>TI paramedic* OR AB paramedic*</td>
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<td>(MH &quot;Ambulances&quot;)</td>
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<td>(MH &quot;Emergency Medical Services&quot;)</td>
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<td>(MH &quot;Emergency Medical Technicians&quot;)</td>
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<td>TI ( ((multidisciplinary or multi-disciplinary or multiprofessional or &quot;multi-professional&quot; or interdisciplinary or interprofessional) ) OR AB ( (multidisciplinary or &quot;multi-disciplinary&quot; or multiprofessional or &quot;multi-professional&quot; or interdisciplinary or interprofessional) N2 team* ) )</td>
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<td>(MH &quot;Multidisciplinary Care Team&quot;)</td>
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<td>TI nutritionist* OR AB nutritionist*</td>
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<td>TI dietitian* OR AB dietitian*</td>
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<td>TI physiotherapist* OR AB physiotherapist*</td>
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<td>TI ( ((physical or occupational or language or speech) N1 therapist*) ) AND AB ( ((physical or occupational or language or speech) N1 therapist*) )</td>
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<td>(MH &quot;Physical Therapist Assistants&quot;)</td>
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<td>TI &quot;music therapist*&quot; OR AB &quot;music therapist*&quot;</td>
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<td>S48</td>
<td>TI &quot;Physical Therapist Assistant*&quot; or AB &quot;Physical Therapist Assistant*&quot;</td>
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<td>TI ( ((computer* or electronic* or CDSS) N2 (reminder* or alert*)) ) OR AB ( ((computer* or electronic* or CDSS) N2 (reminder* or alert*)) ) or TI ( (medication or medicine or treatment or therapy) N2 (reminder* or alert*)) or AB ( (medication or medicine or treatment or therapy) N2 (reminder* or alert*))</td>
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<td>S36</td>
<td>TI ( (&quot;computer aided&quot; N2 (decision* or diagnos* or therap*)) ) OR AB ( (&quot;computer aided&quot; N2 (decision* or diagnos* or therap*)) )</td>
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7. Cochrane Library search strategy

#1 MeSH descriptor: [Decision Making] explode all trees 3960

#2 MeSH descriptor: [Decision Support Techniques] explode all trees 2466

#3 (decision* near/2 making):ti,ab,kw (Word variations have been searched) 14369

#4 ((decision* near/2 support*)):ti,ab,kw (Word variations have been searched) 3552
#5  (decision* near/2 aid*):ti,ab,kw (Word variations have been searched) 1657
#6  {or #1-#5} 20279
#7  MeSH descriptor: [Computers] explode all trees 1732
#8  MeSH descriptor: [Information Systems] explode all trees 2293
#9  MeSH descriptor: [Informatics] explode all trees 8936
#10 MeSH descriptor: [Patient Portals] this term only 19
#11 MeSH descriptor: [Software] this term only 940
#12 MeSH descriptor: [Mobile Applications] this term only 686
#13 MeSH descriptor: [Cell Phone] explode all trees 1710
#14 MeSH descriptor: [Telemedicine] explode all trees 2649
#15 MeSH descriptor: [Medical Records Systems, Computerized] this term only 196
#16 MeSH descriptor: [Electronic Health Records] 1 tree(s) exploded 359
#17  (computer*):ti,ab,kw (Word variations have been searched) 47867
#18  (electronic*):ti,ab,kw (Word variations have been searched) 17343
#19  (internet or web or online or on-line):ti,ab,kw (Word variations have been searched) 32321
#20  (software or "computer program"):ti,ab,kw (Word variations have been searched) 24140
#21  (automate* or automation):ti,ab,kw (Word variations have been searched) 8858
#22  (pda or pdas):ti,ab,kw (Word variations have been searched) 1067
#23  ("personal digital assistant"):ti,ab,kw (Word variations have been searched) 168
#24  ((app or apps)):ti,ab,kw (Word variations have been searched) 4858
#25  (application* near/2 mobile*):ti,ab,kw (Word variations have been searched) 2489
#26  ((iPad* or iPhone* or smartphone* or "smart phone*" or "smart device*" or "android phone" or "cell phone*")):ti,ab,kw (Word variations have been searched) 6453
#27  ((tablet near/2 (pc or device* or comput*)):ti,ab,kw (Word variations have been searched) 936
#28  (("hand held" or handheld) near/2 (pc or device* or comput*)):ti,ab,kw 720
#29 ((telehealth or telecare or telemedicine or eHealth or mHealth)):ti,ab,kw (Word variations have been searched) 6874
#30 {or #7-#29} 124876
#31 #6 and #30 7180
#32 MeSH descriptor: [Decision Making, Computer-Assisted] explode all trees 4237
#33 MeSH descriptor: [Decision Support Systems, Clinical] this term only 380
#34 ((computer assisted near/2 (decision* or diagnos* or therap* or support or treatment* or management))):ti,ab,kw (Word variations have been searched) 2996
#35 ((computer aided near/2 (decision* or diagnos* or therap* or support or treatment* or management))):ti,ab,kw (Word variations have been searched) 191
#36 ((decision near/2 support near/2 (system* or tool*))):ti,ab,kw (Word variations have been searched) 1893
#37 ((decision making near/2 (system* or tool*))):ti,ab,kw (Word variations have been searched) 241
#38 MeSH descriptor: [Expert Systems] this term only 58
#39 ((expert near/2 system*)):ti,ab,kw (Word variations have been searched) 243
#40 MeSH descriptor: [Reminder Systems] this term only 953
#41 (((computer* or electronic*) near/2 (reminder* or alert*))):ti,ab,kw (Word variations have been searched) 445
#42 (reminder system*):ti,ab,kw (Word variations have been searched) 2798
#43 ((medication or medicine or treatment or therapy) near/2 (reminder* or alert*)):ti,ab,kw 339
#44 MeSH descriptor: [Medical Order Entry Systems] this term only 67
#45 (((computer* or electronic*) near/2 order entry)):ti,ab,kw (Word variations have been searched) 119
#46 (computer* near/2 "decision support") 476
#47 {or #32-#46} 10556
#48 #31 or #47 15798
#49 MeSH descriptor: [Allied Health Personnel] this term only 273
#50 MeSH descriptor: [Allied Health Occupations] this term only 7
#51 MeSH descriptor: [Physical Therapist Assistants] this term only 2
MeSH descriptor: [Physical Therapy Specialty] this term only 120
MeSH descriptor: [Speech-Language Pathology] this term only 67
MeSH descriptor: [Occupational Therapy] this term only 775
MeSH descriptor: [Nutritionists] this term only 44
MeSH descriptor: [Dietetics] this term only 96
MeSH descriptor: [Anesthesiologists] this term only 36
MeSH descriptor: [Podiatry] this term only 39
MeSH descriptor: [Osteopathic Physicians] this term only 3
(anesthesiologist*):ti,ab,kw 7826
(podiatrist*):ti,ab,kw 116
(prosthetist*):ti,ab,kw 35
(chiropract*):ti,ab,kw 10
(orthoptist*):ti,ab,kw 43
(orthotist*):ti,ab,kw 32
(osteopath*):ti,ab,kw 753
(radiographer*):ti,ab,kw 132
("art therapist*"):ti,ab,kw 12
("music therapist*"):ti,ab,kw 137
("drama therapist*"):ti,ab,kw 2
((allied near/2 health near/2 (profession* or worker* or personnel
or occupation* or staff))):ti,ab,kw (Word variations have been searched) 472
(((physical or occupational or language or speech) near/
therapist*)):ti,ab,kw (Word variations have been searched) 31090
(physiotherapist*):ti,ab,kw (Word variations have been searched) 5252
(dietitian*):ti,ab,kw (Word variations have been searched) 2027
(nutritionist*):ti,ab,kw (Word variations have been searched) 715
MeSH descriptor: [Patient Care Team] this term only 1700
(((multidisciplinary or "multi-disciplinary" or interdisciplinar
or multiprofessional or "multi-professional" or interprofessional) near/2
team*)):ti,ab,kw (Word variations have been searched) 2422
MeSH descriptor: [Emergency Medical Technicians] this term only 171
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<td>MeSH descriptor: [Emergency Medical Services] this term only</td>
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<td>MeSH descriptor: [Air Ambulances] this term only</td>
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<td>81</td>
<td>(paramedic*):ti,ab,kw (Word variations have been searched)</td>
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<td>(HEMS):ti,ab,kw (Word variations have been searched)</td>
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<td>(ems):ti,ab,kw (Word variations have been searched)</td>
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<td>(emt):ti,ab,kw (Word variations have been searched)</td>
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<td>(prehospital):ti,ab,kw (Word variations have been searched)</td>
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<td>(&quot;emergency medical technician&quot;):ti,ab,kw (Word variations have been searched)</td>
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<td>(&quot;emergency services&quot;):ti,ab,kw (Word variations have been searched)</td>
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<td>(ambulance*):ti,ab,kw (Word variations have been searched)</td>
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<td>(&quot;field triage&quot;):ti,ab,kw (Word variations have been searched)</td>
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<td>(&quot;out-of-hospital&quot;):ti,ab,kw (Word variations have been searched)</td>
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<td>MeSH descriptor: [Nursing] explode all trees</td>
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<td>MeSH descriptor: [Nursing Care] explode all trees</td>
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<td>95</td>
<td>MeSH descriptor: [Nursing Staff] explode all trees</td>
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<td>#48 AND #99</td>
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Cochrane Database of Systematic Reviews = 58  Cochrane Trials =2205

