

Draft

Spinal injury

Search strategies appendix

Clinical guideline

Appendices

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Draft for Consultation

*Commissioned by the National Institute for
Health and Care Excellence*

Disclaimer

Healthcare professionals are expected to take NICE clinical guidelines fully into account when exercising their clinical judgement. However, the guidance does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of each patient, in consultation with the patient and, where appropriate, their guardian or carer.

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Appendix A: Literature search strategies

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Search strategies used for the trauma spinal injuries guideline are outlined below and were run in accordance with the methodology in the NICE guidelines manual 2012.¹ All searches were run up to 27th March 2015, unless otherwise stated. Any studies added to the databases after this date (even if

they were published prior to this date) were not included unless specifically stated in the text. We do not routinely search for electronic, ahead of print or “online early” publications. Where possible searches were limited to retrieve material published in English.

Table 1: Database date parameters

Database	Dates searched
Medline	1946 – 27 th March 2015
Embase	1974 – 27 th March 2015
The Cochrane Library	Cochrane Reviews to 2015 Issue 3 of 12 CENTRAL to 2015 issue 2 of 12 DARE, HTA and NHSEED to 2015 Issue 1 of 4

Searches for the **clinical reviews** were run in Medline (OVID), Embase (OVID), the Cochrane Library (Wiley) and CINAHL (Ebsco).

Searches for intervention and diagnostic studies were usually constructed using a PICO format where population (P) terms were combined with Intervention (I) and sometimes Comparison (C) terms. An intervention can be a drug, a procedure or a diagnostic test. Outcomes (O) are rarely used in search strategies for interventions. Search filters were also added to the search where appropriate.

Searches for prognostic studies were usually constructed combining population terms with prognostic variable terms and sometimes outcomes. Search filters were added to the search where appropriate.

Searches for the health economic reviews were run in Medline (OVID), Embase (OVID), the NHS Economic Evaluations Database (NHS EED) the Health Technology Assessment (HTA) database, the Health Economic Evaluation Database (HEED). The economic searches were run up until 31st March 2015 and quality of life searches were run up until 31st July 2014. NHS EED and HTA were hosted by the Centre of Reviews and Dissemination (CRD) database. The Health Economic Evaluation Database (HEED) ceased production in 2014 with access ceasing in January 2015. For the final dates of HEED searches, please see individual economic questions. Searches in CRD and HEED were constructed using population terms only, unless otherwise specified. For Medline and Embase an economic filter (instead of a study type filter) was added to the same clinical search strategy.

A.2 Population search strategies

All searches included the following population search strategies unless otherwise stated.

Medline search terms

1	exp spinal injuries/
2	exp spinal cord injuries/
3	spinal cord compression/
4	exp neck injuries/
5	((spine or spinal or vertebr* or neck or cervical or lumbar or sacral or thoracic or cord or whiplash) adj2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*)).ti,ab.
6	(central cord syndrome or central spinal cord syndrome).ti,ab.
7	(conus medullaris syndrome* or cauda equina syndrome*).ti,ab.
8	or/1-7

Embase search terms

1	exp spine injury/
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2	neck injury/ or whiplash injury/
3	exp spinal cord injury/
4	((spine or spinal or vertebr* or neck or cervical or lumbar or sacral or thoracic or cord or whiplash) adj2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*)):ti,ab.
5	(central cord syndrome or central spinal cord syndrome).ti,ab.
6	(conus medullaris syndrome* or cauda equina syndrome*).ti,ab.
7	or/1-6

Cochrane search terms

#1	MeSH descriptor: [spinal injuries] explode all trees
#2	MeSH descriptor: [spinal cord injuries] explode all trees
#3	MeSH descriptor: [spinal cord compression] this term only
#4	MeSH descriptor: [neck injuries] explode all trees
#5	((spine or spinal or vertebr* or neck or cervical or lumbar or sacral or thoracic or cord or whiplash) near/2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*)):ti,ab,kw
#6	(central cord syndrome or central spinal cord syndrome):ti,ab,kw
#7	(conus medullaris syndrome or cauda equina syndrome):ti,ab,kw
#8	{or #1-#7}

CINAHL search terms

S1	(MH "spinal injuries+")
S2	(MH "spinal cord injuries+")
S3	(MH "spinal cord compression")
S4	(MH "neck injuries+")
S5	TX (spine or spinal or vertebr* or neck or cervical or cord or whiplash) and (injur* or trauma* or fracture*)
S6	S1 or S2 or S3 or S4 or S5

CRD search terms

#1	MeSH descriptor spinal injuries explode all trees
#2	MeSH descriptor spinal cord injuries explode all trees
#3	MeSH descriptor spinal cord compression
#4	MeSH descriptor neck injuries explode all trees
#5	((spine or spinal or vertebr* or neck or cervical or lumbar or sacral or thoracic or cord or whiplash) near2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*))
#6	((central adj cord adj syndrome or central adj spinal adj cord adj syndrome))
#7	((conus adj medullaris adj syndrome or cauda adj equina adj syndrome))
#8	#1 or #2 or #3 or #4 or #5 or #6 or #7

HEED search terms

1	searching article title: ((spine or spinal or vertebr* or neck or cervical or lumbar or sacral or thoracic or cord or whiplash) and (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*))
2	searching abstract: ((spine or spinal or vertebr* or neck or cervical or lumbar or sacral or thoracic or cord or whiplash) and (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*))

3	1 or 2
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A.3 Study filter search terms

A.3.1 Systematic review (SR) search terms

Medline search terms

1	meta-analysis/
2	meta-analysis as topic/
3	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
4	((systematic* or evidence*) adj2 (review* or overview*)).ti,ab.
5	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
6	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
7	(search* adj4 literature).ab.
8	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or CINAHL or science citation index or bids or cancerlit).ab.
9	cochrane.jw.
10	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
11	or/1-10

Embase search terms

1	systematic review/
2	meta-analysis/
3	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
4	((systematic or evidence) adj2 (review* or overview*)).ti,ab.
5	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
6	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
7	(search* adj4 literature).ab.
8	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or CINAHL or science citation index or bids or cancerlit).ab.
9	cochrane.jw.
10	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
11	or/1-10

A.3.2 Randomised controlled studies (RCTs) search terms

Medline search terms

1	randomized controlled trial.pt.
2	controlled clinical trial.pt.
3	randomi#ed.ab.
4	placebo.ab.
5	randomly.ab.
6	clinical trials as topic.sh.
7	trial.ti.
8	or/1-7

Embase search terms

1	random*.ti,ab.
2	factorial*.ti,ab.
3	(crossover* or cross over*).ti,ab.
4	((doubl* or singl*) adj blind*).ti,ab.
5	(assign* or allocat* or volunteer* or placebo*).ti,ab.
6	crossover procedure/
7	single blind procedure/
8	randomized controlled trial/
9	double blind procedure/
10	or/1-9

A.3.3 Diagnostic accuracy (DIAG) search terms

Lines 11 and 12 (Medline) and 12 and 13 (Embase) were used in question A.4.3only.

Medline search terms

1	exp "sensitivity and specificity"/
2	(sensitivity or specificity).ti,ab.
3	((pre test or pretest or post test) adj probability).ti,ab.
4	(predictive value* or ppv or npv).ti,ab.
5	likelihood ratio*.ti,ab.
6	likelihood function/
7	(roc curve* or auc).ti,ab.
8	(diagnos* adj2 (performance* or accurac* or utilit* or value* or efficien* or effectiveness)).ti,ab.
9	gold standard.ab.
10	or/1-9
11	(di or ra).fs.
12	10 or 11

Embase search terms

1	exp "sensitivity and specificity"/
2	(sensitivity or specificity).ti,ab.
3	((pre test or pretest or post test) adj probability).ti,ab.
4	(predictive value* or ppv or npv).ti,ab.
5	likelihood ratio*.ti,ab.
6	(roc curve* or auc).ti,ab.
7	(diagnos* adj2 (performance* or accurac* or utilit* or value* or efficien* or effectiveness)).ti,ab.
8	diagnostic accuracy/
9	diagnostic test accuracy study/
10	gold standard.ab.
11	or/1-10
12	(di or ra).fs.
13	11 or 12

A.3.4 Prognostic (PROG) search terms

Medline search terms

1	predict.ti.
2	(validat* or rule*).ti,ab.
3	(predict* and (outcome* or risk* or model*)).ti,ab.
4	((history or variable* or criteria or scor* or characteristic* or finding* or factor*) and (predict* or model* or decision* or identif* or prognos*)).ti,ab.
5	decision*.ti,ab. and logistic models/
6	(decision* and (model* or clinical*)).ti,ab.
7	(prognostic and (history or variable* or criteria or scor* or characteristic* or finding* or factor* or model*)).ti,ab.
8	(stratification or discrimination or discriminate or c statistic or "area under the curve" or auc or calibration or indices or algorithm or multivariable).ti,ab.
9	roc curve/
10	or/1-9

Embase search terms

1	predict.ti.
2	(validat* or rule*).ti,ab.
3	(predict* and (outcome* or risk* or model*)).ti,ab.
4	((history or variable* or criteria or scor* or characteristic* or finding* or factor*) and (predict* or model* or decision* or identif* or prognos*)).ti,ab.
5	decision*.ti,ab. and statistical model/
6	(decision* and (model* or clinical*)).ti,ab.
7	(prognostic and (history or variable* or criteria or scor* or characteristic* or finding* or factor* or model*)).ti,ab.
8	(stratification or discrimination or discriminate or c statistic or "area under the curve" or auc or calibration or indices or algorithm or multivariable).ti,ab.
9	receiver operating characteristic/
10	or/1-9

A.3.5 Observational studies (OBS) search terms

Medline search terms

1	epidemiologic studies/
2	exp case control studies/
3	exp cohort studies/
4	cross-sectional studies/
5	case control.ti,ab.
6	(cohort adj (study or studies or analys*)).ti,ab.
7	((follow up or observational or uncontrolled or non randomi#ed or nonrandomi#ed or epidemiologic*) adj (study or studies)).ti,ab.
8	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort*)).ti,ab.
9	or/1-8

