Appendix A: Research Team, Expert Panel, Technical Advisory Panel, and Peer Reviewers

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Occupational Safety and Health Administration
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Appendix B: Search Strategies by Working Condition and for the Campbell Collaboration Database

Workforce Staffing

Database: MEDLINE

---

1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 exp hospital mortality/
6 Iatrogenic Disease/ or iatrogenic disease.mp.
7 quality assurance health care/
8 (patient safety or safety of patient$).mp.
9 *treatment outcome/
10 Patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 workload/ or workload.mp. or overwork.mp.
13 exp professional competence/
14 work schedule tolerance/ or personnel turnover/ or teamwork.tw.
15 burnout, professional/
16 "Personnel Staffing and Scheduling"/ or personnel staffing.mp.
17 12 or 13 or 14 or 15 or 16
18 11 and 17
19 limit 18 to (human and english language)
20 limit 19 to yr=1980-2002

Database: CINAHL

---

1 Medication Errors/ or medication errors.mp.
2 Treatment Errors/ or medical errors.mp.
3 Diagnostic Errors/ or diagnostic errors.mp.
4 safety management.mp. or Safety/
5 Hospital Mortality/ or hospital mortality.mp.
6 iatrogenic disease/ or iatrogenic.mp.
7 Patient Safety/ or patient safety.mp.
8 *Treatment Outcomes/
9 Quality of Health Care/
10 patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 WORKLOAD/ or WORKLOAD MEASUREMENT/
13 Personnel Turnover/ or personnel turnover.mp.
14 TEAMWORK/ or teamwork.mp.
15 BURNOUT, PROFESSIONAL/
16 "Personnel Staffing and Scheduling"/ or personnel staffing.mp.
17 exp Professional Competence/og, pf, ev, st, td [Organizations, Psychosocial Factors, Evaluation, Standards, Trends]
18 12 or 13 or 14 or 15 or 16 or 17
19 11 and 18

Database: PsycINFO

---

1 exp Job Performance/ or human performance.mp.
2 exp EMPLOYEE PRODUCTIVITY/ or exp Group Performance/
3 exp Person Environment Fit/ or person environment fit.mp.
4 (medical errors or medication errors or diagnostic errors).mp.
5 iatrogenic disease/ or iatrogenic.mp.
6 exp Hospitalized Patients/ or patient safety.mp.
7 error$.tw.
8 1 or 2 or 3 or 4 or 5 or 6 or 7
9 exp Work Scheduling/ or exp Work Rest Cycles/ or exp Workday Shifts/ or work schedule.mp.
10 teamwork.mp.
11 exp *occupational stress/
12 exp work load/ or work load.tw.
13 exp Professional Competence/ or professional competence.mp.
14 9 or 10 or 11 or 12 or 13
15 8 and 14
16 limit 15 to human

Workflow Design

Database: MEDLINE

---

1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 exp hospital mortality/
6 Iatrogenic Disease/ or iatrogenic disease.mp.
7 quality assurance health care/
8 (patient safety or safety of patient$).mp.
9 *treatment outcome/
10 Patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 Efficiency, Organizational/ or organizational efficiency.mp.
13 (workflow or work flow).tw.
14 exp "Task Performance and Analysis"/ or task performance.mp.
15 exp *Information Systems/og, sd, td, ma, ut
16 (equipment safety and patient$).mp.
17 *Equipment Design/ae, sn, td, mt
18 12 or 13 or 14 or 15 or 16 or 17
19 11 and 18
20 limit 19 to (human and english language)
21 limit 20 to yr=1980-2002

Database: CINAHL

---

1 Medication Errors/ or medication errors.mp.
2 Treatment Errors/ or medical errors.mp.
3 Diagnostic Errors/ or diagnostic errors.mp.
4 safety management.mp. or Safety/
5 Hospital Mortality/ or hospital mortality.mp.
6 iatrogenic disease/ or iatrogenic.mp.
7 Patient Safety/ or patient safety.mp.
8 *Treatment Outcomes/
9 Quality of Health Care/
10 patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 Organizational Efficiency/ or organizational efficiency.mp.
13 workflow.mp.
14 exp "Task Performance and Analysis"/ or task performance.mp.
15 exp *Information Systems/ma, og, st, td, ut [Manpower, Organizations, Standards, Trends, Utilization]
16 equipment safety/ and patient$.mp.
17 *Equipment Design/ae, st, ev, td [Adverse Effects, Standards, Evaluation, Trends]
18 12 or 13 or 14 or 15 or 16 or 17
19 11 and 18