8. Social Science Citation Index Search Strategy
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<td>#6</td>
<td>TS=(((&quot;allied health&quot; NEAR/2 (profession* OR worker* OR personnel OR occupation* OR staff) ) OR (&quot;physical therapist&quot; OR &quot;physical therapists&quot;) OR (&quot;occupational therapist&quot; OR &quot;occupational therapists&quot;) OR (&quot;language therapist&quot; OR &quot;language therapists&quot;) OR (&quot;speech therapist&quot; OR &quot;speech therapists&quot;) ) OR (physiotherapist* OR dietitian* OR dietetics OR nutritionist* OR music therapist* OR anesthesiologist* OR orthoptist* OR chiropodist* OR podiatrist* OR osteopath* OR prosthetist* OR orthotist* OR radiographer* OR &quot;art therapist&quot;* OR &quot;drama therapist&quot;<em>) OR ((multidisciplinary OR &quot;multi-disciplinary&quot; OR interdisciplinary OR multiprofessional OR &quot;multi-professional&quot; OR interprofessional) NEAR/2 team</em>) OR (nurse OR nurses OR nursing or paramedic* OR HEMS OR EMS OR EMT OR prehospital or &quot;pre-hospital&quot; or &quot;first responder&quot;* or &quot;emergency medical technician&quot;* or &quot;emergency services&quot; OR ambulance* OR &quot;field triage&quot; OR &quot;out-of-hospital&quot; OR midwif* OR midwiv* ) )))</td>
<td>228,344</td>
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<td>#5</td>
<td>#4 AND #3</td>
<td>34,209</td>
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<td>#4</td>
<td>TS=(((&quot;computer assisted decision*&quot; OR &quot;computer assisted diagnos*&quot; OR &quot;computer assisted therap*&quot;) OR (&quot;computer aided decision*&quot; OR &quot;computer aided diagnos*&quot; OR &quot;computer aided therap*&quot; OR &quot;computer aided support&quot; OR &quot;computer aided treatment*&quot; OR &quot;computer aided management&quot;) OR (&quot;computer assisted support&quot; OR &quot;computer assisted treatment*&quot; OR &quot;computer assisted management&quot;) OR (&quot;decision support system*&quot; OR &quot;decision support or tool*&quot;&quot;) OR (&quot;decision making system*&quot; OR &quot;decision making tool*&quot;&quot;) OR (expert NEAR/2 system*) OR (computer* NEAR/2 reminder* OR computer NEAR/2 alert* OR electronic* NEAR/2 reminder* OR electronic* NEAR/2 alert*) OR (&quot;reminder system*&quot; OR &quot;medical Order Entry System*&quot; OR (computer* NEAR/2 &quot;order entry&quot;) OR (electronic* NEAR/2 &quot;order entry&quot;) OR (computer* near/2 &quot;decision making&quot;) OR (medication or medicine or treatment or therapy) NEAR/2 (reminder* or alert*))</td>
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<td>#3</td>
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<td>438,284</td>
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9. Search Strategy

Proquest ASSIA and Dissertations & Theses Abstracts & Index

ab(((decision* NEAR/2 making) OR (decision* NEAR/2 support*) OR (decision* NEAR/2 aid*)) AND ((computer* OR electronic* OR internet OR web OR online OR on-line OR software OR computer program* OR automate* OR automation OR pda OR pdas OR "personal digital assistant") OR (app OR apps OR application* NEAR/2 mobile* OR iPad* OR iPhone* OR smartphone* OR "smart phone" OR "smart phones") OR ("smart device" OR "smart devices") OR (tablet NEAR/2 (pc OR device* OR comput*))) OR (telehealth OR telecare OR telemedicine))) OR (("computer assisted decision*" OR "computer assisted diagnos*" OR "computer assisted therap*") OR ("computer aided decision*" OR "computer aided diagnos*" OR "computer aided therap*") OR ("decision support system*" OR "decision support or tool") OR (expert NEAR/2 system*) OR (computer NEAR/2 reminder* OR computer NEAR/2 alert* OR electronic* NEAR/2 reminder* OR electronic* NEAR/2 alert*)) OR "reminder system*" OR "medical Order Entry System*" OR (computer NEAR/2 "order entry" OR electronic* NEAR/2 "order entry")) AND ("allied health" NEAR/2 (profession* OR worker* OR personnel OR occupation* OR staff)) OR (("physical therapist" OR "physical therapists") OR ("occupational therapist" OR "occupational therapists") OR ("language therapist" OR "language therapists") OR ("speech therapist" OR "speech therapists")(physiotherapist* OR dietitian* OR dietetics OR nutritionist*) OR ((multidisciplinary OR interdisciplinary OR multiprofessional OR interprofessional) NEAR/2 team*) OR (nurse OR nurses OR nursing OR paramedic* OR HEMS OR EMS OR EMT OR prehospital OR "pre-hospital" OR "first responder*" OR "emergency medical technician*" OR "emergency services" OR ambulance* OR "field triage" OR "out-of-hospital" OR midwif* OR midwiv*)) OR ti(((decision* NEAR/2 making) OR (decision* NEAR/2 support*) OR (decision* NEAR/2 aid*)) AND ((computer* OR electronic* OR internet OR web OR online OR on-line OR software OR computer program* OR automate* OR automation OR pda OR pdas OR "personal digital assistant") OR (app OR apps OR application* NEAR/2 mobile* OR iPad* OR iPhone* OR smartphone* OR "smart phone" OR "smart phones") OR ("smart device" OR "smart devices") OR (tablet NEAR/2 (pc OR device* OR comput*))) OR (telehealth OR telecare OR telemedicine))) OR ("computer assisted decision*" OR "computer assisted diagnos*" OR "computer assisted therap*") OR ("computer aided decision*" OR "computer aided diagnos*" OR "computer aided therap") OR ("decision support system*" OR "decision support or tool") OR (expert NEAR/2 system*) OR (computer NEAR/2 reminder* OR computer NEAR/2 alert* OR electronic* NEAR/2 reminder* OR electronic* NEAR/2 alert*)) OR "reminder system*" OR "medical Order Entry System*" OR (computer NEAR/2 "order entry" OR electronic* NEAR/2 "order entry")) AND ("allied health" NEAR/2 (profession* OR worker* OR personnel OR occupation* OR staff)) OR (("physical therapist" OR "physical therapists") OR ("occupational therapist" OR "occupational therapists") OR ("language therapist" OR "language therapists") OR ("speech therapist" OR "speech therapists") OR (physiotherapist* OR dietitian* OR dietetics OR nutritionist*) OR ((multidisciplinary OR interdisciplinary OR multiprofessional OR interprofessional) NEAR/2 team*) OR (nurse OR nurses OR nursing OR paramedic* OR HEMS OR EMS OR EMT OR prehospital OR "pre-hospital" OR "first responder*" OR "emergency medical technician*" OR "emergency services" OR ambulance* OR "field triage" OR "out-of-hospital" OR midwif* OR midwiv*))
10. **Search strategies**: Clinicaltrials.gov, ITRP, OpenGrey, OpenClinical, HealthIT.gov, Agency for Healthcare Research and Quality Health Information Technology website

**Search 1**: Decision* AND computer*

**Search 2**: Decision* AND web*

**Search 3**: Decision* AND online

**Search 4**: Decision* AND software

**Search 5**: Decision* AND device*

**Search 6**: Decision* AND mobile*

11. **Search strategy Health Services Research Projects in Progress**

(decision*) AND (computer* OR web* OR online OR software OR device* OR mobile* AND allied OR therapist* OR occupational OR therap* OR physiotherapist OR physiotherapy))
# Supplementary Table 2: Risk of Bias assessment justifications using Effective Practice Organisation of Care (EPOC)'s tool