Embase search terms

1	clinical study/
2	exp case control study/
3	family study/
4	longitudinal study/
5	retrospective study/
6	prospective study/
7	cross-sectional study/
8	cohort analysis/
9	follow-up/
10	cohort*.ti,ab.
11	9 and10
12	case control.ti,ab.
13	(cohort adj (study or studies or analys*)).ti,ab.
14	((follow up or observational or uncontrolled or non randomi#ed or nonrandomi#ed or epidemiologic*) adj (study or studies)).ti,ab.
15	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort*)).ti,ab.
16	or/1-8,11-15

A.3.6 Health economic (HE) search terms

Medline search terms

1	economics/
2	value of life/
3	exp "costs and cost analysis"/
4	exp economics, hospital/
5	exp economics, medical/
6	economics, nursing/
7	economics, pharmaceutical/
8	exp "fees and charges"/
9	exp budgets/
10	budget*.ti,ab.
11	cost*.ti.
12	(economic* or pharmaco?economic*).ti.
13	(price* or pricing*).ti,ab.
14	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
15	(financ* or fee or fees).ti,ab.
16	(value adj2 (money or monetary)).ti,ab.
17	or/1-16

Embase search terms

1	health economics/
2	exp economic evaluation/
3	exp health care cost/
4	exp fee/

5	budget/
6	funding/
7	budget*.ti,ab.
8	cost*.ti.
9	(economic* or pharmaco?economic*).ti.
10	(price* or pricing*).ti,ab.
11	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
12	(financ* or fee or fees).ti,ab.
13	(value adj2 (money or monetary)).ti,ab.
14	or/1-13

A.3.7 Quality of life (QOL) search terms

Medline search terms

1	quality-adjusted life years/
2	sickness impact profile/
3	(quality adj2 (wellbeing or well being)).ti,ab.
4	sickness impact profile.ti,ab.
5	disability adjusted life.ti,ab.
6	(qal* or qtime* or qwb* or daly*).ti,ab.
7	(euroqol* or eq5d* or eq 5*).ti,ab.
8	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
9	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
10	(hui or hui1 or hui2 or hui3).ti,ab.
11	(health* year* equivalent* or hye or hyes).ti,ab.
12	discrete choice*.ti,ab.
13	rosser.ti,ab.
14	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
15	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
16	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
17	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
18	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
19	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
20	(upper limb functional index or ulfi or lower limb functional index or llfi).ti,ab,ot.
21	or/1-20

Embase search terms

1	quality adjusted life year/
2	"quality of life index"/
3	short form 12/ or short form 20/ or short form 36/ or short form 8/
4	sickness impact profile/
5	(quality adj2 (wellbeing or well being)).ti,ab.
6	sickness impact profile.ti,ab.
7	disability adjusted life.ti,ab.
8	(qal* or qtime* or qwb* or daly*).ti,ab.

9	(euroqol* or eq5d* or eq 5*).ti,ab.
10	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
11	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
12	(hui or hui1 or hui2 or hui3).ti,ab.
13	(health* year* equivalent* or hye or hyes).ti,ab.
14	discrete choice*.ti,ab.
15	rosser.ti,ab.
16	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
17	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
18	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
19	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
20	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
21	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
22	(upper limb functional index or ulfi or lower limb functional index or llfi).ti,ab,ot.
23	or/1-22

A.3.8 Economic modelling (MOD) search terms

Medline search terms

1	exp models, economic/
2	*models, theoretical/
3	*models, organizational/
4	markov chains/
5	monte carlo method/
6	exp decision theory/
7	(markov* or monte carlo).ti,ab.
8	econom* model*.ti,ab.
9	(decision* adj2 (tree* or analy* or model*)).ti,ab.
10	or/1-9

Embase search terms

1	statistical model/
2	exp economic aspect/
3	1 and 2
4	*theoretical model/
5	*nonbiological model/
6	stochastic model/
7	decision theory/
8	decision tree/
9	monte carlo method/
10	(markov* or monte carlo).ti,ab.
11	econom* model*.ti,ab.
12	(decision* adj2 (tree* or analy* or model*)).ti,ab.
13	or/3-12

A.3.9 Excluded study designs and publication types

The following study designs and publication types were removed from retrieved results using the NOT operator. This filter was used in all searches.

Medline search terms

1	letter/
2	editorial/
3	news/
4	exp historical article/
5	anecdotes as topic/
6	comment/
7	case report/
8	(letter or comment*).ti.
9	or/1-8
10	randomized controlled trial/ or random*.ti,ab.
11	9 not 10
12	animals/ not humans/
13	exp animals, laboratory/
14	exp animal experimentation/
15	exp models, animal/
16	exp rodentia/
17	(rat or rats or mouse or mice).ti.
18	or/11-17

Embase search terms

1	letter.pt. or letter/
2	note.pt.
3	editorial.pt.
4	case report/ or case study/
5	(letter or comment*).ti.
6	or/1-5
7	randomized controlled trial/ or random*.ti,ab.
8	6 not 7
9	animal/ not human/
10	nonhuman/
11	exp animal experiment/
12	exp experimental animal/
13	animal model/
14	exp rodent/
15	(rat or rats or mouse or mice).ti.
16	or/8-15

CINAHL search terms

1	PT anecdote or PT audiovisual or PT bibliography or PT biography or PT book or PT book review or PT brief item or PT cartoon or PT commentary or PT computer program or PT editorial or PT games or PT glossary or PT historical material or PT interview or PT letter or PT
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	listservs or PT masters thesis or PT obituary or PT pamphlet or PT pamphlet chapter or PT pictorial or PT poetry or PT proceedings or PT “questions and answers” or PT response or PT software or PT teaching materials or PT website
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A.4 Searches by specific questions

A.4.1 Pre-hospital strategies

1. What pre-hospital strategies to protect the spine in people with suspected traumatic spinal injury are the most clinically and cost effective during transfer from the scene of the incident to acute medical care?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Expanded spinal injury population. Detailed with intervention terms below	Spinal protection	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Error! Reference source not found. English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp spinal injuries/
2	exp spinal cord injuries/
3	spinal cord compression/
4	exp neck injuries/
5	(spine* or spinal or vertebr* or cervical or cord or whiplash).ti,ab.
6	or/1-5
7	exp immobilization/
8	exp transportation of patients/
9	splints/ or braces/ or stretchers/
10	(backboard* or back board* or spineboard* or spine board* or spinal board* or longboard* or long board* or stretcher* or stretch board* or trolley* or stretchboard* or rescue board* or ortho stretcher* or orthostretcher* or short board* or shortboard* or fracture board* or fractureboard* or wood* board or foam board* or foamboard* or patslide* or ked* or kendrick or gurney* or litter* or aquaboard* or aqua board* or scoop*).ti,ab.
11	collar*.ti,ab.
12	((vacuum or air) adj2 (splint* or mattress* or immobili*)).ti,ab.
13	(mattress* adj2 (splint* or spine or spinal or immobili*)).ti,ab.
14	(headblock* or head block* or sandbag* or sand bag*).ti,ab.
15	(strapping or strapped or straps or tapes or taping or pads or padding).ti,ab.
16	patient positioning/
17	"moving and lifting patients"/
18	(neutral position* or log roll* or logroll*).ti,ab.
19	(lift* adj2 (slide or vertical or straddle or translation or dutch or spoon)).ti,ab.
20	((casualt* or patient*) adj3 (evacuat* or move* or moving or lift* or transport* or position* or carry*)).ti,ab.

21	((extricat* or immobili* or mobili* or stabili* or ortho* or protect*) adj3 (technique* or device* or strateg* or method*)).ti,ab.
22	((spine or spinal or head or neck or trauma or cervical or manual) adj3 (stabili* or immobili* or protection or extricat* or align* or restrain*)).ti,ab.
23	or/7-22
24	6 and 23

Embase search terms

1	exp spine injury/
2	neck injury/ or whiplash injury/
3	exp spinal cord injury/
4	(spine* or spinal or vertebr* or cervical or cord or whiplash).ti,ab.
5	or/1-4
6	immobilization/
7	patient transport/
8	orthopedic fixation device/ or spine board/ or exp spine fixation device/ or exp splint/ or exp brace/ or exp cervical collar/ or orthosis/ or lumbar support/ or stretcher/
9	(backboard* or back board* or spineboard* or spine board* or spinal board* or longboard* or long board* or stretcher* or stretch board* or trolley* or stretchboard* or rescue board* or ortho stretcher* or orthostretcher* or short board* or shortboard* or fracture board* or fractureboard* or wood* board or foam board* or foamboard* or patslide* or ked* or kendrick or gurney* or litter* or aqua board* or aqua board* or scoop*).ti,ab.
10	collar*.ti,ab.
11	((vacuum or air) adj2 (splint* or mattress* or immobili*)).ti,ab.
12	(mattress* adj2 (splint* or spine or spinal or immobili*)).ti,ab.
13	(headblock* or head block* or sandbag* or sand bag*).ti,ab.
14	(strapping or strapped or straps or tapes or taping or pads or padding).ti,ab.
15	patient positioning/ or patient lifting/
16	(neutral position* or log roll* or logroll*).ti,ab.
17	(lift* adj2 (slide or vertical or straddle or translation or dutch or spoon)).ti,ab.
18	((casualt* or patient*) adj3 (evacuat* or move* or moving or lift* or transport* or position* or carry*)).ti,ab.
19	((extricat* or immobili* or mobili* or stabili* or ortho* or protect*) adj3 (technique* or device* or strateg* or method*)).ti,ab.
20	((spine or spinal or head or neck or trauma or cervical or manual) adj3 (stabili* or immobili* or protection or extricat* or align* or restrain*)).ti,ab.
21	spine mobility/ or spine stabilization/
22	or/6-21
23	5 and 22