Database: PsycINFO

---

1 exp Job Performance/ or human performance.mp.
2 exp EMPLOYEE PRODUCTIVITY/ or exp Group Performance/
3 exp Person Environment Fit/ or person environment fit.mp.
4 (medical errors or medication errors or diagnostic errors).mp.
5 iatrogenic disease/ or iatrogenic.mp.
6 exp Hospitalized Patients/ or patient safety.mp.
7 error$.tw.
8 1 or 2 or 3 or 4 or 5 or 6 or 7
9 exp Organizational Effectiveness/ or organizational efficiency.mp.
10 (workflow or work flow).mp.
11 equipment safety.mp.
12 (equipment design$ or design$ of equipment).mp.
13 (job performance or task performance).tw.
14 9 or 10 or 11 or 12 or 13
15 8 and 14
16 limit 15 to (human and english language)

Database: MEDLINE

---

1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 exp hospital mortality/
6 Iatrogenic Disease/ or iatrogenic disease.mp.
7 quality assurance health care/
8 (patient safety or safety of patient$).mp.
9 *treatment outcome/
10 Patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 exp User-Computer Interface/
13 exp Expert Systems/ or expert systems.mp.
14 (diagnosis or screening or appendicitis or abdominal pain).mp.
15 13 and 14
16 (distraction$ or interruption$ or multi task$ or multitask$).mp.
17 closed loop control$.mp.
18 limit 17 to review articles
19 12 or 15 or 16 or 18
20 11 and 19
21 limit 20 to (human and english language)
22 from 21 keep 1-1048

Database: CINAHL

---

1 Medication Errors/ or medication errors.mp.
2 Treatment Errors/ or medical errors.mp.
3 Diagnostic Errors/ or diagnostic errors.mp.
4 safety management.mp. or Safety/
5 Hospital Mortality/ or hospital mortality.mp.
6 iatrogenic disease/ or iatrogenic.mp.
7 Patient Safety/ or patient safety.mp.
8 *Treatment Outcomes/
9 Quality of Health Care/
10 patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 exp Expert Systems/ or expert systems.mp.
13 (diagnosis or screening or appendicitis or abdominal pain).tw.
14 12 and 13
15 closed loop control$.mp.
16 exp User-Computer Interface/ or user computer interface.mp.
17 (interruption$ or distraction$ or paging or paged).tw.
18 14 or 15 or 16 or 17
19 11 and 18
20 from 19 keep 1-103

Database: PsycINFO

---

1 exp Job Performance/ or human performance.mp.
2 exp EMPLOYEE PRODUCTIVITY/ or exp Group Performance/
3 exp Person Environment Fit/ or person environment fit.mp.
4 (medical errors or medication errors or diagnostic errors).mp.
5 iatrogenic disease/ or iatrogenic.mp.
6 exp Hospitalized Patients/ or patient safety.mp.
7 error$.tw.
8 1 or 2 or 3 or 4 or 5 or 6 or 7
9 exp Expert Systems/ or expert systems.mp.
10 (diagnosis or screening or appendicitis or abdominal pain).mp.
11 9 and 10
12 closed loop control$.mp.
13 (distraction$ or interruption$ or paged or paging).tw.
14 exp Human Computer Interaction/
15 11 or 12 or 13 or 14
16 8 and 15
17 limit 16 to (human and english language)
18 from 17 keep 1-234

Personal/Social

Database: MEDLINE

---

1 exp medical errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 exp hospital mortality/
6 Iatrogenic Disease/ or iatrogenic disease.mp.
7 quality assurance health care/
8 (patient safety or safety of patient$).mp.
9 *treatment outcome/
10 Patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 Job Satisfaction/ or job satisfaction.mp.
13 absenteeism/
14 Employee Grievances/ or employee grievance$.mp.
15 Burnout, Professional/ or professional burnout.mp.
16 professionalism.mp.
17 professional culture.mp.
18 MORALE/ or morale.mp.
19 Professional Autonomy/ or professional autonomy.mp.
20 professional power.mp.
21 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20
22 11 and 21
23 limit 22 to human
24 limit 23 to english language
25 23 not 24
26 limit 25 to abstracts
27 24 or 26
28 limit 27 to yr=1980-2002