## 1. Randomised controlled trials, non-randomised trials and controlled before-after studies

<table>
<thead>
<tr>
<th>Random sequence generation</th>
<th>Allocation concealment</th>
<th>Baseline outcome measurements similar</th>
<th>Baseline characteristics similar</th>
<th>Incomplete outcome data</th>
<th>Knowledge of the allocated interventions adequately prevented during the study</th>
<th>Protection against contamination</th>
<th>Selective outcome reporting</th>
<th>Other bias</th>
<th>Overall bias score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beeckman et al, 2013</td>
<td>“Simple randomisation was used to allocate nurses and patients”</td>
<td>Nurses and residents knew their allocated group</td>
<td>Reported baseline outcomes are broadly similar</td>
<td>Baseline characteristics balanced/similar</td>
<td>No information if there was a problem of missing data or ways of handling it, if any</td>
<td>Assessors were not blinded</td>
<td>Intervention was allocated nursing homes, not individual patients</td>
<td>All relevant outcomes in the methods section are reported in the results section</td>
<td>There is no evidence of other risk of biases</td>
</tr>
<tr>
<td>Blaha et al, 2009</td>
<td>Not specified in paper.</td>
<td>Not specified in paper.</td>
<td>No significant differences in glucose at baseline</td>
<td>Although reported for patients, baseline characteristics of nurses is not reported in text or tables.</td>
<td>Only 11 of 120 patients missing (9%)</td>
<td>The outcomes are objective.</td>
<td>Professionals were allocated within a clinic or practice and it is possible that communication between the two groups could have occurred</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>There is no evidence of other risk of biases.</td>
</tr>
<tr>
<td>Byrne, 2005</td>
<td>Controlled before-after study.</td>
<td>Controlled before-after study.</td>
<td>Models adjusted for covariates.</td>
<td>No report of baseline characteristics of patients or Nurses involved.</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Unit of allocation was the nursing home</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>Multiple comparison</td>
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<tr>
<td>Canbolat et al, 2019 (NRCT)</td>
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<td>Random sequence generation</td>
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<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
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<td>Overall bias score</td>
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<tr>
<td>Is Non-randomised trial.</td>
<td>It is an open label study.</td>
<td>No baseline measure of outcomes reported.</td>
<td>No baseline information reported about the providers (Nurses); difference baseline characteristics patients present</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>There was no randomisation; control and intervention groups were from the same clinic. Therefore, it is highly likely that control group could have received intervention</td>
<td>All relevant outcomes are reported in the results section.</td>
<td>No baseline (pre-intervention) outcomes data available so difficult to judge.</td>
<td><strong>High</strong></td>
</tr>
<tr>
<td><strong>Cavalcanti et al, 2009</strong></td>
<td>'Random numbers were generated by computer.'</td>
<td>No baseline measure of outcomes reported in the paper.</td>
<td>Clinically significant differences in patients at baseline; no baseline information about HPs.</td>
<td>Outcomes reported were based on all participants (complete data).</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other sources of bias.</td>
<td><strong>High</strong></td>
</tr>
<tr>
<td><strong>Cleveringa et al,2008</strong></td>
<td>'Allocation was by centres at the start of the study.'</td>
<td>No baseline measure of outcomes reported in the paper.</td>
<td>Clinically significant differences in the intervention and control groups.</td>
<td>'Values carried forward method' was used but not ideal method.</td>
<td>Not specified in the paper.</td>
<td>Allocation unit was practice so unlikely that the control group received an intervention.</td>
<td>All relevant outcomes discussed in the objective are reported.</td>
<td>No evidence of other risk of biases.</td>
<td><strong>High</strong></td>
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<tr>
<td>Study</td>
<td>Allocation</td>
<td>Baseline Outcome</td>
<td>Baseline Characteristics</td>
<td>Incomplete Outcome Data</td>
<td>Knowledge of the Allocated Interventions Adequately Prevented during the Study</td>
<td>Protection against Contamination</td>
<td>Selective Outcome Reporting</td>
<td>Other Bias</td>
<td>Overall Bias Score</td>
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<tr>
<td>Cleveringa et al, 2010</td>
<td>Unit of allocation was primary care practice.</td>
<td>Baseline outcome measurements are largely similar.</td>
<td>There is no report of baseline characteristics of Nurses in text or tables.</td>
<td>Use of electronic health records</td>
<td>Not specified in the paper.</td>
<td>Allocation was by primary care practices so unlikely that control group received intervention.</td>
<td>All relevant outcomes set out in the objective were reported.</td>
<td>No evidence of other risk of biases.</td>
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<td>Cortez, 2014</td>
<td>Allocation was based on clinic and nurses.</td>
<td>Outcome measurements were different among the two groups.</td>
<td>Baseline characteristics were largely similar in both groups.</td>
<td>Use of electronic health records</td>
<td>The study participants (nurses) did not know about the other group’s usage of CDSS at the start and during the study.</td>
<td>Nurses in the intervention group did not know about or receive CDSS during study.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
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<td>Dalaba et al, 2015</td>
<td>A controlled before-after study.</td>
<td>Baseline outcome measurements were significantly different.</td>
<td>No report of baseline characteristics of HPs in text or tables</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Comparison groups were in different districts.</td>
<td>All outcomes mentioned in the methods section have been reported.</td>
<td>No indication of other biases.</td>
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<td>Duclos et al, 2015</td>
<td>Allocation was by department at the start of the study.</td>
<td>Baseline outcome measures appear to be</td>
<td>Only aggregated baseline characteristics of children for Medical records were used.</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No indication of other biases.</td>
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<td>Description</td>
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<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
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<td>Dumont et al, 2012</td>
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<td>Simple randomisation used</td>
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<td>Randomisation was achieved by a Nurse choosing unmarked sealed envelope</td>
<td>No baseline measure of outcome reported.</td>
<td>Patient characteristics reported and largely similar, but report on HP were presented as aggregated.</td>
<td>Not specified in the paper.</td>
<td>Nurses were allocated within a clinic and it is possible that communication between intervention and control nurse could have occurred.</td>
<td>All outcomes in methods section were reported.</td>
<td></td>
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<tr>
<td>Dykes et al, 2009</td>
<td></td>
<td>Allocation was by unit at the start of the study</td>
<td>Baseline outcome measurements are largely similar.</td>
<td>Patient characteristics were similar, but no information on HPs.</td>
<td>Medical records were used.</td>
<td>Study noted as open-label design in the protocol; and, intervention and control units in one hospital.</td>
<td>Contamination of information highly likely; patients rather than professionals were randomised</td>
<td>All outcomes in methods section were reported.</td>
<td>No indication of other biases.</td>
</tr>
<tr>
<td>Fitzmaurice et al, 2000</td>
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<td>Random sequence generation</td>
<td>Allocation concealment</td>
<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
<td>Overall bias score</td>
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</tr>
<tr>
<td>‘Randomisation was computer generated.’</td>
<td>Not specified in the paper</td>
<td>Baseline outcome measurements are largely similar.</td>
<td>There is no report of baseline characteristics of HPs in text or tables</td>
<td>Use of medical records.</td>
<td>Outcomes are objective.</td>
<td>Groups in same practice—possibility of communication between health professionals</td>
<td>All relevant outcomes in the introduction/methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Forberg et al, 2016</td>
<td>Not specified in the paper</td>
<td>Baseline measure of outcomes appear to be largely similar.</td>
<td>Baseline characteristics of the intervention and control groups are similar.</td>
<td>Missing outcomes is very minimal (&lt;2%).</td>
<td>Not specified in the paper.</td>
<td>Not clear that nurses did not swap between units within the same hospital.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Fossum et al, 2011</td>
<td>Controlled before-after study</td>
<td>Baseline outcome measurements are largely similar.</td>
<td>Although reported for patients, baseline characteristics of providers was not reported in text or tables.</td>
<td>Use medical records.</td>
<td>Not specified in the paper.</td>
<td>Allocation was by nursing homes and is unlikely that control group received intervention.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Geurts et al, 2016</td>
<td>‘Centralised randomisation scheme used.’</td>
<td>No baseline measure of outcome in the paper.</td>
<td>Baseline characteristics are largely similar among the two groups.</td>
<td>Medical records used.</td>
<td>‘Nurses were blinded for the contribution of predictors on the risk score.’</td>
<td>Patient based randomisation; a high possibility. Intra clinician and inter clinician</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>Question about representativeness of final study sample as 75% of eligible kids not randomised as</td>
<td>High</td>
</tr>
<tr>
<td>Random sequence generation</td>
<td>Allocation concealment</td>
<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
<td>Overall bias score</td>
</tr>
<tr>
<td>---------------------------</td>
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</tr>
<tr>
<td>Hovorka et al, 2007</td>
<td>Centralised randomisation scheme was used.</td>
<td>No baseline measure of outcome reported in the paper.</td>
<td>Although some report about patients, no report of baseline characteristics about HP participants in text or tables.</td>
<td>Not specified in the paper.</td>
<td>The outcomes were objective.</td>
<td>Patients based randomisation; same clinicians involved in standard and intervention arms</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Kroth et al, 2006</td>
<td>Not specified in the paper.</td>
<td>No baseline measure of outcome.</td>
<td>There is no detailed report of characteristics in text or tables.</td>
<td>Consecutive [medical] records used.</td>
<td>Objective outcome</td>
<td>Randomisation was for patients and nurses. Nurses in the control group did not receive reminders.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Lattimer et al, 1998</td>
<td>Unit of allocation was by team and allocation was performed on all units at the start of the study.</td>
<td>No baseline measure of outcome reported.</td>
<td>Some about patients, but no report of baseline characteristics HPs in text or tables.</td>
<td>Not specified in the paper.</td>
<td>Use of medical records.</td>
<td>Health professionals in the intervention (Nurses) and control (Doctors) were different.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>Unclear</td>
</tr>
<tr>
<td>Study</td>
<td>Random sequence generation</td>
<td>Allocation concealment</td>
<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
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</tr>
<tr>
<td>Lattimer et al, 2000</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>There is no detailed report of characteristics in text or tables</td>
<td>Not specified in the paper.</td>
<td>Use of medical records.</td>
<td>Health professionals in the intervention (Nurses) and control (Doctors) were different.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Lee et al, 2009</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Although weight and BMI data were recorded, no data on the outcome measurements.</td>
<td>Reported for patients, but no report on providers in text or tables.</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Patients based randomisation so it is likely that the control group received the intervention.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Lv et al, 2019</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Reported for patients, but no report on providers in text or tables.</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Not specified in the paper.</td>
<td>Patients based randomisation; Patient based randomisation; same clinicians involved in both arms.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Mann et al, 2011</td>
<td>Computer generated sequence was used.</td>
<td>Not specified in the paper.</td>
<td>Baseline measure of outcome not reported.</td>
<td>No baseline characteristics of HPs in text or tables were found.</td>
<td>Not clear from the paper.</td>
<td>A cross-over study; not specified in the paper.</td>
<td>A cross-over trial with only patients rather than professionals randomised.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Study</td>
<td>Random sequence generation</td>
<td>Allocation concealment</td>
<td>Baseline characteristics similar</td>
<td>Baseline outcome measurements similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
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</tr>
<tr>
<td>McDonald et al, 2017</td>
<td>Automated block randomisation was used.</td>
<td>Automated block randomisation schema was used</td>
<td>Baseline characteristics were largely similar.</td>
<td>Possible medical records use.</td>
<td>Assessor was not blinded.</td>
<td>Both intervention and control nurses were in one organisation and it is possible that communication between them could have occurred</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>Only 42% of patients who should have had a CDSS applied suggesting that the nurses selectively chose which patients to use it with or selective non adoption</td>
</tr>
<tr>
<td>Paulson et al, 2020</td>
<td>Automated block randomisation was used.</td>
<td>Automated block randomisation schema was used</td>
<td>Reported for patients, but no report on providers in text or tables</td>
<td>Baseline characteristics were largely similar.</td>
<td>Only complete case analysis conducted</td>
<td>Outcomes are objective.</td>
<td>Both intervention and control nurses were in one organisation and it is possible that communication between them could have occurred</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Plank et al, 2006</td>
<td>Not specified in the paper</td>
<td>Not specified in the paper</td>
<td>Blood glucose measured but not intervention group based</td>
<td>Differences in types of surgery and history of diabetes between sites</td>
<td>Use of medical records.</td>
<td>Outcomes are objective.</td>
<td>Same units delivering all arms of the trial with same clinicians</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Rood et al, 2005</td>
<td></td>
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<td></td>
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<tr>
<td>Study</td>
<td>Random sequence generation</td>
<td>Allocation concealment</td>
<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
</tr>
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</tr>
<tr>
<td>Roukema et al, 2008</td>
<td>'Automatic random number generating'</td>
<td>Not specified in the paper</td>
<td>Baseline measure of outcome not reported.</td>
<td>No report of characteristics of HPs in text or tables.</td>
<td>Not specified in the paper.</td>
<td>Patient based randomisation; same clinicians involved in both arms.</td>
<td>There is no evidence that outcomes were selectively reported.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Sassen et al, 2014</td>
<td>Randomisation was based on computer algorithm.</td>
<td>'centralised randomisation scheme'</td>
<td>Baseline measure of outcome not reported.</td>
<td>No report of characteristics of HPs in text or tables.</td>
<td>Not specified in the paper.</td>
<td>Professionals were allocated within a clinic so hard to see how decision rule training effect not present in the clinicians who were delivering both arms of the trial</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Snooks et al, 2014</td>
<td>Not specified in the paper.</td>
<td>The unit of allocation was by health professional and allocation was performed on all units at the start of the study</td>
<td>No important differences were present across study groups.</td>
<td>Baseline characteristics of the study and control providers are reported and similar.</td>
<td>Significant proportion participants dropped out and the report is based on the complete case analysis.</td>
<td>Outcomes cannot be assessed blindly.</td>
<td>Participants in the control group did not have a log-in code to access the website (CDSS tool) until post-intervention data were collected.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
</tr>
<tr>
<td>Random sequence generation</td>
<td>Allocation concealment</td>
<td>Baseline outcome measurements similar</td>
<td>Baseline characteristics similar</td>
<td>Incomplete outcome data</td>
<td>Knowledge of the allocated interventions adequately prevented during the study</td>
<td>Protection against contamination</td>
<td>Selective outcome reporting</td>
<td>Other bias</td>
<td>Overall bias score</td>
</tr>
<tr>
<td>----------------------------</td>
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</tr>
<tr>
<td>Randomisation based on computer algorithm.</td>
<td>Random allocation was performed on all units at the start of the study.</td>
<td>No baseline measure of outcome reported.</td>
<td>No report of characteristics in text or tables about the paramedics involved.</td>
<td>Not specified in the paper.</td>
<td>Analyst was blinded.</td>
<td>Intervention and control groups were in separates sites</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>Unclear</td>
</tr>
<tr>
<td>Vadher et al, 1997</td>
<td>Random tables were used.</td>
<td>No baseline measure of outcome reported.</td>
<td>Patient baseline characteristics reported; one nurse versus a clinician.</td>
<td>Not specified in the paper.</td>
<td>Outcomes are objectively measured.</td>
<td>Hard to see how same clinicians seeing both arm trial patients didn't pick up something from the CDSS.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>There was only one Nurse participant in the intervention group.</td>
<td>High</td>
</tr>
<tr>
<td>Wells, 2013</td>
<td>Random table was used for randomisation.</td>
<td>No baseline measure of outcomes reported.</td>
<td>Baseline characteristics are largely similar.</td>
<td>Not specified in the paper.</td>
<td>Outcomes were assessed blindly.</td>
<td>Intervention and control groups in the same site so it is likely that the control group received the intervention.</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
</tbody>
</table>