Cochrane search terms

#1	MeSH descriptor: [spinal injuries] explode all trees
#2	MeSH descriptor: [spinal cord injuries] explode all trees
#3	MeSH descriptor: [spinal cord compression] this term only
#4	MeSH descriptor: [neck injuries] explode all trees
#5	(spine* or spinal or vertebr* or cervical or cord or whiplash):ti,ab
#6	{or #1-#5}
#7	MeSH descriptor: [immobilization] explode all trees

#8	MeSH descriptor: [transportation of patients] explode all trees
#9	MeSH descriptor: [splints] this term only
#10	MeSH descriptor: [braces] this term only
#11	MeSH descriptor: [stretchers] this term only
#12	(litter* or gurney* or kendrick* or ked or patslide* or trolley* or *stretcher* or *board* or scoop*):ti,ab
#13	collar*:ti,ab
#14	(vacuum or air) near/2 (splint* or mattress* or immobili*):ti,ab
#15	(mattress*) near/2 (splint* or spine or spinal or immobili*):ti,ab
#16	head next block*:ti,ab
#17	sand next bag*:ti,ab
#18	(headblock or sandbag):ti,ab
#19	(strapping or strapped or straps or tapes or taping or pads or padding):ti,ab
#20	MeSH descriptor: [patient positioning] this term only
#21	MeSH descriptor: [moving and lifting patients] this term only
#22	logroll*:ti,ab
#23	log next roll*:ti,ab
#24	neutral next position*:ti,ab
#25	lift* near/2 (slide* or vertical or straddle or translation or dutch or spoon):ti,ab
#26	(casualt* or patient*) near/3 (evacuat* or move* or moving or lift* or transport* or position* or carry*):ti,ab
#27	(extricat* or immobili* or mobili* or stabili* or ortho* or protect*) near/3 (technique* or device* or strateg* or method*):ti,ab
#28	(spine or spinal or head or neck or trauma or cervical or manual) near/3 (stabili* or immobili* or protection or extricat* or align* or restrain*):ti,ab
#29	{or #7-#28}
#30	#6 and #29

A.4.2 Destination (immediate)

2. What is the optimal immediate destination of a person with suspected traumatic spinal injury?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Destinations	n/a	The following filters were used in Medline and Embase only: OBS, RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	((prefer* or optim* or ideal or best or recommend* or favour* or favor* or decision* or choice* or choose*) adj4 (destination* or transport* or centre* or center* or unit* or service* or hospital* or protocol*)):ti,ab.
2	((patient* or casualt* or immediat* or urgent or direct* or initial or urgent or trauma*) adj4 (destination* or transport* or protocol*)):ti,ab.

3	((transport* or ambulance* or helicopter* or emergenc* or triage* or triaging or transit or prehospital* or pre hospital*) adj4 (destination* or protocol*)).ti,ab.
4	or/1-3
5	((spin* or trauma*) adj4 (centre* or center* or unit* or service* or institut* or network*)).ti,ab.
6	((level 1 or level i or level 2 or level ii or level 3 or level iii or level 4 or level iv or level 5 or level v) adj4 (spin* or trauma* or centre* or center* or unit* or service*)).ti,ab.
7	hospitals, special/
8	trauma centers/
9	((teaching or academic or tertiary or university) adj4 hospital*).ti,ab.
10	hospitals, teaching/
11	hospitals, university/
12	or/5-11
13	(destination* or transport* or transit* or triage* or triaging).ti,ab.
14	(prehospital* or pre hospital* or roadside* or road side*).ti,ab.
15	severity indice*.ti,ab.
16	((accident* or trauma) adj3 (site* or scene* or location*)).ti,ab.
17	"load and go".ti,ab.
18	"scoop and run".ti,ab.
19	ambulances/
20	air ambulances/
21	emergency medical services/
22	triage/
23	or/13-22
24	12 and 23
25	4 or 24

Embase search terms

1	((prefer* or optim* or ideal or best or recommend* or favour* or favor* or decision* or choice* or choose*) adj4 (destination* or transport* or centre* or center* or unit* or service* or hospital* or protocol*)).ti,ab.
2	((patient* or casual* or immediat* or urgent or direct* or initial or urgent or trauma*) adj4 (destination* or transport* or protocol*)).ti,ab.
3	((transport* or ambulance* or helicopter* or emergenc* or triage* or triaging or transit or prehospital* or pre hospital*) adj4 (destination* or protocol*)).ti,ab.
4	or/1-3
5	((spin* or trauma*) adj4 (centre* or center* or unit* or service* or institut* or network*)).ti,ab.
6	((level 1 or level i or level 2 or level ii or level 3 or level iii or level 4 or level iv or level 5 or level v) adj4 (spin* or trauma* or centre* or center* or unit* or service*)).ti,ab.
7	((teaching or academic or tertiary or university) adj4 hospital*).ti,ab.
8	teaching hospital/
9	university hospital/
10	or/5-9
11	(destination* or transport* or transit* or triage* or triaging).ti,ab.
12	(prehospital* or pre hospital* or roadside* or road side*).ti,ab.
13	severity indice*.ti,ab.

14	((accident* or trauma) adj3 (site* or scene* or location*)):ti,ab.
15	"load and go".ti,ab.
16	"scoop and run".ti,ab.
17	ambulance/
18	air medical transport/
19	emergency care/
20	emergency health service/
21	or/11-20
22	10 and 21
23	4 or 22

Cochrane search terms

#1	((prefer* or optim* or ideal or best or recommend* or favour* or favor* or decision* or choice* or choose*) next/4 (destination* or transport* or centre* or center* or unit* or service* or hospital* or protocol*)):ti,ab
#2	((patient* or casual* or immediat* or urgent or direct* or initial or urgent or trauma*) next/4 (destination* or transport* or protocol*)):ti,ab
#3	((transport* or ambulance* or helicopter* or emergenc* or triage* or triaging or transit or prehospital* or pre hospital*) next/4 (destination* or protocol*)):ti,ab
#4	{or #1-#3}
#5	((spin* or trauma*) next/4 (centre* or center* or unit* or service* or institut* or network*)):ti,ab
#6	((level 1 or level i or level 2 or level ii or level 3 or level iii or level 4 or level iv or level 5 or level v) next/4 (spin* or trauma* or centre* or center* or unit* or service*)):ti,ab
#7	MeSH descriptor: [hospitals, special] this term only
#8	MeSH descriptor: [trauma centers] this term only
#9	((teaching or academic or tertiary or university) next/4 hospital*):ti,ab
#10	MeSH descriptor: [hospitals, teaching] this term only
#11	MeSH descriptor: [hospitals, university] this term only
#12	{or #5-#11}
#13	(destination* or transport* or transit* or triage* or triaging):ti,ab
#14	(prehospital* or pre hospital* or roadside* or road side*):ti,ab
#15	severity indice*:ti,ab
#16	((accident* or trauma) next/3 (site* or scene* or location*)):ti,ab
#17	"load and go":ti,ab
#18	"scoop and run":ti,ab
#19	MeSH descriptor: [ambulances] this term only
#20	MeSH descriptor: [air ambulances] this term only
#21	MeSH descriptor: [emergency medical services] this term only
#22	MeSH descriptor: [triage] this term only
#23	{or #13-#22}
#24	#12 and #23
#25	{or #4, #24}

A.4.3 Diagnostic imaging

Searches for the following two questions were run as one search:

3. What is the diagnostic accuracy of i) X-ray, ii) dynamic fluoroscopy), iii) CT and iv) MRI for people with traumatic spinal cord injury (with or without column injury)?
4. What is the diagnostic accuracy of i) X-ray, ii) dynamic fluoroscopy), iii) CT and iv) MRI for people with traumatic spinal column injury alone?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Interventions / exposure	Comparison	Study filter used	Date parameters
Modified spinal injuries population to exclude neck fractures (search terms included below)	Imaging techniques	n/a	The following filters were used in Medline and Embase only: Expanded DIAG combined with OBS or RCT or SR See note in A.3.3	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp spinal injuries/
2	exp spinal cord injuries/
3	spinal cord compression/
4	((spine or spinal or vertebr* or cervical or lumbar or sacral or thoracic or cord or whiplash) adj2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*)).ti,ab.
5	(central cord syndrome or central spinal cord syndrome).ti,ab.
6	(conus medullaris syndrome* or cauda equina syndrome*).ti,ab.
7	or/1-6
8	radiography/ or exp fluoroscopy/
9	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or magnetic resonance imag* or mri* or mr imag* or nmr or ct or radiograph*).ti,ab.
10	(cat adj (scan or imag*)).ti,ab.
11	(compute* adj2 tomograph*).ti,ab.
12	magnetic resonance imaging/
13	exp tomography, emission-computed/ or exp tomography, x-ray/
14	or/8-13
15	7 and 14

Embase search terms

1	exp spine injury/
2	whiplash injury/
3	exp spinal cord injury/
4	((spine or spinal or vertebr* or cervical or lumbar or sacral or thoracic or cord or whiplash) adj2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*)).ti,ab.
5	(central cord syndrome or central spinal cord syndrome).ti,ab.
6	(conus medullaris syndrome* or cauda equina syndrome*).ti,ab.
7	or/1-6
8	radiography/
9	exp radiodiagnosis/
10	exp fluoroscopy/

11	nuclear magnetic resonance imaging/
12	exp computer assisted emission tomography/ or exp computer assisted tomography/ or emission tomography/
13	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or magnetic resonance imag* or mri* or mr imag* or nmr or ct or radiograph*).ti,ab.
14	(cat adj (scan or imag*)).ti,ab.
15	(compute* adj2 tomograph*).ti,ab.
16	or/8-15
17	7 and 16