Database: CINAHL

---

1 (medical errors or medication errors or diagnostic errors).mp.
2 quality of health care/
3 *safety/ or safety/st or safety management.mp.
4 exp hospital mortality/
5 Iatrogenic Disease/ or iatrogenic disease.mp.
6 (patient safety or safety of patient$).mp.
7 *treatment outcome/
8 Patient$.ti.
9 Job Satisfaction/ or job satisfaction.mp.
10 ABSENTEEISM/ or absenteeism.mp.
11 Employee Grievances/ or employee grievance$.mp.
12 BURNOUT, PROFESSIONAL/ or burnout.mp. or Stress, Occupational/
13 PROFESSIONALISM/ or professionalism.mp.
14 professional culture.mp.
15 MORALE/ or morale.mp.
16 AUTONOMY/ or PROFESSIONAL AUTONOMY/ or autonomy.mp.
17 Power/ or professional power.mp.
18 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17
19 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8
20 18 and 19

Database: PsycINFO

---

1 exp Job Performance/ or human performance.mp.
2 exp EMPLOYEE PRODUCTIVITY/ or exp Group Performance/
3 exp Person Environment Fit/ or person environment fit.mp.
4 (medical errors or medication errors or diagnostic errors).mp.
5 iatrogenic disease/ or iatrogenic.mp.
6 exp Hospitalized Patients/ or patient safety.mp.
7 error$.tw.
8 1 or 2 or 3 or 4 or 5 or 6 or 7
9 exp Job Satisfaction/ or job satisfaction.mp.
10 exp EMPLOYEE ABSENTEEISM/ or absenteeism.mp.
11 employee grievance$.mp.
12 exp Occupational Stress/ or burnout.mp.
13 exp Professional Ethics/ or professionalism.mp.
14 exp Professional Identity/ or professional culture.mp.
15 exp MORALE/ or morale.mp.
16 autonomy.mp.
17 exp Power/ or professional power.mp.
18 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17
19 8 and 18
20 limit 19 to human

Physical Environment

Database: MEDLINE

---

1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 exp hospital mortality/
6 Iatrogenic Disease/ or iatrogenic disease.mp.
7 quality assurance health care/
8 (patient safety or safety of patient$).mp.
9 *treatment outcome/
10 Patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 exp "Facility Design and Construction"/ or facility design.mp.
13 exp Health Facility Environment/
14 (working environment$ or physical environment$).mp.
15 exp Air Pollution, Indoor/ or indoor pollution.mp.
16 indoor lighting.mp.
17 lighting/
18 acoustics.tw. or acoustics/
19 workplace.mp.
20 NOISE/
21 working conditions.mp.
22 exp "Interior Design and Furnishings"/ or interior design.mp.
23 HUMIDITY/ or humidity.mp.
24 indoor temperature$.mp.
25 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24
26 11 and 25
27 limit 26 to human
28 limit 27 to english language
29 27 not 28
30 limit 29 to abstracts
31 28 or 30
32 limit 31 to yr=1980-2002

Database: CINAHL

---

1 Medication Errors/ or medication errors.mp.
2 Treatment Errors/ or medical errors.mp.
3 Diagnostic Errors/ or diagnostic errors.mp.
4 safety management.mp. or Safety/
5 Hospital Mortality/ or hospital mortality.mp.
6 iatrogenic disease/ or iatrogenic.mp.
7 Patient Safety/ or patient safety.mp.
8 *Treatment Outcomes/
9 Quality of Health Care/
10 patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 exp "Facility Design and Construction"/ or facility design.mp.
13 exp Health Facility Environment/
14 Work Environment/ or working environment.mp.
15 physical environment.mp. or exp "Interior Design and Furnishings"/ or Noise/ or exp "Hospital Design and Construction"/
16 exp Air Pollution, Indoor/ or indoor air pollution.mp.
17 LIGHTING/
18 ACOUSTICS/ or acoustics.mp.
19 workplace.mp.
20 working conditions.mp.
21 HUMIDITY/ or humidity.mp.
22 *temperature/
23 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22
24 11 and 23

Database: PsycINFO

---

1 exp Job Performance/ or human performance.mp.
2 exp EMPLOYEE PRODUCTIVITY/ or exp Group Performance/
3 exp Person Environment Fit/ or person environment fit.mp.
4 (medical errors or medication errors or diagnostic errors).mp.
5 iatrogenic disease/ or iatrogenic.mp.
6 exp Hospitalized Patients/ or patient safety.mp.
7 error$.tw.
8 1 or 2 or 3 or 4 or 5 or 6 or 7
9 exp Human Factors Engineering/ or facility design.mp.
10 exp Facility Environment/ or facility environment.mp.
11 exp Working Conditions/ or working environment.mp.
12 indoor air pollution.mp.
13 exp Illumination/ or indoor light$.mp.
14 exp acoustics/
15 exp "noise levels (work areas)"/
16 exp Interior Design/ or interior design.mp.
17 exp Facility Environment/
18 exp Temperature Effects/
19 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18
20 8 and 19
21 limit 20 to human