Colour codes: Red, high risk; orange, unclear risk; green, low risk.
2. Interrupted time series studies

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Intervention independent of other changes</th>
<th>Shape of the intervention effect pre-specified</th>
<th>Intervention unlikely to affect data collection</th>
<th>Knowledge of the allocated interventions adequately prevented during the study</th>
<th>Incomplete outcome data adequately</th>
<th>Selective outcome reporting</th>
<th>Other bias</th>
<th>Overall bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennet, 2016</td>
<td>Very long adoption period with no measurement; possible confounding factors not presented/models not adjusted</td>
<td>Data were classified as pre and post-intervention from the point/date of intervention.</td>
<td>Data were collected from the hospital records databases for pre- and post-intervention periods</td>
<td>Not presented in the paper.</td>
<td>Medical records used</td>
<td>All relevant outcomes in the methods section are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Dykes et al., 2020</td>
<td>Highly likely the changes in outcome to be influenced by confounders.</td>
<td>Point of analysis is the point of intervention.</td>
<td>Sources and methods of data collection were the same before and after the intervention.</td>
<td>Not presented in the paper.</td>
<td>Medical records used</td>
<td>All relevant outcomes are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
<tr>
<td>Dowding et al., 2012</td>
<td>Highly likely the changes in outcome to be influenced by confounders.</td>
<td>Point of analysis is the point of intervention.</td>
<td>Sources and methods of data collection were the same before and after the intervention.</td>
<td>Not presented in paper.</td>
<td>Medical records used</td>
<td>All relevant outcomes are reported in the results section.</td>
<td>No evidence of other risk of biases.</td>
<td>High</td>
</tr>
</tbody>
</table>

**Colour codes:** Red, high risk; orange, unclear risk; green, low risk
### Supplementary Table 3: Summary of patient care process results