Cochrane search terms

#1	MeSH descriptor: [spinal injuries] explode all trees
#2	MeSH descriptor: [spinal cord injuries] explode all trees
#3	MeSH descriptor: [spinal cord compression] this term only
#4	((spine or spinal or vertebr* or cervical or lumbar or sacral or thoracic or cord or whiplash) near/2 (injur* or damag* or trauma* or fracture* or compress* or contus* or lacerat* or transect* or lesion*)):ti,ab,kw
#5	(central cord syndrome or central spinal cord syndrome):ti,ab,kw
#6	(conus medullaris syndrome or cauda equina syndrome):ti,ab,kw
#7	{or #1-#6}
#8	MeSH descriptor: [radiography] this term only
#9	MeSH descriptor: [fluoroscopy] this term only
#10	MeSH descriptor: [magnetic resonance spectroscopy] this term only
#11	MeSH descriptor: [tomography] explode all trees
#12	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or mri* or nmr or ct or radiograph*):ti,ab
#13	magnetic resonance imag*:ti,ab
#14	mr imag*:ti,ab
#15	cat scan:ti,ab
#16	cat imag*:ti,ab
#17	compute* near/2 tomograph*:ti,ab
#18	{or #8-#17}
#19	#7 and #18

A.4.4 Further imaging

5. For people who have clinical signs of traumatic spinal cord or column injury, but who have normal or indeterminate findings on initial imaging, what is the most clinically and cost effective further imaging strategy?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Further imaging techniques	n/a	The following filters were used in Medline and Embase only: OBS, RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	radiography/ or exp fluoroscopy/
2	magnetic resonance imaging/
3	exp tomography, emission-computed/ or exp tomography, x-ray/
4	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or mri* or nmr or ct or radiograph* or cat or tomograph*).ti,ab.
5	(scan* or imag*).ti,ab.
6	or/1-5
7	(reimag* or re-imag* or repeat* or subsequent* or second* or follow-up* or recur* or addition* or enhance* or further or false negative* or incomplete* or indetermin* or false positive* or frequen* or strateg* or polic* or approach* or ensue* or ensuing or supplement* or auxiliary or extra*).ti,ab.
8	6 and 7

Embase search terms

1	radiography/
2	exp radiodiagnosis/
3	exp fluoroscopy/
4	nuclear magnetic resonance imaging/
5	exp computer assisted emission tomography/ or exp computer assisted tomography/ or emission tomography/
6	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or mri* or nmr or ct or radiograph* or cat or tomograph*).ti,ab.
7	(scan* or imag*).ti,ab.
8	or/1-7
9	(reimag* or re-imag* or repeat* or subsequent* or second* or follow-up* or recur* or addition* or enhance* or further or false negative* or incomplete* or indetermin* or false positive* or frequen* or strateg* or polic* or approach* or ensue* or ensuing or supplement* or auxiliary or extra*).ti,ab.
10	8 and 9

Cochrane search terms

#1	MeSH descriptor: [radiography] this term only
#2	MeSH descriptor: [fluoroscopy] this term only
#3	MeSH descriptor: [magnetic resonance imaging] this term only
#4	MeSH descriptor: [tomography] explode all trees
#5	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or mri* or nmr or ct or radiograph* or cat or tomograph*).ti,ab
#6	(scan* or imag*).ti,ab
#7	{or #1-#6}
#8	(reimag* or re-imag* or repeat* or subsequent* or second* or follow-up* or recur* or addition* or enhance* or further or incomplete* or indetermin* or frequen* or strateg* or polic* or approach* or ensue* or ensuing or supplement* or auxiliary or extra*).ti,ab
#9	false negative*.ti,ab
#10	false positive*.ti,ab
#11	{or #8-#10}
#12	#7 and #11

A.4.5 Non-imaging

6. What tools are most predictive of outcome in people with in people with suspected traumatic spinal injury when trying to exclude spinal cord injury (with or without spinal column injury)?
7. What tools are most predictive of outcome in people with in people with suspected traumatic spinal injury when trying to exclude isolated spinal column injury?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Non-imaging methods	n/a	The following filters were used in Medline and Embase only: DIAG, OBS, RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	((Canadian or c spine or cervical spine) adj4 rule*).ti,ab.
2	CCR.ti,ab.
3	(National Emergency X-Radiography Utilization Study or nexus).ti,ab.
4	SPINEX*.ti,ab.
5	(Australian adj3 card*).ti,ab.
6	(American Spinal Injury Association or asia).ti,ab.
7	NASCIS* or National Acute Spinal Cord Injury Study).ti,ab.
8	or/1-7

Embase search terms

1	((Canadian or c spine or cervical spine) adj4 rule*).ti,ab.
2	CCR.ti,ab.
3	(National Emergency X-Radiography Utilization Study or nexus).ti,ab.
4	SPINEX*.ti,ab.
5	(Australian adj3 card*).ti,ab.
6	(American Spinal Injury Association or asia).ti,ab.
7	(NASCIS* or National Acute Spinal Cord Injury Study).ti,ab.
8	or/1-7

Cochrane search terms

#1	((Canadian or c spine or cervical spine) near/4 rule*):ti,ab
#2	CCR:ti,ab
#3	("X-Radiography Utilization" or nexus):ti,ab
#4	SPINEX*:ti,ab
#5	(Australian near/3 card*):ti,ab
#6	(American Spinal Injury Association or asia):ti,ab
#7	(NASCIS*):ti,kw
#8	(National next Acute next Spinal):ti,kw
#9	{or #1-#8}

A.4.6 Radiation risk

8. For people with clinical signs of spinal injury what are the radiation risks of having a x-ray(s) and/or CT scans?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
No population	X-ray or CT	n/a	The following filters were used in Medline and Embase only: OBS, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	radiography/
2	exp fluoroscopy/ or exp tomography, x-ray/ or tomography, emission-computed/
3	(fluoroscop* or fluroscop* or x ray* or xray* or mdct* or ct or radiograph or radiographic).ti,ab.
4	(cat adj (scan* or imag*)).ti,ab.
5	(compute* adj2 tomograph*).ti,ab.
6	(cardiac* adj2 catheteri?ation*).ti,ab.
7	or/1-6
8	((radiat* or irradiat* or millisievert* or msv or x ray* or xray* or milligray* or mgy) adj5 (dose or dosage or doses or expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
9	(malignan* or neoplas* or cancer* or myelodysplas* or tumo?* or carcinom* or adenocarcinoma* or lymphoma* or leuk?emia* or cataract*).ti,ab.
10	(skin adj4 (change* or burn* or erythema or reddening)).ti,ab.
11	(tissue adj4 (injur* or damag*)).ti,ab.
12	((birth or genetic*) adj4 (defect* or mutation*)).ti,ab.
13	or/9-12
14	7 and 13
15	8 and 14
16	((malignan* or neoplas* or cancer* or myelodysplas* or tumo?* or carcinom* or adenocarcinoma* or lymphoma* or leuk?emia* or cataract*) adj3 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
17	(skin adj4 (change* or burn* or erythema or redd*) adj4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
18	(tissue adj4 (injur* or damag*) adj4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
19	((birth or genetic*) adj4 (defect* or mutation*) adj4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
20	or/16-19
21	(radiat* or irradiat* or millisievert* or msv or x ray beam* or milligray* or mgy).ti,ab.
22	20 and 21
23	7 and 22
24	(exp *radiation dosage/ or *radiation injuries/) and exp *neoplasms/
25	*leukemia, radiation-induced/ or *neoplasms, radiation-induced/

26	beir.ti,ab.
27	or/24-26
28	7 and 27
29	15 or 23 or 28

Embase search terms

1	exp computer assisted emission tomography/ or exp computer assisted tomography/ or emission tomography/ or exp fluoroscopy/ or Radiography/
2	(fluoroscop* or fluroscop* or x ray* or xray* or MDCT* or CT or radiograph*).ti,ab.
3	(cat adj (scan* or imag*)).ti,ab.
4	(compute* adj2 tomograph*).ti,ab.
5	(cardiac* adj2 catheteri?ation*).ti,ab.
6	or/1-5
7	((radiat* or irradiat* or millisievert* or msv or x ray* or xray* or milligray* or mgy) adj5 (dose or dosage or doses or expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
8	(malignan* or neoplas* or cancer* or myelodysplas* or tumo?r* or carcinom* or adenocarcinoma* or lymphoma* or leuk?emia* or cataract*).ti,ab.
9	(skin adj4 (change* or burn* or erythema or reddening)).ti,ab.
10	(tissue adj4 (injur* or damag*)).ti,ab.
11	((birth or genetic*) adj4 (defect* or mutation*)).ti,ab.
12	or/8-11
13	7 and 12
14	6 and 13
15	((malignan* or neoplas* or cancer* or myelodysplas* or tumo?r* or carcinom* or adenocarcinoma* or lymphoma* or leuk?emia* or cataract*) adj3 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
16	(skin adj4 (change* or burn* or erythema or redden*) adj4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
17	(tissue adj4 (injur* or damag*) adj4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
18	((birth or genetic*) adj4 (defect* or mutation*) adj4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)).ti,ab.
19	or/15-18
20	(radiat* or irradiat* or millisievert* or msv or x ray beam* or milligray* or mgy).ti,ab.
21	19 and 20
22	6 and 21
23	(*radiation dose/ or exp *radiation injury/) and exp *neoplasm/
24	beir.ti,ab.
25	or/23-24
26	6 and 25
27	14 or 22 or 26

Cochrane search terms

#1	MeSH descriptor: [radiography] this term only
#2	MeSH descriptor: [fluoroscopy] explode all trees
#3	MeSH descriptor: [tomography, x-ray] explode all trees
#4	MeSH descriptor: [tomography, emission-computed] this term only