Organizational Culture

Database: MEDLINE

---

1 exp Medical Errors/
2 (medical errors or medication errors or diagnostic errors).mp.
3 quality of health care/
4 *safety/ or safety/st or safety management.mp.
5 exp hospital mortality/
6 Iatrogenic Disease/ or iatrogenic disease.mp.
7 quality assurance health care/
8 (patient safety or safety of patient$).mp.
9 *treatment outcome/
10 Patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 Organizational Culture/ or organizational culture.mp.
13 organizational climate.mp.
14 exp interprofessional relations/ and og.fs.
15 leadership/ and og.fs.
16 managerial style.mp.
17 management style.mp.
18 12 or 13 or 14 or 15 or 16 or 17
19 11 and 18
20 limit 19 to (human and english language and yr=1980-2002)

Database: CINAHL

---

1 Medication Errors/ or medication errors.mp.
2 Treatment Errors/ or medical errors.mp.
3 Diagnostic Errors/ or diagnostic errors.mp.
4 safety management.mp. or Safety/
5 Hospital Mortality/ or hospital mortality.mp.
6 iatrogenic disease/ or iatrogenic.mp.
7 Patient Safety/ or patient safety.mp.
8 *Treatment Outcomes/
9 Quality of Health Care/
10 patient$.ti.
11 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10
12 exp Skill Mix/ or skill mix.mp.
13 exp Organizational Culture/ or organizational culture.mp.
14 organizational climate.mp.
15 *Interprofessional Relations/
16 Management Styles/ or management style.mp.
17 12 or 13 or 14 or 15 or 16
18 11 and 17

Database: PsycINFO

---

1 exp Job Performance/ or human performance.mp.
2 exp EMPLOYEE PRODUCTIVITY/ or exp Group Performance/
3 exp Person Environment Fit/ or person environment fit.mp.
4 (medical errors or medication errors or diagnostic errors).mp.
5 iatrogenic disease/ or iatrogenic.mp.
6 exp Hospitalized Patients/ or patient safety.mp.
7 1 or 2 or 3 or 4 or 5 or 6
8 exp Organizational Climate/ or organizational culture.mp.
9 organizational climate.mp.
10 exp Teams/ or interprofessional relatio ns.mp.
11 exp LEADERSHIP QUALITIES/ or exp LEADERSHIP STYLE/
12 exp Conflict Resolution/ or exp Leadership Style/
13 8 or 9 or 10 or 11 or 12
14 7 and 13
15 limit 14 to human

Campbell Collaboration Database
Social, Psychological, Educational, and Criminological Trials Register (C2-SPECTR)