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Interventions</th>
<th>Health professionals</th>
<th>patient participants</th>
<th>Outcome measured</th>
<th>Outcome values reported</th>
<th>Change of value within a group (\dagger)</th>
<th>Risk difference (95% CI) (\dagger)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dumont et al, 2012</td>
<td>• CDSS use</td>
<td>Nurses (OA=44)</td>
<td>141 adults</td>
<td>Deviations from the protocol, out of 10 (mean (SD))</td>
<td>4 months=0.39(1.0) 4 months=3 (0.3)</td>
<td>-</td>
<td>Mean difference: -2.61 (-4.5 to -0.71)</td>
</tr>
<tr>
<td></td>
<td>• Paper protocol</td>
<td>Nurses</td>
<td>159 adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forberg et al, 2016</td>
<td>• CDSS-use</td>
<td>108 Nurses</td>
<td>Not applicable</td>
<td>Nurses adherence to guidelines on disinfection of hands</td>
<td>Baseline=97/108 3 months =93/105 Baseline=96/103 3 months =87/102</td>
<td>-1.2%</td>
<td>6.7% (4.9 to 8.5)</td>
</tr>
<tr>
<td></td>
<td>• CDSS non-use</td>
<td>103 Nurses</td>
<td>Not applicable</td>
<td></td>
<td></td>
<td>-7.9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS-use</td>
<td></td>
<td></td>
<td>Nurses adherence to guidelines on usage of disposable gloves (n/N)</td>
<td>Baseline=80/108 3 months =76/105 Baseline=71/103 3 months =70/102</td>
<td>-1.7%</td>
<td>-1.4% (-2.2 to -0.5)</td>
</tr>
<tr>
<td></td>
<td>• CDSS non-use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS-use</td>
<td></td>
<td></td>
<td>Nurses adherence to guidelines on daily inspection of Peripheral Venous Catheters (PVC) site (n/N)</td>
<td>Baseline=58/108 3 months =58/103 Baseline=47/102 3 months =55/102</td>
<td>2.6%</td>
<td>-5.2% (-7.1 to -3.3)</td>
</tr>
<tr>
<td></td>
<td>• CDSS non-use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.8%</td>
<td></td>
</tr>
<tr>
<td>Rood et al, 2005</td>
<td>• CDSS-based GL</td>
<td>ICU Nurses</td>
<td>66 adults</td>
<td>Adherence to Insulin dose Advice (n/N)</td>
<td>10 weeks =1818/2352 10 weeks =1667/2597</td>
<td>-</td>
<td>22% (19 to 25)</td>
</tr>
<tr>
<td></td>
<td>• Paper-based GL</td>
<td>ICU Nurses</td>
<td>54 adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS-based GL</td>
<td>ICU Nurses</td>
<td>66 adults</td>
<td>Adherence to the guideline for taking blood samples on time (n/N)</td>
<td>10 weeks =945/2352 10 weeks =922/2597</td>
<td>-</td>
<td>4.7% (2.0 to 7.4)</td>
</tr>
<tr>
<td></td>
<td>• Paper-based GL</td>
<td>ICU Nurses</td>
<td>54 adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vadher et al, 1997</td>
<td>• CDSS</td>
<td>1 Nurse 3 trainee Doctors</td>
<td>87 adults 90 adults</td>
<td>Dose advice ‘acceptance’ in patients with therapeutic range 2-3</td>
<td>Post-test=188/214 Post-test=145/242</td>
<td>-</td>
<td>28% (20.4 to 35.5)</td>
</tr>
<tr>
<td></td>
<td>• Control</td>
<td></td>
<td></td>
<td>Post-test =163/239 Post-test =150/205</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS</td>
<td>1 Nurse 3 trainee Doctors</td>
<td></td>
<td>Dose advice ‘acceptance’ in patients with therapeutic range 3-4.5 (n/N)</td>
<td>Post-test=160/239 Post-test=150/205</td>
<td>-</td>
<td>-6.2% (-14.7 to 2.2)</td>
</tr>
<tr>
<td></td>
<td>• Control</td>
<td>3 trainee Doctors</td>
<td>34 adults</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS</td>
<td>1 Nurse 3 trainee Doctors</td>
<td></td>
<td>Interval advice ‘acceptance’ (%) in patients with therapeutic range 2-3</td>
<td>Post-test=170/230 Post-test=133/266</td>
<td>-</td>
<td>23.9% (15.6 to 32.2)</td>
</tr>
<tr>
<td></td>
<td>• Control</td>
<td>3 trainee Doctors</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS</td>
<td>1 Nurse 3 trainee Doctors</td>
<td></td>
<td>Interval advice ‘acceptance’ (%) in patients with therapeutic range 3-4.5</td>
<td>Post-test=129/239 Post-test=101/202</td>
<td>-</td>
<td>3.9% (-5.4 to 13.3)</td>
</tr>
<tr>
<td></td>
<td>• Control</td>
<td>3 trainee Doctors</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### 2. Patient assessment, diagnosis, and treatment practices

| | | | | Pain assessment | Post-test=97.7% | - | 62.7% (59.6 to 65.8) |
### Bennett et al, 2016

- **CDSS non-use**
  - IV antibiotics in 1hr for sepsis
  - Pre-test: 35%
  - Post-test: 5.6%
  - Pre-test: 11.5%
  - Post-test: 5.6%

- **CDSS use**
  - IV antibiotics in 1hr for sepsis
  - Pre-test: 284/667
  - Post-test: 230/667
  - Pre-test: 305/667
  - Post-test: 230/667

### Duclos et al, 2015

- **CDSS non-use**
  - Investigation of malnutrition aetiology
  - Pre-test: 667 children
  - Post-test: 284/667
  - Pre-test: 477 children
  - Post-test: 102/477

- **CDSS use**
  - Managed by a dietitian
  - Pre-test: 667 children
  - Post-test: 305/667
  - Pre-test: 477 children
  - Post-test: 161/477

### Geurts et al, 2017

- **CDSS non-use**
  - Patient consultation time (min) - median (IQR)
  - Pre-test: 136 (108)
  - Post-test: 133 (92)

- **CDSS use**
  - Electrolytes level test
  - Pre-test: 17/113
  - Post-test: 15/113

### Roukema et al, 2008

- **CDSS non-use**
  - Time spent in ED (minutes), median (IQR)
  - 27 months: 138 (77)
  - 27 months: 123 (96)

- **CDSS use**
  - Time spent in ED for lab test (minutes), median (IQR)
  - 27 months: 140 (68)
  - 27 months: 160 (98)

### Snooks et al, 2014

- **CDSS non-use**
  - Mean length of episode of care (minutes)
  - 1 year: 405/436
  - 1 year: 321/341

- **CDSS use**
  - Respiratory rate recorded, %
  - 1 year: 414/436
  - 1 year: 327/341

### Wells, 2013

- **CDSS non-use**
  - Pulse rate recorded
  - 1 year: 405/436
  - 1 year: 334/341

- **CDSS use**
  - Consciousness recorded
  - 1 year: 405/436
  - 1 year: 334/341

### Kroth et al, 2006

- **CDSS non-use**
  - Proportion of erroneously recorded temperatures
  - 9 months: 248/45823
  - 9 months: 575/44339

## 3. Documenting of events
<table>
<thead>
<tr>
<th></th>
<th>CDSS use Nurses</th>
<th>Fall documentation ratio</th>
<th>Post-CDSS use Vs pre-CDSS use period</th>
<th>CdSS non-use Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dowding et al, 2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.4 (0.03 to 73.7)†</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CDSS use Nurses</th>
<th>Hospital acquired pressure ulcer (HAPU) risk documentation ratio</th>
<th>Post-CDSS use Vs pre-CDSS use period</th>
<th>CdSS non-use Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paulson et al, 2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.1 (1.95 to 42.5)†</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CDSS use Nurses</th>
<th>Documentation of nutritional intake compared to requirements</th>
<th>10 months=37/44</th>
<th>10 months=2/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paulson et al, 2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>80% (67 to 92)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CDSS use Nurses</th>
<th>Documentation of a nutritional care plan</th>
<th>10 months=31/44</th>
<th>10 months=8/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paulson et al, 2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>54.4% (37.6 to 71.3)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CDSS use Nurses</th>
<th>Documentation of nutritional treatment</th>
<th>10 months=36/44</th>
<th>10 months=29/50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paulson et al, 2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>23.8% (6 to 41.6)</td>
<td></td>
</tr>
</tbody>
</table>

4. **Patient referrals**

<table>
<thead>
<tr>
<th></th>
<th>CDSS Paramedics</th>
<th>Patients referred to falls service</th>
<th>1 year=42/436</th>
<th>1 year=17/343</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snooks et al, 2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>436 adults</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>343 adults</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ‡, calculated from reported information unless stated otherwise; †, as reported by study authors.
### Supplementary Table 4: Summary of patient care outcomes results