#5	(fluoroscop* or fluroscop* or ray* or xray* or mdct* or ct* or radiograph*):ti,ab
#6	(cat next (scan* or imag*)):ti,ab
#7	(compute* near/2 tomograph*):ti,ab
#8	(catheter* near/2 cardiac*):ti,ab
#9	{or #1-#8}
#10	((radiat* or irradiat* or millisievert* or msv or ray* or xray* or milligray* or mgy) near/5 (dose or dosage or doses or expos* or risk* or induced or induct* or danger* or hazard* or harm*)):ti,ab
#11	(malignan* or neoplas* or cancer* or myelodysplas* or tumour* or tumor* or carcinom* or adenocarcinoma* or lymphoma* or leukaemia* or leukemia* or cataract*):ti,ab
#12	(skin near/4 (change* or burn* or erythema or reddening)):ti,ab
#13	(tissue near/4 (injur* or damag*)):ti,ab
#14	((birth or genetic*) near/4 (defect* or mutation*)):ti,ab
#15	{or #11-#14}
#16	#10 and #15
#17	#9 and #16
#18	((malignan* or neoplas* or cancer* or myelodysplas* or tumor* or tumour* or carcinom* or adenocarcinoma* or lymphoma* or leukaemia* or leukemia* or cataract*) near/3 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)):ti,ab
#19	(skin near/4 (change* or burn* or erythema or redd*) near/4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)):ti,ab
#20	(tissue near/4 (injur* or damag*) near/4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)):ti,ab
#21	((birth or genetic*) near/4 (defect* or mutation*) near/4 (expos* or risk* or induced or induct* or danger* or hazard* or harm*)):ti,ab
#22	{or #18-#21}
#23	(radiat* or irradiat* or millisievert* or msv or ray* or xray* or milligray* or mgy):ti,ab
#24	#22 and #23
#25	#9 and #24
#26	MeSH descriptor: [radiation dosage] explode all trees
#27	MeSH descriptor: [radiation injuries] this term only
#28	{or #26-#27}
#29	MeSH descriptor: [neoplasms] explode all trees
#30	#28 and #29
#31	MeSH descriptor: [leukemia, radiation-induced] this term only
#32	MeSH descriptor: [neoplasms, radiation-induced] this term only
#33	beir:ti,ab
#34	{or #31-#33}
#35	#30 or #34
#36	#9 and #35
#37	#17 or #25 or #36

A.4.7 Dislocation

9. What is the clinical and cost-effectiveness of emergency closed reduction of cervical facet joint dislocation of the cervical spine?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Reduced spinal injuries population focusing only on acute traumatic cervical dislocations	Emergency closed reduction	n/a	None	See Table 1 English only Exclusion filter* applied in Medline and Embase

*Line 7 (Medline) and line 4 (Embase) removed from Excluded studies filters to prevent removal of papers reporting case series

Medline search terms

1	spinal fractures/
2	spinal cord compression/
3	((spine or spinal or vertebr* or cervical) adj4 (trauma* or fracture* or dislocat* or compress*)):ti,ab.
4	or/1-3
5	(early or emergenc* or immediat* or 4 hour* or acute).ti,ab.
6	emergency medicine/ or emergency medical services/ or advanced trauma life support care/ or emergency service, hospital/ or trauma centers/
7	or/5-6
8	((dislocat* or fracture* or spine or spinal or cervical) adj5 (reduced or reduction* or manipulation)).ti,ab.
9	7 and 8
10	((close* or early or emergenc* or immediat*) adj5 (reduced or reduction*)):ti,ab.
11	9 or 10
132	4 and 11

Embase search terms

1	spine injury/ or exp spine fracture/ or vertebra compression/ or exp vertebra dislocation/
2	((spine or spinal or vertebr* or cervical) adj4 (trauma* or fracture* or dislocat* or compress*)):ti,ab.
3	or/1-2
4	(early or emergenc* or immediat* or 4 hour* or acute).ti,ab.
5	emergency medicine/ or emergency health service/ or emergency/
6	or/4-5
7	((dislocat* or fracture* or spine or spinal or cervical) adj5 (reduced or reduction* or manipulation)).ti,ab.
8	6 and 7
9	((close* or early or emergenc* or immediat*) adj5 (reduced or reduction*)):ti,ab.
10	8 or 9
11	3 and 10

Cochrane search terms

#1	MeSH descriptor: [spinal fractures] this term only
#2	MeSH descriptor: [spinal cord compression] this term only
#3	((spine or spinal or vertebr* or cervical) near/4 (trauma* or fracture* or dislocat* or compress*)):ti,ab,kw
#4	{or #1-#3}

#5	(early or emergenc* or immediat* or 4 hour* or acute):ti,ab,kw
#6	MeSH descriptor: [emergency medicine] this term only
#7	MeSH descriptor: [emergency medical services] this term only
#8	MeSH descriptor: [advanced trauma life support care] this term only
#9	MeSH descriptor: [emergency service, hospital] this term only
#10	MeSH descriptor: [trauma centers] this term only
#11	{or #5-#10}
#12	((dislocat* or fracture* or spine or spinal or cervical) near/5 (reduced or reduction* or manipulation)):ti,ab,kw
#13	#11 and #12
#14	((close* or early or emergenc* or immediat*) near/5 (reduced or reduction*)):ti,ab,kw
#15	#13 or #14
#16	#4 and #15

A.4.8 Stabilisation

10. What is the clinical and cost effectiveness of routine spinal protection of all children, young people and adults experiencing trauma compared to selective protection, based on the use of a risk assessment tool or clinical assessment at the scene of the incident or at initial presentation?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Expanded spinal injury population. Detailed with intervention terms below	Pre-hospital spinal protection risk assessment tools/ clinical assessment	n/a	The following filters were used in Medline and Embase only: OBS, PROG, RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp spinal injuries/
2	exp spinal cord injuries/
3	spinal cord compression/
4	exp neck injuries/
5	(spine* or spinal or vertebr* or cervical or cord or whiplash).ti,ab.
6	or/1-5
7	exp logistic models/ or exp risk assessment/ or exp risk factors/
8	((risk* or predict* or decision*) adj2 (tool* or rule* or instrument* or index* or technique* or analys* or model* or scale* or system* or factor* or algorithm* or criteria or score* or scoring or rating or stratif* or assess*)):ti,ab.
9	((assess* or rating or score* or scoring or stratif*) adj2 (tool* or rule* or instrument* or index* or test* or technique* or analys* or model* or scale* or system* or algorithm* or criteria)):ti,ab.
10	decision support.ti,ab.
11	(evidence adj2 (algorithm* or index* or system* or criteria)).ti,ab.
12	((canadian or c spine or cervical spine) adj2 rule*).ti,ab.
13	ccr.ti,ab.
14	(jrcalc or joint royal colleges ambulance liaison committee).ti,ab.

15	or/7-14
16	emergency medical services/ or advanced trauma life support care/ or emergency medical service communication systems/ or emergency service, hospital/ or trauma centers/ or triage/
17	(prehospital* or pre hospital* or roadside* or road side* or triage or triaging).ti,ab.
18	((accident* or trauma) adj2 (site* or scene* or location*)).ti,ab.
19	((outside or out) adj2 hospital).ti,ab.
20	((in or on) adj2 field).ti,ab.
21	(ambulance* or helicopter* or paramedic* or emergency medic* or emergency service* or emergency care or first respon* or rescue*).ti,ab.
22	(transport* or transfer* or transit or extricat*).ti,ab.
23	(extraction adj2 (patient* or casual*)).ti,ab.
24	or/16-23
25	6 and 15 and 24

Embase search terms

1	exp spine injury/
2	neck injury/ or whiplash injury/
3	exp spinal cord injury/
4	(spine* or spinal or vertebr* or cervical or cord or whiplash).ti,ab.
5	or/1-4
6	risk factor/ or risk assessment/
7	((risk* or predict* or decision*) adj2 (tool* or rule* or instrument* or index* or technique* or analys* or model* or scale* or system* or factor* or algorithm* or criteria or score* or scoring or rating or stratif* or assess*)).ti,ab.
8	((assess* or rating or score* or scoring or stratif*) adj2 (tool* or rule* or instrument* or index* or test* or technique* or analys* or model* or scale* or system* or algorithm* or criteria)).ti,ab.
9	decision support.ti,ab.
10	(evidence adj2 (algorithm* or index* or system* or criteria)).ti,ab.
11	((canadian or c spine or cervical spine) adj2 rule*).ti,ab.
12	ccr.ti,ab.
13	(jrcalc or joint royal colleges ambulance liaison committee).ti,ab.
14	or/6-13
15	emergency care/ or emergency health service/ or rescue personnel/ or emergency patient/ or emergency treatment/
16	injury/
17	(prehospital* or pre hospital* or roadside* or road side* or triage or triaging).ti,ab.
18	((accident* or trauma) adj2 (site* or scene* or location*)).ti,ab.
19	((outside or out) adj2 hospital).ti,ab.
20	((in or on) adj2 field).ti,ab.
21	(ambulance* or helicopter* or paramedic* or emergency medic* or emergency service* or emergency care or first respon* or rescue*).ti,ab.
22	(transport* or transfer* or transit or extricat*).ti,ab.
23	(extraction adj2 (patient* or casual*)).ti,ab.
24	or/15-23
25	6 and 14 and 24