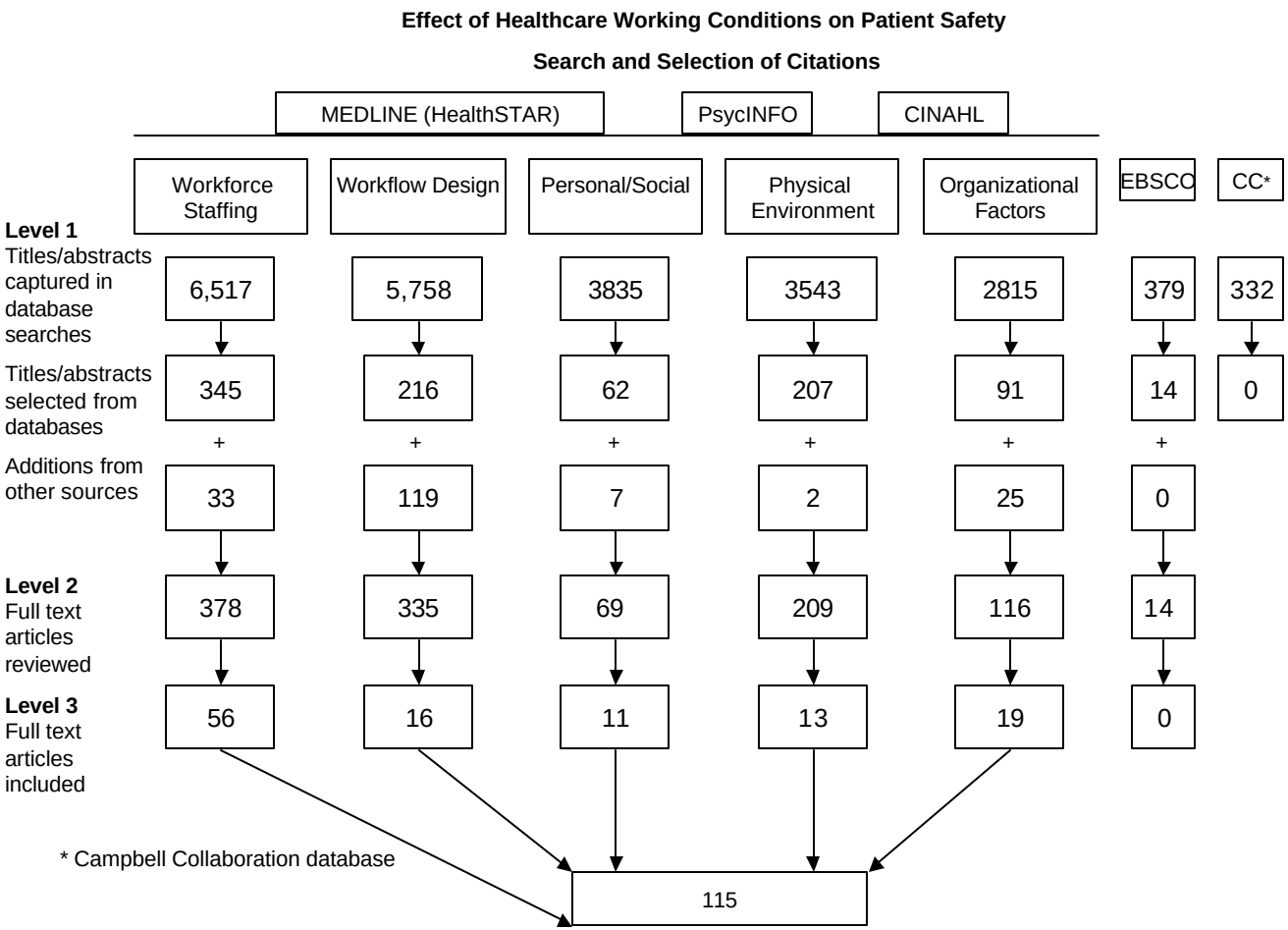
Database: Campbell Collaboration

---

1 patient and safety
2 safety
3 medical and error
4 error
5 error and safety
6 working and conditions
7 quality and health and care
8 medication and errors
9 diagnostic and errors
10 hospital and mortality
11 iatrogenic and disease
12 quality and assurance
13 treatment and outcome
14 job and performance
15 employee and productivity
16 person and environment and fit
17 human and performance
18 productivity

Note: We searched in the keywords and non-indexed fields.

Appendix C: Search Results



Appendix D: Data Abstraction Guidelines

Source

Author(s): _____

Editor(s): _____

Year: _____

Title: _____

Journal: _____

Volume (Issue) or Edition: _____

Publisher (Place): _____

Page(s): _____

Exclusion Code at the Paper Review Level (if applicable): _____

Study Design

Purpose of Study: _____

Industrial/Healthcare Setting: _____

Comparison Groups: _____

Working Conditions Measured: _____

Length of Followup: _____

Interventions: _____

Co-Interventions: _____

Blinding: _____

Sample/Population

Population: _____

Inclusion Criteria: _____

Sample Characteristics: _____

Groups/n: _____

Baseline Differences in Groups: _____

Non-respondents: _____

Exclusions: _____

Intervention

Description: _____

Procedure: _____

Duration of Intervention: _____

Measures/Analysis

Baseline Measures: _____

Outcome Measures: _____

Confounders: _____

Analysis Methods: _____

Outcome

Relationship of outcome to patient safety: _____

_____

Strength of association between working condition and outcome: _____

_____

Overall findings (Check one):

_____ Working condition affects patient safety.

_____ Working condition does not affect patient safety.

Comments: _____

_____

Quality

Study Design (Check as appropriate):

_____Randomized Controlled Trial
_____Cohort Study
_____Case Control Study
_____Cross-sectional Study
_____Case Series
_____Survey/Self-report
_____Pre-test/Post-test
_____Other

Comments: _____

_____

Internal Validity:

Comparability of Groups: _____
Differential Loss to Follow Up: _____
Measurement/Instrumentation Issues: _____
Maturation/Pre-testing Effects: _____
Clear Description of Interventions: _____
Other Issues: _____

External Validity (Check as appropriate):

_____Sensitized or Pre-tested Population
_____Specialized/Atypical Population
_____Selection Biases (non-random subject selection)
_____Reactive Effects of Experimental Settings
_____Multiple Interventions

Comments: _____

_____