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Interventions</th>
<th>Health professionals</th>
<th>patient participants</th>
<th>Outcome measured</th>
<th>Outcome values reported</th>
<th>Change of value within a group</th>
<th>Risk difference (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glycaemic control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blaha et al, 2009</td>
<td>• CDSS (eMPC)</td>
<td>ICU Nurses</td>
<td>40 adults</td>
<td>Entire study time in target range (blood glucose) - mmol/l</td>
<td>After 48hrs=46%</td>
<td>-</td>
<td>Versus Mathias: 7.8% (-13.7 to 29.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>After 48hrs=38.2%</td>
<td>-</td>
<td>Versus Bath: 6.3% (-3.9 to 16.5)</td>
</tr>
<tr>
<td></td>
<td>• Mathias protocol</td>
<td></td>
<td>40 adults</td>
<td></td>
<td>After 48hrs=39.7%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Bath-protocol</td>
<td></td>
<td>40 adults</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS (eMPC)</td>
<td>ICU Nurses</td>
<td>40 adults</td>
<td>Entire study mean blood glucose (SE) - mmol/l</td>
<td>Baseline=8.1(0.6) 48hrs=5.9(0.2)</td>
<td>-2.2 mmol/l</td>
<td>Versus Mathias: -1.1 mmol/l</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Baseline=7.9(0.4) 48hrs=6.7(0.1)</td>
<td>-1.2 mmol/l</td>
<td>Versus Bath: -0.7 mmol/l</td>
</tr>
<tr>
<td></td>
<td>• Mathias protocol</td>
<td></td>
<td>40 adults</td>
<td></td>
<td>Baseline=8.0(0.2) 48hrs=6.5(0.2)</td>
<td>-1.5 mmol/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Bath-protocol</td>
<td></td>
<td>40 adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canbolat et al, 2019</td>
<td>• CDSS (automated BG control)</td>
<td>Nurses</td>
<td>33 adults</td>
<td>Occasions for BG out of target (120 to 180 mg/dL) range</td>
<td>22 months =2101/5789 22 months =2977/5122</td>
<td>-</td>
<td>-21.8% (-23.7 to -20.0)</td>
</tr>
<tr>
<td></td>
<td>• Standard protocol</td>
<td>Physicians</td>
<td>33 adults</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cavalcanti et al, 2009</td>
<td>• CDSS (computer-assisted insulin protocol)</td>
<td>ICU Nurses</td>
<td>56 adults</td>
<td>Mean blood glucose (mmol/dL)</td>
<td>19 months =125</td>
<td>-</td>
<td>Versus Leuven: -2.1 mmol/dL</td>
</tr>
<tr>
<td></td>
<td>• Control (Leuven protocol)</td>
<td>ICU Nurses</td>
<td>58 adults</td>
<td></td>
<td>19 months =127.1</td>
<td>-</td>
<td>Versus conventional: -33.5 mmol/dL</td>
</tr>
<tr>
<td></td>
<td>• Control (conventional treatment)</td>
<td>ICU Nurses</td>
<td>53 adults</td>
<td></td>
<td>19 months =158.5</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS (computer-assisted insulin protocol)</td>
<td>ICU Nurses</td>
<td>56 adults</td>
<td>Patients with hypoglycaemia</td>
<td>19 months =12/56</td>
<td>-</td>
<td>Versus Leuven: -20% (-36.6 to -3.4)</td>
</tr>
<tr>
<td></td>
<td>• Control (Leuven protocol)</td>
<td>ICU Nurses</td>
<td>58 adults</td>
<td></td>
<td>19 months =24/58</td>
<td>-</td>
<td>Versus conventional: 17.6% (5.7 to 29.5)</td>
</tr>
<tr>
<td></td>
<td>• Control (conventional treatment)</td>
<td>ICU Nurses</td>
<td>53 adults</td>
<td></td>
<td>19 months =2/53</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Cleveringa et al, 2008</td>
<td>• CDSS use in diabetic patients</td>
<td>Nurses</td>
<td>1699 adults</td>
<td>A1C&lt;7%</td>
<td>Baseline=60.8% 1 year=68%</td>
<td>7.2%</td>
<td>4.6% (2.7 to 6.5)</td>
</tr>
<tr>
<td></td>
<td>• Usual care</td>
<td>Nurses</td>
<td>1692 adults</td>
<td></td>
<td>Baseline=61.6% 1 Year=64.2%</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CDSS use in diabetic patients</td>
<td></td>
<td>1699 adults</td>
<td>Systolic BP&lt;140</td>
<td>Baseline=41% 1 year=33.9%</td>
<td>12.9%</td>
<td>10.2% (7.9 to 12.5)</td>
</tr>
</tbody>
</table>
### Usual care

- **Usual care**
  - 1692 adults
  - Baseline = 39.5%
  - 1 year = 42.2%
  - 2.7%

- **CDSS use in diabetic patients**
  - 1699 adults
  - Baseline = 36.2%
  - 1 year = 49.0%
  - 10.5%

- **Usual care**
  - 1692 adults
  - Baseline = 38.5%
  - 1 year = 45.3%
  - 6.8%

- **CDSS**
  - ICU Nurses
  - 30 adults
  - Proportion in target range (4-6.1 mmol/L)
    - 48 hrs = 60.4%
    - 48 hrs = 27.5%

- **Usual care**
  - ICU Nurses
  - 30 adults
  - Entire study mean blood glucose (mmol/L (SD))
    - 48 hrs = 6.2 (1.1)
    - 48 hrs = 7.2 (1.1)

- **CDSS**
  - ICU Nurses
  - 30 adults
  - Time in target range (hours)
    - 48 hrs = 14.5
    - 48 hrs = 6.6

- **Usual care**
  - ICU Nurses
  - 30 adults
  - 48 hrs = 27.5%

- **CDSS**
  - ICU Nurses
  - 30 adults
  - Average glucose (mg/dL)
    - 48 hrs = 117 mg/dL
    - 48 hrs = 131 mg/dL

- **Usual care**
  - ICU Nurses
  - 30 adults
  - 48 hrs = 7.9 hrs

- **CDSS**
  - ICU Nurses
  - 30 adults
  - Improvement glycaemic control for 48 hours
    - 48 hrs = 46%
    - 48 hrs = 77%

- **Usual care**
  - ICU Nurses
  - 30 adults
  - 48 hrs = 32.9% (20.0 to 46.0)

### Blood coagulation management

- **CDSS use**
  - Nurses
  - 122 adults
  - Proportion of tests in range
    - Baseline = 223/366
    - 1 year = 732/1181
    - Improvement glycaemic control for 48 hours
      - 48 hrs = 65%
      - 48 hrs = 25%

- **CDSS non-use**
  - Physicians
  - 245 adults
  - International Normalised Ratio (INR) Results Within Range Point Prevalence
    - Baseline = 74/118
    - 1 year = 86/121
    - Baseline = 129/244

- **Usual care**
  - Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 52%
    - 33% (20.5 to 45.4)

- **Usual care**
  - Physicians
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 19%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 49%
    - 72 hrs = 54%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.8%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 46%
    - 72 hrs = 46%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 46%
    - 72 hrs = 46%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.5%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 52%
    - 33% (20.5 to 45.4)

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 19%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 49%
    - 72 hrs = 54%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.8%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 46%
    - 72 hrs = 46%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 46%
    - 72 hrs = 46%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.5%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 52%
    - 33% (20.5 to 45.4)

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 19%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 49%
    - 72 hrs = 54%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.8%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 52%
    - 33% (20.5 to 45.4)

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 19%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 49%
    - 72 hrs = 54%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.8%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 52%
    - 33% (20.5 to 45.4)

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 19%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions over target range (over 110 mg/dL)
    - 72 hrs = 49%
    - 72 hrs = 54%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.5%
    - 72 hrs = 4.8%

- **Usual care**
  - ICU Nurses
  - Not reported
  - Occasions under target range (under 80 mg/dL)
    - 72 hrs = 4.8%

- **CDSS**
  - ICU Nurses
  - Not reported
  - Occasions within the target glycaemic range (80-110 mg/dL)
    - 48 hrs = 52%
    - 33% (20.5 to 45.4)
<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Nurses</th>
<th>Time Spent Within INR Target Range</th>
<th>1 year</th>
<th>Baseline</th>
<th>12%</th>
<th>7% (-0.7 to 14.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSS non-use</td>
<td>Physicians</td>
<td></td>
<td></td>
<td>Baseline=64/113</td>
<td>1 year=76/110</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Baseline=99/174</td>
<td>1 year=143/230</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Antenatal and peripartum care

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Nurses</th>
<th>Antenatal complications per 1000 attendance</th>
<th>Before=9</th>
<th>After =12</th>
<th>0.3%</th>
<th>0.3% (-0.03 to 0.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSS non-use</td>
<td>Nurses</td>
<td>Not reported</td>
<td>Baseline=9</td>
<td>After =16</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Nurses</th>
<th>Delivery complications per 1000 attendances</th>
<th>Before=107</th>
<th>After=96</th>
<th>-0.9%</th>
<th>2.4% (1.1 to 3.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSS non-use</td>
<td>Nurses</td>
<td>Not reported</td>
<td>Baseline=133</td>
<td>After=100</td>
<td>-3.3%</td>
<td></td>
</tr>
</tbody>
</table>

4. Managing patients with chronic co-morbid diseases

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Usual care</th>
<th>165 Nurses</th>
<th>2550 adults</th>
<th>Medication regimen complexity index &lt;24.5</th>
<th>Post-test=158/2550</th>
<th>-</th>
<th>0% (-1.1 to 1.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care</td>
<td>335 Nurses</td>
<td>5369 adults</td>
<td>Post-test =333/5369</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Usual care</th>
<th>165 Nurses</th>
<th>2550 adults</th>
<th>Emergency room use</th>
<th>Post-test =421/2550</th>
<th>-</th>
<th>-0.2 (-1.9 to 1.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care</td>
<td>335 Nurses</td>
<td>5369 adults</td>
<td>Post-test =897/5369</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Usual care</th>
<th>165 Nurses</th>
<th>2550 adults</th>
<th>Hospitalisation</th>
<th>Post-test =502/2550</th>
<th>-</th>
<th>-1.4% (-3.3 to 0.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care</td>
<td>335 Nurses</td>
<td>5369 adults</td>
<td>Post-test =1133/5369</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lv et al, 2019

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Nurses</th>
<th>Number of asthma exacerbations per patient (median)</th>
<th>1 year=3</th>
<th>-</th>
<th>-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care</td>
<td>Nurses</td>
<td>73 children</td>
<td>1 year=4</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