Cochrane search terms

#1	MeSH descriptor: [spinal injuries] explode all trees
#2	MeSH descriptor: [spinal cord injuries] explode all trees
#3	MeSH descriptor: [spinal cord compression] this term only
#4	MeSH descriptor: [neck injuries] explode all trees
#5	(spine* or spinal or vertebr* or cervical or cord or whiplash):ti,ab
#6	{or #1-#5}
#7	MeSH descriptor: [logistic models] this term only
#8	MeSH descriptor: [risk assessment] this term only
#9	MeSH descriptor: [risk factors] this term only
#10	(decision* or predict* or assess* or screen* or score* or scoring or stratif* or risk*) near/1 (tool* or rule* or instrument* or index* or test* or technique* or analys* or model* or factor*):ti,ab
#11	(risk* or predict* or decision*) near/2 (tool* or rule* or instrument* or index* or technique* or analys* or model* or scale* or system* or factor* or algorithm* or criteria or score* or scoring or rating or stratif* or assess*):ti,ab
#12	(assess* or rating or score* or scoring or stratif*) near/2 (tool* or rule* or instrument* or index* or test* or technique* or analys* or model* or scale* or system* or algorithm* or criteria):ti,ab
#13	evidence near/2 (algorithm* or index* or system* or criteria):ti,ab
#14	decision support*:ti,ab
#15	canadian near/2 rule*:ti,ab
#16	"c spine" near/2 rule*:ti,ab
#17	"cervical spine" near/2 rule*:ti,ab
#18	ccr:ti,ab
#19	(joint royal colleges ambulance liaison committee):ti,ab
#20	jrcalc:ti,ab
#21	{or #7-#20}
#22	MeSH descriptor: [emergency medical services] this term only
#23	MeSH descriptor: [advanced trauma life support care] this term only
#24	MeSH descriptor: [emergency medical service communication systems] this term only
#25	MeSH descriptor: [emergency service, hospital] this term only
#26	MeSH descriptor: [emergency service, hospital] this term only
#27	MeSH descriptor: [trauma centers] this term only
#28	MeSH descriptor: [triage] this term only
#29	(prehospital* or roadside* or triage or triaging):ti,ab
#30	pre next hospital*:ti,ab
#31	road next side*:ti,ab
#32	(accident* or trauma) near/2 (site* or scene* or location*):ti,ab
#33	(outside or out) near/2 hospital:ti,ab
#34	(in or on) near/2 field:ti,ab
#35	(ambulance* or helicopter* or paramedic* or rescue*):ti,ab
#36	emergency next (medic* or service* or care*):ti,ab
#37	first next respon*:ti,ab
#38	(transport* or transfer* or transit or extraction or extricat*):ti,ab
#39	{or #22-#38}
#41	#6 and #21 and #39

A.4.9 Medical intervention

11. What is the clinical and cost-effectiveness of neuroprotective pharmacological interventions (such as anti-inflammatories, antioxidants and anti-excitotoxins) in people with traumatic spinal cord injury during the acute stage?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Neuroprotective pharmacological interventions	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp methylprednisolone/ or (methylprednisolone or medrone or solu medrone or depo medrone or medrol or metipred or urbason or 83-43-2).ti,ab,rn.
2	exp dexamethasone/ or (dexamethasone or millicorten or maxidex or decaspray or dexpak or dexasone or oradexon or decaject* or hexadecadrol or hexadrol or decameth or maxitrol or otomize or minims or 50-02-2).ti,ab,rn.
3	ibuprofen/ or (ibuprofen or brufen or fenbid or ibugel or ibumetin or motrin or dolgit or salprofen or nuprin or rufen or 15687-27-1).ti,ab,rn.
4	(celecoxib or celebrex or 169590-42-5 or artroxil or caditar or celcox or celebra or celecox or celib or coxel or coxid or dilox or eliflam or lexfin or onsenal or zycel).ti,ab,rn.
5	nimodipine/ or (nimodipine or nimotop or nimodipin or remontal or kenesil or brainal or admon or nimodipinisis or calnit or 66085-59-4).ti,ab,rn.
6	exp naloxone/ or (naloxone or naloxone or narcanti or nalone or narcan or mrz 2593 or mrz2593 or 465-65-6).ti,ab,rn.
7	thyrotropin-releasing hormone/ or (thyrotropin releasing adj2 (hormone* or factor*)).ti,ab.
8	(thyroliberin or protirelin or thypinone or stimutsh or stimu tsh or relefact or antepan or 24305-27-9).ti,ab,rn.
9	or/1-8

Embase search terms

1	methylprednisolone/ or (methylprednisolone or medrone or solu medrone or depo medrone or medrol or metipred or urbason or 83-43-2).ti,ab,rn.
2	dexamethasone/ or (dexamethasone or millicorten or maxidex or decaspray or dexpak or dexasone or oradexon or decaject* or hexadecadrol or hexadrol or decameth or maxitrol or otomize or minims or 50-02-2).ti,ab,rn.
3	ibuprofen/ or (ibuprofen or brufen or fenbid or ibugel or ibumetin or motrin or dolgit or salprofen or nuprin or rufen or 15687-27-1).ti,ab,rn.
4	celecoxib/ or (celecoxib or celebrex or 169590-42-5 or artroxil or caditar or celcox or celebra or celecox or celib or coxel or coxid or dilox or eliflam or lexfin or onsenal or zycel).ti,ab,rn.
5	nimodipine/ or (nimodipine or nimotop or nimodipin or remontal or kenesil or brainal or admon or nimodipinisis or calnit or 66085-59-4).ti,ab,rn.
6	naloxone/ or (naloxone or naloxone or narcanti or nalone or narcan or mrz 2593 or mrz2593 or 465-65-6).ti,ab,rn.
7	protirelin/ or (thyrotropin releasing adj2 (hormone* or factor*)).ti,ab.
8	(thyroliberin or protirelin or thypinone or stimutsh or stimu tsh or relefact or antepan or 24305-27-9).ti,ab,rn.

9	or/1-8
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Cochrane search terms

#1	MeSH descriptor: [methylprednisolone] explode all trees
#2	(methylprednisolone or medrone or solu medrone or depo medrone or medrol or metipred or urbason or 83-43-2):ti,ab,kw
#3	MeSH descriptor: [dexamethasone] explode all trees
#4	(dexamethasone or millicorten or maxidex or decaspray or dexpak or dexasone or oradexon or decaject* or hexadecadrol or hexadrol or decameth or maxitrol or otomize or minims or 50-02-2):ti,ab,kw
#5	MeSH descriptor: [ibuprofen] this term only
#6	(ibuprofen or brufen or fenbid or ibugel or ibumetin or motrin or dolgit or salprofen or nuprin or rufen or 15687-27-1):ti,ab,kw
#7	(celecoxib or celebrex or 169590-42-5 or artroxil or caditar or celcox or celebra or celecox or celib or coxel or coxid or dilox or eliflam or lexfin or onsenal or zycel):ti,ab,kw
#8	MeSH descriptor: [nimodipine] this term only
#9	(nimodipine or nimotop or nimodipin or remontal or kenesil or brainal or admon or nimodipinisis or calnit or 66085-59-4):ti,ab,kw
#10	MeSH descriptor: [naloxone] explode all trees
#11	(naloxone or naloxone or narcanti or nalone or narcan or mrz 2593 or mrz2593 or 465-65-6):ti,ab,kw
#12	MeSH descriptor: [thyrotropin-releasing hormone] this term only
#13	(thyrotropin near/2 (hormone* or factor*)):ti,ab,kw
#14	(thyroliberin or protirelin or thypinone or stimutsh or stimu tsh or relefact or antepan or 24305-27-9):ti,ab,kw
#15	{or #1-#14}

A.4.10 Neuropathic pain

12. What are the optimum strategies given in the acute management stage to prevent later neuropathic pain in people with traumatic spinal cord injury?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Strategies to prevent later neuropathic pain	n/a	The following filters were used in Medline and Embase only: RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	amitriptyline/
2	(amitrip* or amineurin or amitrol or anapsique or damilen or domical or elavil or endep or laroxyl or lentizol or novoprotect or saroten or sarotex or syneudon or triptafen or tryptanol or tryptine or tryptizol).ti,ab,rn.
3	trazodone/
4	(trazodon* or molipaxin or deprax or desyrel or thombran or trazon or trittico).ti,ab,rn.
5	(duloxetine or cymbalta or yentreve or ariclaim or xeristar or duzela or dulane).ti,ab,rn.
6	(venlafaxine or dobupal or efexor or trevilor or vandral or depefex or foraven or politid or

	tonpular or venaxx or venladex or venlalic or viepax or alventa or bonilux or depefex or ranfaxine or tifaxin or vensir or winfex).ti,ab,rn.
7	(lamotrigine or crisomet or labileno or lamictal or lamiktal).ti,ab,rn.
8	mexiletine/
9	(mexilitine or mexitil or mexityl or mexiletine).ti,ab,rn.
10	carbamazepine/
11	(carbamazepine or carbazepin or epitol or finlepsin or neurotol or tegretol or equetro).ti,ab,rn.
12	(gabapentin or convalis or neurontin).ti,ab,rn.
13	(pregabalin or lyrica).ti,ab,rn.
14	(topiramate or epitomax or topamax).ti,ab,rn.
15	valproic acid/
16	(sodium adj2 valporate).ti,ab,rn.
17	(epival or depacon or valpro or valprease or orlept or epival or epiject or convulex or valparin or stavzor or depakene or depakine or depakote or divalproex or ergenyl or vupral or epilim or episenta).ti,ab,rn.
18	clonidine/
19	(clonidine or catapres* or chlrophazolin or clofelin or clofenil or clopheline or dixarit or gemiton or hemiton or isoglaucon or klofelin or klofenil).ti,ab,rn.
20	(levetiracetam or etiracetam or keppra or desitrend).ti,ab,rn.
21	ketamine/
22	(ketamine or calipsol or calypsol or kalipsol or ketalar or ketanest or ketaset).ti,ab,rn.
23	alfentanil/
24	(alfentanil or alfenta or alfentanyl or fanaxal or limifen or rapifen).ti,ab,rn.
25	lidocaine/
26	(lidocaine or xylocaine or lignocaine or dalcaine or octocaine or xylesthesin or xylocaine or xylocitin or xyloneural or minijet).ti,ab,rn.
27	or/1-26

Embase search terms

1	amitriptyline/
2	(amitrip* or amineurin or amitrol or anapsique or damilen or domical or elavil or endep or laroxyl or lentizol or novoprotect or saroten or sarotex or syneudon or triptafen or tryptanol or tryptine or tryptizol).ti,ab,rn.
3	trazodone/
4	(trazodon* or molipaxin or deprax or desyrel or thombran or trazon or trittico).ti,ab,rn.
5	duloxetine/
6	(duloxetine or cymbalta or yentreve or ariclaim or xeristar or duzela or dulane).ti,ab,rn.
7	venlafaxine/
8	(venlafaxine or dobupal or efexor or trevilor or vandral or depefex or foraven or politid or tonpular or venaxx or venladex or venlalic or viepax or alventa or bonilux or depefex or ranfaxine or tifaxin or vensir or winfex).ti,ab,rn.
9	lamotrigine/
10	(lamotrigine or crisomet or labileno or lamictal or lamiktal).ti,ab,rn.
11	mexiletine/
12	(mexilitine or mexitil or mexityl or mexiletine).ti,ab,rn.
13	carbamazepine/
14	(carbamazepine or carbazepin or epitol or finlepsin or neurotol or tegretol or equetro).ti,ab,rn.
15	gabapentin/