5. Outpatient obesity screening

Lee et al, 2009

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Usual care</th>
<th>13 Nurses</th>
<th>807 adults</th>
<th>Encounters with obesity related diagnosis</th>
<th>8 months =91/807</th>
<th>-</th>
<th>10.3% (8.0 to 12.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care</td>
<td>16 Nurses</td>
<td>997 adults</td>
<td>8 months =10/997</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CDSS use</th>
<th>Usual care</th>
<th>13 Nurses</th>
<th>807 adults</th>
<th>Encounters with missed obesity-related diagnosis</th>
<th>8 months =51/208</th>
<th>-</th>
<th>-41.9% (-48.8 to -35.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual care</td>
<td>16 Nurses</td>
<td>997 adults</td>
<td>8 months =440/662</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Fall and pressure ulcer management

Beeckman et al, 2013

<table>
<thead>
<tr>
<th>CDSS(Pre-vPlan)</th>
<th>65 Nurses and physios</th>
<th>225 adults</th>
<th>Pressure ulcer prevention</th>
<th>Day=15/58</th>
<th>Day120=41/65</th>
<th>37.2%</th>
<th>2.3% (-11.0 to 15.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard protocol</td>
<td>53 Nurses and physios</td>
<td>239 adults</td>
<td>Day=1/6/63</td>
<td>Day120=41/68</td>
<td>34.9%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CDSS(Pre-vPlan)</th>
<th>65 Nurses and physios</th>
<th>225 adults</th>
<th></th>
<th>Day=1/34/225</th>
<th>Day120=16/225</th>
<th>-8%</th>
<th>-6.3% (-10.2 to -2.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>CDSS use</td>
<td>CDSS non-use</td>
<td>Fall rate</td>
<td>Pressure ulcer rate</td>
<td>Urinary tract infection Rate</td>
<td>Malnutrition Rate</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>--------------</td>
<td>-----------</td>
<td>--------------------</td>
<td>-----------------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>Byrne, 2005</td>
<td>89 Nurses</td>
<td>Not reported</td>
<td>Before=0.312 After=0.318</td>
<td>Before=0.085 After=0.088</td>
<td>Not reported</td>
<td>Not reported</td>
<td></td>
</tr>
<tr>
<td>Dowding et al, 2012</td>
<td>Not reported</td>
<td>Not reported</td>
<td>Post-CDSS use Vs pre-CDSS use period</td>
<td>-</td>
<td>0.91 (0.75 to 1.12)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dykes et al, 2009</td>
<td>Nurses 5160 adults 5104 adults</td>
<td>CDSS use Vs usual care</td>
<td>-1.16 (-2.16 to -0.17)*</td>
<td>-</td>
<td>0.47 (0.25 to 0.85)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dykes et al, 2020</td>
<td>Nurses 19,283 adults 17,948 adults</td>
<td>Post-CDSS use Vs pre-CDSS use period</td>
<td>-</td>
<td>-</td>
<td>-0.15 (-0.04 to -0.25)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fossum et al, 2011</td>
<td>Nurses 367 adults</td>
<td>Prevalence of pressure Ulcers</td>
<td>Before=16/167 After=23/200 Before=17/150 After=11/122</td>
<td>1.9%</td>
<td>4.2% (0.2 to 8.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bennett et al, 2016</td>
<td>Nurses 400 adults 400 adults</td>
<td>Correct triage prioritisation</td>
<td>Post-test=85.2% Pre-test=60.5%</td>
<td>-</td>
<td>24.7% (18.8 to 30.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lattimer et al, 1998</td>
<td>Nurses Physicians Not applicable Not applicable</td>
<td>Calls managed with telephone advice from GP</td>
<td>Post-test =1109/7184 Post-test =3629/7308</td>
<td>-</td>
<td>-34.2% (-35.6 to -32.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lattimer et al, 2000</td>
<td>Nurses Physicians Not applicable Not applicable</td>
<td>Patient attended primary care centre</td>
<td>Post-test =1177/7184 Post-test =1934/7308</td>
<td>-</td>
<td>-10% (-11.4 to -8.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lattimer et al, 2000</td>
<td>Nurses Physicians Not applicable Not applicable</td>
<td>Patient visited at home by duty GP</td>
<td>Post-test =1317/7184 Post-test =1745/7308</td>
<td>-</td>
<td>-5.5% (-6.9 to -4.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lattimer et al, 2000</td>
<td>Paramedics 436 adults</td>
<td>Total admissions within 3 days</td>
<td>1 year =428/7184 1 year =507/7308</td>
<td>-</td>
<td>-0.98% (-1.8 to -0.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lattimer et al, 2000</td>
<td>Paramedics 436 adults</td>
<td>-</td>
<td>1 year =183/436</td>
<td>-</td>
<td>5.2% (-1.7 to 12.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Snooks et al, 2014

<table>
<thead>
<tr>
<th>Group</th>
<th>Control</th>
<th>Patients left at scene without conveyance to emergency department</th>
<th>1 year 126/343</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSS</td>
<td>343 adults</td>
<td>Patients with further emergency admission to hospital or death</td>
<td>1 year 69/436</td>
</tr>
<tr>
<td>Control</td>
<td>343 adults</td>
<td>Patients with ED attendance or emergency admission to hospital or death</td>
<td>1 year 49/343</td>
</tr>
</tbody>
</table>

### CDSS

- Control: 1 year = 49/343
- CDSS: 1 year = 61/343

### Control

- Patients who reported >1 further fall
- 1 year = 135/236
- 1 year = 112/175

### CDSS

- Patients who reported >1 further fall
- 1 year = 135/236
- 1 year = 112/175

### Quality of life and patients' satisfaction

<table>
<thead>
<tr>
<th>Group</th>
<th>Control</th>
<th>CDSS</th>
<th>Quality of Life (SF12 MCS), mean (SD)</th>
<th>1 year 10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSS</td>
<td>239 adults</td>
<td>Paramedics</td>
<td>1 year = 41.9(10.3)</td>
<td>1 year = 42.9(10.9)</td>
</tr>
<tr>
<td>Control</td>
<td>177 adults</td>
<td>Paramedics</td>
<td>-1 (-3.1 to 1.1)</td>
<td>-</td>
</tr>
</tbody>
</table>

### CDSS

- Patients who reported >1 further fall
- 1 year = 29(8)
- 1 year = 30(8.5)

### Control

- Patients who reported >1 further fall
- 1 year = 29(8)
- 1 year = 30(8.5)

### CDSS

- Patients who reported >1 further fall
- 1 year = 97.8(10.7)
- 1 year = 98.2(9.4)

### Control

- Patients who reported >1 further fall
- 1 year = 97.8(10.7)
- 1 year = 98.2(9.4)

### Note:

‡, calculated from reported information unless stated otherwise; †, as reported by study authors.

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Supplementary Table 5: Summary of Health professionals’ knowledge, beliefs and behaviour results