16	(gabapentin or convalis or neurontin).ti,ab,rn.
17	pregabalin/
18	(pregabalin or lyrica).ti,ab,rn.
19	topiramate/
20	(topiramate or epitomax or topamax).ti,ab,rn.
21	valproic acid/
22	(valporic adj acid*).ti,ab.
23	(sodium adj2 valporate).ti,ab,rn.
24	(epival or depacon or valpro or valprease or orlept or epival or epiject or convulex or valparin or stavzor or depakene or depakine or depakote or divalproex or ergenyl or vupral or epilim or episenta).ti,ab,rn.
25	clonidine/
26	(clonidine or catapres* or chlophazolin or clofelin or clofenil or clopheline or dixarit or gemiton or hemiton or isoglaucou or klofelin or klofenil).ti,ab,rn.
27	etiracetam/
28	(levetiracetam or etiracetam or keppra or desitrend).ti,ab,rn.
29	ketamine/
30	(ketamine or calipsol or calypsol or kalipsol or ketalar or ketanest or ketaset).ti,ab,rn.
31	alfentanil/
32	(alfentanil or alfenta or alfentanyl or fanaxal or limifen or rapifen).ti,ab,rn.
33	lidocaine/
34	(lidocaine or xylocaine or lignocaine or dalcaine or octocaine or xylesthesin or xylocaine or xylocitin or xyloneural or minijet).ti,ab,rn.
35	or/1-34

Cochrane search terms

#1	MeSH descriptor: [amitriptyline] this term only
#2	(amitrip* or amineurin or amitrol or anapsique or damilen or domical or elavil or endep or laroxyl or lentizol or novoprotect or saroten or sarotex or syneudon or triptafen or tryptanol or tryptine or tryptizol):ti,ab
#3	MeSH descriptor: [trazodone] this term only
#4	(trazodon* or molipaxin or deprax or desyrel or thombran or trazon or trittico):ti,ab
#5	(duloxetine or cymbalta or yentreve or ariclaim or xeristar or duzela or dulane):ti,ab
#6	(venlafaxine or dobupal or efexor or trevilor or vandral or depefex or foraven or politid or tonpular or venaxx or venladex or venlalic or viepax or alventa or bonilux or depefex or ranfaxine or tifaxin or vensir or winfex):ti,ab
#7	(lamotrigine or crisomet or labileno or lamictal or lamiktal):ti,ab
#8	MeSH descriptor: [mexiletine] this term only
#9	(mexilitine or mexitil or mexityl or mexiletine):ti,ab
#10	MeSH descriptor: [carbamazepine] this term only
#11	(carbamazepine or carbazepin or epitol or finlepsin or neurotol or tegretol or equetro):ti,ab
#12	(gabapentin or convalis or neurontin):ti,ab
#13	(pregabalin or lyrica):ti,ab
#14	(topiramate or epitomax or topamax):ti,ab
#15	MeSH descriptor: [valproic acid] this term only
#16	sodium next/2 valporate:ti,ab
#17	valporic next acid:ti,ab

#18	(epival or depacon or valpro or valprease or orlept or epival or epiject or convulex or valparin or stavzor or depakene or depakine or depakote or divalproex or ergenyl or vupral or epilim or episenta):ti,ab
#19	MeSH descriptor: [clonidine] this term only
#20	(clonidine or catapres* or chlophazolin or clofelin or clofenil or clopheline or dixarit or gemiton or hemiton or isoglaucon or klofelin or klofenil):ti,ab
#21	(levetiracetam or etiracetam or keppra or desitrend):ti,ab
#22	MeSH descriptor: [ketamine] this term only
#23	(ketamine or calipsol or calypsol or kalipsol or ketalar or ketanest or ketaset):ti,ab
#24	MeSH descriptor: [alfentanil] this term only
#25	(alfentanil or alfenta or alfentanyl or fanaxal or limifen or rapifen):ti,ab
#26	MeSH descriptor: [lidocaine] this term only
#27	(lidocaine or xylocaine or lignocaine or dalcaine or octocaine or xylesthesin or xylocaine or xylocitin or xyloneural or minijet):ti,ab
#28	{or #1-#27}

A.4.11 Timing of referral

13. Is there a benefit of early liaison and referral (within 4 hours) and to spinal cord injury centres compared to delayed liaison?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Referral	n/a	The following filters were used in Medline and Embase only: OBS, RCT, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp "referral and consultation"/
2	(transfer* or dumping).ti,ab.
3	(refer or referr* or refers).ti,ab.
4	(consultation* or consult or consults or consulting).ti,ab.
5	((liais* or co operat* or cooperat* or contact* or relationship* or convers* or dialog* or talk* or exchange* or discuss*) adj8 (specialist* or expert* or consultant* or center* or centre* or spine or spinal or cervical or cord or lumbar or sacral or thoracic)).ti,ab.
6	or/1-5
7	time factors/
8	(early or earlie* or late or later or time* or timing* or schedul* or hour* or rapid* or fast* or slow* or delay* or immediate*).ti,ab.
9	or/7-8
10	6 and 9
11	tertiary care centers/
12	scic*.ti,ab.
13	(spinal adj1 (injur* or treatment) adj1 (unit* or centre*)).ti,ab.
14	(royal national orthopaedic hospital or london spinal cord injury centre).ti,ab.

15	(stoke mandeville or national spinal cord injury centre).ti,ab.
16	duke of cornwall spinal treatment centre.ti,ab.
17	princess royal spinal injuries centre.ti,ab.
18	midlands centre for spinal injuries.ti,ab.
19	(pinderfields hospital or regional spinal injuries centre).ti,ab.
20	("southport and ormskirk hospital" or north west regional spinal injuries centre).ti,ab.
21	golden jubilee regional spinal cord injuries centre.ti,ab.
22	queen elizabeth national spinal injury unit.ti,ab.
23	rookwood hospital.ti,ab.
24	musgrave park hospital.ti,ab.
25	(dublin national spinal cord injury service or mater misericordiae university hospital).ti,ab.
26	or/11-25
27	10 or 26

Embase search terms

1	patient referral/
2	(transfer* or dumping).ti,ab.
3	(refer or referr* or refers).ti,ab.
4	(consultation* or consult or consults or consulting).ti,ab.
5	((liais* or co operat* or cooperat* or contact* or relationship* or convers* or dialog* or talk* or exchange* or discuss*) adj8 (specialist* or expert* or consultant* or center* or centre* or spine or spinal or cervical or cord or lumbar or sacral or thoracic)).ti,ab.
6	or/1-5
7	time/ or turnaround time/
8	(early or earlie* or late or later or time* or timing* or schedul* or hour* or rapid* or fast* or slow* or delay* or immediate*).ti,ab.
9	or/7-8
10	6 and 9
11	tertiary health care/
12	scic*.ti,ab.
13	(spinal adj1 (injur* or treatment) adj1 (unit* or centre*)).ti,ab.
14	(royal national orthopaedic hospital or london spinal cord injury centre).ti,ab.
15	(stoke mandeville or national spinal cord injury centre).ti,ab.
16	duke of cornwall spinal treatment centre.ti,ab.
17	princess royal spinal injuries centre.ti,ab.
18	midlands centre for spinal injuries.ti,ab.
19	(pinderfields hospital or regional spinal injuries centre).ti,ab.
20	("southport and ormskirk hospital" or north west regional spinal injuries centre).ti,ab.
21	golden jubilee regional spinal cord injuries centre.ti,ab.
22	queen elizabeth national spinal injury unit.ti,ab.
23	rookwood hospital.ti,ab.
24	musgrave park hospital.ti,ab.
25	(dublin national spinal cord injury service or mater misericordiae university hospital).ti,ab.
26	or/11-25
27	10 or 26

Cochrane search terms

#	MeSH descriptor: [referral and consultation] explode all trees
#2	(transfer* or dumping):ti,ab
#3	(refer or ferr* or refers):ti,ab
#4	(consultation* or consult or consults or consulting):ti,ab
#5	((liais* or cooperat* or contact* or relationship* or convers* or dialog* or talk* or exchange* or discuss*) near/8 (specialist* or expert* or consultant* or center* or centre* or spine or spinal or cervical or cord or lumbar or sacral or thoracic)):ti,ab
#6	{or #1-#5}
#7	MeSH descriptor: [time factors] this term only
#8	(early or earlie* or late or later or time* or timing* or schedul* or hour* or rapid* or fast* or slow* or delay* or immediate*):ti,ab
#9	{or #7-#8}
#10	#6 and #9
#11	MeSH descriptor: [tertiary care centers] this term only
#12	scic*:ti,ab
#13	(spinal near/1 (injur* or treatment) near/1 (unit* or centre*)):ti,ab
#14	(royal national orthopaedic hospital or london spinal cord injury centre):ti,ab
#15	(stoke mandeville or national spinal cord injury centre):ti,ab
#16	(duke of cornwall spinal treatment centre):ti,ab
#17	(princess royal spinal injuries centre):ti,ab
#18	(midlands centre for spinal injuries):ti,ab
#19	(pinderfields hospital or regional spinal injuries centre):ti,ab
#20	("southport and ormskirk hospital" or north west regional spinal injuries centre):ti,ab
#21	(golden jubilee regional spinal cord injuries centre):ti,ab
#22	(queen elizabeth national spinal injury unit):ti,ab
#23	(rookwood hospital):ti,ab
#24	(musgrave park hospital):ti,ab
#25	(dublin national spinal cord injury service or mater misericordiae university hospital):ti,ab
#26	{or #11-#25}
#27	#10 or #26

A.4.12 Tertiary services

14. What are the clinical factors associated with a positive outcome after transfer to an SCIC for patients with spinal trauma?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injury	Transfer/acceptance to SCIC	n/a	The following filters were used in Medline and Embase only: OBS, PROG, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp "referral and consultation"/ or patient transfer/
2	(transfer* or dumping).ti,ab.

3	(refer or referr* or refers).ti,ab.
4	(acceptance or refus*).ti,ab.
5	(patient* adj2 (movement or transport*)).ti,ab.
6	or/1-5
7	(specialist* or center* or centre* or unit* or rehabilitation or system or systems or service* or institut* or network*).ti,ab.
8	tertiary care centers/
9	scic*.ti,ab.
10	royal national orthopaedic hospital.ti,ab.
11	stoke mandeville.ti,ab.
12	pinderfields hospital.ti,ab.
13	"southport and ormskirk hospital".ti,ab.
14	rookwood hospital.ti,ab.
15	musgrave park hospital.ti,ab.
16	mater misericordiae university hospital.ti,ab.
17	or/7-16
18	6 and 17

Embase search terms

1	patient referral/ or patient transport/
2	(transfer* or dumping).ti,ab.
3	(refer or referr* or refers).ti,ab.
4	(acceptance or refus*).ti,ab.
5	(patient* adj2 (movement or transport*)).ti,ab.
6	or/1-5
7	(specialist* or center* or centre* or unit* or rehabilitation or system or systems or service* or institut* or network*).ti,ab.
8	tertiary health care/
9	scic*.ti,ab.
10	royal national orthopaedic hospital.ti,ab.
11	stoke mandeville.ti,ab.
12	pinderfields hospital.ti,ab.
13	"southport and ormskirk hospital".ti,ab.
14	rookwood hospital.ti,ab.
15	musgrave park hospital.ti,ab.
16	mater misericordiae university hospital.ti,ab.
17	or/7-16
18	6 and 17

Cochrane search terms

#1	MeSH descriptor: [referral and consultation] explode all trees
#2	MeSH descriptor: [patient transfer] this term only
#3	(transfer* or dumping):ti,ab
#4	(refer or referr* or refers):ti,ab
#5	(acceptance or refus*):ti,ab
#6	(patient* near/2 (movement or transport*)):ti,ab

#7	{or #1-#6}
#8	(specialist* or center* or centre* or unit* or rehabilitation or system or systems or service* or institut* or network*):ti,ab
#9	MeSH descriptor: [tertiary care centers] this term only
#10	scic*:ti,ab
#11	{or #8-#10}
#12	#7 and #11

A.4.13 Information and support

15. What information and support do people with suspected traumatic spinal cord/column injury and their families want in the early stages after trauma before a definitive diagnosis has been made?
16. What information and support do people with a confirmed traumatic spinal cord/column injury and their families want in the early stages after trauma before transfer to specialist care?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Information and support	n/a	n/a	See Table 1 English only Exclusion filter applied in Medline, Embase and CINAHL

Medline search terms

1	exp consumer health information/ or patient education as topic/
2	(publications/ or pamphlets/ or posters as topic/) and (client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*).ti,ab.
3	((client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*) adj3 (information* or educat* or learn* or train* or program* or advi?e* or instruct* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*)).ti,ab.
4	((client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*) adj3 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*)).ti,ab.
5	((information* or educat* or learn* or train* or program* or advi?e* or instruction* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*) adj3 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*)).ti,ab.
6	((information* or educat*) adj3 (model* or program* or need* or requirement* or support* or seek* or access* or disseminat*)).ti,ab.
7	or/1-6

Embase search terms

1	consumer health information/ or patient education/
2	publication/ and (client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*).ti,ab.
3	((client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*) adj3 (information* or educat* or learn* or train* or

	program* or advi?e* or instruct* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*).ti,ab.
4	((client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*) adj3 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*).ti,ab.
5	((information* or educat* or learn* or train* or program* or advi?e* or instruction* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*) adj3 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*).ti,ab.
6	((information* or educat*) adj3 (model* or program* or need* or requirement* or support* or seek* or access* or disseminat*).ti,ab.
7	or/1-6

Cochrane search terms

#1	MeSH descriptor: [publications] this term only
#2	MeSH descriptor: [pamphlets] this term only
#3	MeSH descriptor: [posters as topic] this term only
#4	{or #1-#3}
#5	(client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*).ti,ab
#6	#4 and #5
#7	MeSH descriptor: [consumer health information] explode all trees
#8	MeSH descriptor: [patient education as topic] this term only
#9	((client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*) near/3 (information* or educat* or learn* or train* or program* or advice* or advise* or instruct* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*).ti,ab
#10	((client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*) near/3 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*).ti,ab
#11	((information* or educat* or learn* or train* or program* or advice* or advise* or instruction* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*) near/3 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*).ti,ab
#12	((information* or educat*) near/3 (model* or program* or need* or requirement* or support* or seek* or access* or disseminat*).ti,ab
#13	{or #7-#12}
#14	#6 or #13

CINAHL search terms

S1	(MH "pamphlets")
S2	(MH "posters")
S3	S1 or S2
S4	TX (client* or patient* or user* or carer* or consumer* or customer* or famil* or parent* or father* or mother* or caregiver*)
S5	S3 and S4
S6	(MH "consumer health information")
S7	(MM "patient education+")

S8	TX (patient* n2 (information* or educat* or learn* or train* or program* or advice* or advise* or instruct* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*))
S9	TX (famil* n2 (information or information* or educat* or learn* or train* or program* or advice* or advise* or instruct* or teach* or knowledge or understanding or misunderstanding or communicat* or involvement or support*))
S10	TX (information* n2 (pamphlet* or leaflet* or booklet* or manual* or brochure* or publication* or handout* or website* or web site* or web page* or webpage* or video* or dvd*))
S11	S6 or S7 or S8 or S9 or S10
S12	S5 or S11

A.4.14 Documentation

17. What documentation tool should be routinely used to record baseline neurological function in people with spinal injuries?

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	Documentation tools	n/a	The following filters were used in Medline and Embase only: OBS, SR	See Table 1 English only Exclusion filter applied in Medline and Embase

Medline search terms

1	exp *neurologic examination/
2	(neurologic* adj5 (exam* or assess* or evaluat* or tool* or record* or document* or note or notes or template* or design* or layout*)):ti,ab.
3	((american spinal injury association or asia or ais) adj4 (classifi* or impairment or scale* or record* or document* or grade* or grading or function*)):ti,ab.
4	(nascis* or national acute spinal cord injury study).ti,ab.
5	frankel*.ti,ab.
6	or/1-5

Embase search terms

1	exp *neurologic examination/
2	(neurologic* adj5 (exam* or assess* or evaluat* or tool* or record* or document* or note or notes or template* or design* or layout*)):ti,ab.
3	((american spinal injury association or asia or ais) adj4 (classifi* or impairment or scale* or record* or document* or grade* or grading or function*)):ti,ab.
4	(nascis* or national acute spinal cord injury study).ti,ab.
5	frankel*.ti,ab.
6	or/1-5

Cochrane search terms

#1	MeSH descriptor: [neurologic examination] explode all trees
#2	(neurologic* near/5 (exam* or assess* or evaluat* or tool* or record* or document* or note or notes or template* or design* or layout*)):ti,ab

#3	((american spinal injury association or asia or ais) near/4 (classifi* or impairment or scale* or record* or document* or grade* or grading or function*)):ti,ab
#4	(nascis* or national acute spinal cord injury study):ti,ab
#5	frankel*:ti,ab
#6	{or #1-#5}

A.5 Economics searches

A.5.1 Health economics

Economic searches were conducted in Medline, Embase, HEED and CRD for NHS EED and HTA.

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	n/a	n/a	The following filters were used in Medline and Embase only: HE, MOD	Medline and Embase: 2011 – 31 st March 2015 CRD: All dates – 31 st March 2015 HEED: All dates – 30 th July 2014 English only Exclusion filter applied in Medline and Embase

A.5.2 Quality of life

Searches for quality of life data were run in Medline (OVID) and Embase (OVID).

Search constructed by combining the columns in the following table using the AND Boolean operator

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
Spinal injuries	n/a	n/a	The following filters were used in Medline and Embase only: QoL	Medline and Embase: 2011 – 31 st July 2014 English only Exclusion filter applied in Medline and Embase

A.5.3 Radiation risk

18. For people with clinical signs of spinal injury what are the radiation risks of having a x-ray(s) and/or CT scans?

These searches were conducted in Medline, Embase, HEED and Cochrane Library for NHS EED and HTA.

Population	Intervention / exposure	Comparison	Study filter used	Date parameters
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Population	Intervention / exposure	Comparison	Study filter used	Date parameters
No population	X-ray or CT		The following filters were used in Medline and Embase only: HE	Medline and Embase: 2011 – 31 st March 2015 Cochrane NHSEED and HTA: All years –2015 Issue 1 of 4 HEED: All dates – 30 th July 2014

Medline search terms

1	See A.4.6 for Medline terms
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Embase search terms

1	See A.4.6 for Embase terms
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Cochrane search terms

1	See A.4.6 for Cochrane Library terms
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HEED search terms

1	AX=fluoroscop* or fluroscop* or ray* or xray* or MDCT* or CT* or tomograph*
2	AX=radiat* or irradiat* or millisievert* or mSv or milligray* or mGy or BEIR
3	AX= dose or dosage or doses or expos* or risk* or induced or induct* or danger* or hazard* or harm*
4	AX=malignan* or neoplas* or cancer* or myelodysplas* or tumour* or tumor* or carcinom* or adenocarcinoma* or lymphoma* or leukaemia* or leukemia* or cataract* or burn* or erythema or reddening or tissue or defect* or mutation*
5	CS=1 and 2
6	CS=1 and 3
7	CS=4 and 6
8	CS=5 or 7

A.6 References

- 1 National Institute for Health and Clinical Excellence. The guidelines manual. London: National Institute for Health and Clinical Excellence; 2012. Available from: <http://publications.nice.org.uk/the-guidelines-manual-pmg6/>