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Interventions</th>
<th>Health professionals</th>
<th>patient participants</th>
<th>Outcome measured</th>
<th>Outcome values reported</th>
<th>Change of value within a group ‡</th>
<th>Mean or risk difference (95% CI) ‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beeckman et al, 2013</td>
<td>CDSS(Pre-vPlan)</td>
<td>65 Nurses and physios</td>
<td>225 adults</td>
<td>Positive knowledge change</td>
<td>Baseline=28/65 5 months=26/50 Baseline=21/53 5 months=16/38</td>
<td>8.9%</td>
<td>6.5% (0.8 to 13.2)</td>
</tr>
<tr>
<td></td>
<td>Standard protocol</td>
<td>53 Nurses and physios</td>
<td>239 adults</td>
<td></td>
<td></td>
<td>2.4%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CDSS(Pre-vPlan)</td>
<td>65 Nurses and physios</td>
<td>225 adults</td>
<td>Positive attitude change</td>
<td>Baseline=48/65 5 months=42/50 Baseline=39/53 5 months=27/38</td>
<td>10.2%</td>
<td>12.7% (5.9 to 19.5)</td>
</tr>
<tr>
<td></td>
<td>Standard protocol</td>
<td>53 Nurses and physios</td>
<td>239 adults</td>
<td></td>
<td></td>
<td>-2.5%</td>
<td></td>
</tr>
<tr>
<td>Cortez, 2014</td>
<td>CDSS (drop-down boxes)</td>
<td>26 Nurses</td>
<td>NA</td>
<td>Research utilisation</td>
<td>Baseline=35% 11 weeks=38% Baseline=19% 11 weeks=13%</td>
<td>3%</td>
<td>9% (3.3 to 14.7)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>24 Nurses</td>
<td>NA</td>
<td></td>
<td></td>
<td>-6%</td>
<td></td>
</tr>
<tr>
<td>Dumont et al, 2012</td>
<td>CDSS use</td>
<td>Nurses (OA=44)</td>
<td>141 adults</td>
<td>Nurses satisfaction, out of 10 (mean (SD))</td>
<td>Baseline=4.5 (1.02) 17 months=4.6 (0.85) Baseline=4.8 (0.69) 17 months=4.8 (0.82)</td>
<td>0.1 (0.93)</td>
<td>0.1 (-0.32 to 0.53)</td>
</tr>
<tr>
<td></td>
<td>Paper protocol</td>
<td>Nurses</td>
<td>159 adults</td>
<td>perception of how often needed to deviate from the protocol, out of 10 (mean (SD))</td>
<td>Baseline=6.3 (1.0) 17 months=6.1 (1.1) Baseline=5.9 (1.15) 17 months=6.0 (0.91)</td>
<td>0.2 (1.05)</td>
<td>0.3 (-0.22 to 0.82)</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>42 nurses and physios</td>
<td>Not reported</td>
<td>Behaviour, mean (SD)</td>
<td>Baseline=6.3 (1.0) 17 months=6.1 (1.1) Baseline=5.9 (1.15) 17 months=6.0 (0.91)</td>
<td>0.2 (1.05)</td>
<td>0.3 (-0.22 to 0.82)</td>
</tr>
<tr>
<td></td>
<td>Paper protocol</td>
<td>27 nurses and physios</td>
<td>Not reported</td>
<td>Attitude, mean (SD)</td>
<td>Baseline=6.3 (0.44) 17 months=6.3 (0.56) Baseline=6.2 (0.69) 17 months=6.3 (0.68)</td>
<td>0.0 (0.05)</td>
<td>-0.1 (-0.13 to -0.07)</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>42 nurses and physios</td>
<td>Not reported</td>
<td>Intention, mean (SD)</td>
<td>Baseline=6.3 (1.0) 17 months=6.1 (1.1) Baseline=5.9 (1.15) 17 months=6.0 (0.91)</td>
<td>0.2 (1.05)</td>
<td>0.3 (-0.22 to 0.82)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>27 nurses and physios</td>
<td>Not reported</td>
<td>Perceived behavioural control, mean (SD)</td>
<td>Baseline=4.7 (0.79) 17 months=5.0 (0.73)</td>
<td>0.3 (0.77)</td>
<td>-0.1 (-0.49 to 0.29)</td>
</tr>
<tr>
<td>Group</td>
<td>Group Size</td>
<td>Measure</td>
<td>Baseline</td>
<td>17 months</td>
<td>Change</td>
<td>95% CI</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>----------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>--------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>27 nurses and physios</td>
<td>Subjective norms, mean (SD)</td>
<td>Baseline=4.9 (0.87)</td>
<td>17 months=5.3 (0.8)</td>
<td>0.4 (0.85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDSS use</td>
<td>42 nurses and physios</td>
<td>Subjective norms, mean (SD)</td>
<td>Baseline=5.5 (0.55)</td>
<td>17 months=5.6 (0.63)</td>
<td>0.1 (0.59)</td>
<td>0 (0.34 to 0.34)</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>27 nurses and physios</td>
<td>Moral norms, mean (SD)</td>
<td>Baseline=6.0 (0.63)</td>
<td>17 months=6.2 (0.7)</td>
<td>0.2 (0.67)</td>
<td>0.1 (-0.21 to 0.41)</td>
<td></td>
</tr>
<tr>
<td>CDSS use</td>
<td>42 nurses and physios</td>
<td>Moral norms, mean (SD)</td>
<td>Baseline=6.2 (0.59)</td>
<td>17 months=6.3 (0.55)</td>
<td>0.1 (0.57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>27 nurses and physios</td>
<td>Barriers, mean (SD)</td>
<td>Baseline=3.1 (1.17)</td>
<td>17 months=3.2 (1.12)</td>
<td>0.1 (1.14)</td>
<td>0.3 (-0.23 to 0.83)</td>
<td></td>
</tr>
<tr>
<td>CDSS use</td>
<td>42 nurses and physios</td>
<td>Barriers, mean (SD)</td>
<td>Baseline=2.8 (1.01)</td>
<td>17 months=2.6 (0.96)</td>
<td>-0.2 (0.98)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ‡, calculated from reported information unless stated otherwise; †, as reported by study authors.
### Supplementary Table 6: Summary of adverse events results

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Interventions</th>
<th>Health professionals</th>
<th>patient participants</th>
<th>Outcome measured</th>
<th>Outcome values reported</th>
<th>Risk difference (95% CI)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveringa et al, 2010</td>
<td>CDSS use in diabetic patients</td>
<td>Nurses</td>
<td>1699 adults</td>
<td>cardiovascular events occurring</td>
<td>CDSS Vs usual care</td>
<td>-11% (-18 to -4)†</td>
</tr>
<tr>
<td></td>
<td>Usual care</td>
<td>Nurses</td>
<td>1692 adults</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitzmaurice et al, 2000</td>
<td>CDSS Nurse</td>
<td>Nurses</td>
<td>224 adults</td>
<td>Serious adverse reaction events</td>
<td>1 year =3 (1.3%)</td>
<td>-5.7% (-10.1 to -1.2)</td>
</tr>
<tr>
<td></td>
<td>CDSS non-use</td>
<td>Physicians</td>
<td>143 adults</td>
<td></td>
<td>1 year =10 (7%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CDSS Nurse</td>
<td>Nurses</td>
<td>224 adults</td>
<td>Deaths</td>
<td>1 year =3 (1.3%)</td>
<td>-5% (-9.2 to -0.7)</td>
</tr>
<tr>
<td></td>
<td>CDSS non-use</td>
<td>Physicians</td>
<td>143 adults</td>
<td></td>
<td>1 year =9 (6.3%)</td>
<td></td>
</tr>
<tr>
<td>Snooks et al, 2014</td>
<td>CDSS</td>
<td>Paramedics</td>
<td>436 adults</td>
<td>Patients dying</td>
<td>1 year =19/436 (4.4%)</td>
<td>1.2% (-1.5 to 3.8)</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Paramedics</td>
<td>343 adults</td>
<td></td>
<td>1 year =11/343 (3.2%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: ‡, calculated from reported information unless stated otherwise; †, as reported by study authors.
<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Interventions</th>
<th>Health professionals</th>
<th>patient participants</th>
<th>Outcome measured</th>
<th>Outcome values reported</th>
<th>Difference (95% CI)²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveringa et al, 2010</td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Diabetes-related costs (excluding CHD)-€ discounted</td>
<td>CDSS Vs usual care</td>
<td>1,698.00 (187 to 3,209)³</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Cardiovascular disease cost-€ discounted</td>
<td>CDSS Vs usual care</td>
<td>-587.00 (-880 to -294)³</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Diabetic care protocol cost-€ discounted</td>
<td>CDSS Vs usual care</td>
<td>316.00 (315 to 318)³</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Total cost-€ discounted</td>
<td>CDSS Vs usual care</td>
<td>1,415.00 (-130 to 2,961)³</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Total costs per QALY gained (Euro)</td>
<td>CDSS Vs usual care</td>
<td>38,243.00³</td>
</tr>
<tr>
<td>Guerts et al, 2017</td>
<td>CDSS use</td>
<td>Nurses</td>
<td>113 children</td>
<td>Average emergency department visit costs (Euro)</td>
<td>CDSS Vs usual care</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td>109 children</td>
<td>Average diagnostics cost (Euro)</td>
<td>CDSS Vs usual care</td>
<td>2.58</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Average treatment cost (Euro)</td>
<td>CDSS Vs usual care</td>
<td>1.55</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Average follow-up/hospitalization (Euro)</td>
<td>CDSS Vs usual care</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Average costs of missed diagnoses/adverse events (Euro)</td>
<td>CDSS Vs usual care</td>
<td>107.4</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Average cost of CDSS implementation (Euro)</td>
<td>CDSS Vs usual care</td>
<td>34.7</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Nurses</td>
<td></td>
<td>Overall average cost</td>
<td>CDSS Vs usual care</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Physicians</td>
<td>Not applicable</td>
<td>Net savings [of CDSS use] in a year (£)</td>
<td>CDSS Vs usual care</td>
<td>408</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Physicians</td>
<td>Not applicable</td>
<td>Cost saved from inpatient stay</td>
<td>CDSS Vs usual care</td>
<td>58.00</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Physicians</td>
<td>Not applicable</td>
<td>Implementing cost of CCDS in one month (in 100s £)</td>
<td>CDSS Vs usual care</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Paramedics</td>
<td>Not applicable</td>
<td>Total cost of implementation in one month (in 100s £)</td>
<td>CDSS Vs usual care</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>CDSS use</td>
<td>Paramedics</td>
<td>Not applicable</td>
<td>Net resources saved</td>
<td>CDSS Vs usual care</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>by CDSS per patient year (£)</td>
<td></td>
<td></td>
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<tr>
<td>Control</td>
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<tr>
<td>CDSS</td>
<td>Net cost resources saved by CCDS per patient year (£)</td>
<td>208-308†</td>
<td></td>
<td></td>
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<tr>
<td>Control</td>
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<tr>
<td>CDSS</td>
<td>Mean length of Job cycle time (minutes)</td>
<td>CDSS Vs control</td>
<td>8.9 min (2.3 to 15.3)†</td>
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<tr>
<td>Control</td>
<td>Mean length of episode of care (minutes)</td>
<td>CDSS Vs control</td>
<td>-5.7 min (-38.5 to 27.2)†</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: †, calculated from reported information unless stated otherwise; ‡, as reported by study authors; PCS, physical component summary; MCS, mental component summary; SF, Short-Form