



Raccomandazione 36 della Linea Guida per la gestione integrata del trauma maggiore dalla scena dell'evento alla cura definitiva

Questo documento rappresenta la versione finale delle raccomandazioni cliniche che hanno completato l'intero processo previsto dal Manuale metodologico per la produzione di linee guida dell'Istituto Superiore di Sanità, inclusa la consultazione pubblica e la revisione esterna indipendente.

Il documento finale della presente Linea Guida sarà pubblicato quando il processo di elaborazione di tutte le raccomandazioni relative ai quesiti clinici sarà ultimato.

Novembre 2022

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Lista delle raccomandazioni formulate

Quesito 18: Qual è il modello di coordinamento più efficace dal punto di vista clinico e dei costi per la presa in carico del paziente traumatizzato?

Raccomandazione 36. Si suggerisce, da parte delle Direzioni aziendali, l'identificazione di una figura professionale deputata al coordinamento dei percorsi assistenziali per le persone con trauma maggiore che utilizzano i servizi sanitari.

Il trauma coordinator deve:

- agire come punto di riferimento per i pazienti e per la famiglia, quale intermediario con le diverse figure professionali che hanno in cura il paziente;
- provvedere a fornire le informazioni a paziente e famiglia sulle strategie e i percorsi assistenziali;
- partecipare alle riunioni dello staff;
- farsi portavoce delle richieste del paziente e della famiglia;
- facilitare il percorso del paziente, coordinare la presa in carico globale del paziente da parte dei diversi professionisti, cercando di risolvere eventuali difficoltà e contribuendo a ridurre i tempi di ricovero;
- garantire la continuità assistenziale pianificando tempestivamente le necessità di riabilitazione, il percorso di dimissione protetta, tenendo in considerazione i bisogni fisici e psicosociali.

[Raccomandazione condizionata a favore dell'intervento, qualità delle prove molto bassa]

Il panel di esperti ha formulato la raccomandazione seguendo un processo metodologicamente rigoroso che, in conformità a quanto previsto dal Manuale metodologico dell'ISS, ha utilizzato il GRADE Evidence to Decision (EtD) framework per procedere in modo strutturato e trasparente dalle prove alla raccomandazione.

La valutazione degli interessi dichiarati dai membri del panel non ha rilevato nessun potenziale o rilevante conflitto di interesse rispetto alla tematica oggetto del quesito clinico.

Di seguito si riportano l'**EtD framework** e le appendici per la raccomandazione 36:

- Appendice A – Quesito clinico e Strategia di ricerca
- Appendice B – Lista degli studi inclusi e degli studi esclusi con motivazione
- Appendici C – Sintesi delle evidenze
- Appendice D – Valutazione della qualità metodologica degli studi inclusi
- Appendice E – Tabelle delle evidenze
- Appendice F – Costi e costo-efficacia

Per i dettagli su: Gruppo di sviluppo della LG, Policy per la gestione del Conflitto di Interesse (CdI), Scope e Metodologia fare riferimento al documento **LGTM_Racc1_4_def** scaricabile dal link: https://www.iss.it/documents/20126/8404212/LGTM_Racc1_4_def

EtD framework – Quesito clinico n.18: modello di coordinamento

Qual è il modello di coordinamento più efficace dal punto di vista clinico e dei costi per la presa in carico del paziente traumatizzato?	
POPOLAZIONE:	Persone con trauma maggiore che utilizzano le strutture del servizio sanitario.
INTERVENTO:	Introduzione di una figura di coordinamento del percorso assistenziale per i pazienti con trauma maggiore.
CONFRONTO:	Servizio traumatologico che non preveda la figura di coordinamento nel percorso assistenziale dei pazienti con trauma maggiore.
ESITI PRINCIPALI:	<p>Critici:</p> <ul style="list-style-type: none"> – Mortalità – Qualità della vita – Morbilità <p>Importanti:</p> <ul style="list-style-type: none"> – Continuità assistenziale <ul style="list-style-type: none"> ○ Durata della degenza totale (trasferimenti interni) ○ Definizione della gravità del traumatizzato e ricadute formative/organizzative – Tempo trascorso nel Dipartimento d’Urgenza – Numero di procedure diagnostiche e terapeutiche – Tempo di accesso ai servizi di riabilitazione – Durata della degenza nelle terapie intensive (UTI) – Comorbilità conseguenti all’evento traumatico – Soddisfazione del paziente e dei familiari – Soddisfazione dello staff.
SETTING:	Ospedaliero.
PROSPETTIVA:	<p>Popolazione, SSN:</p> <ul style="list-style-type: none"> • organizzazione del percorso assistenziale ed erogazione dei servizi per la gestione del paziente traumatizzato; • rete regionale per il trauma; • personale sanitario dei servizi di emergenza territoriale.
CONFLITTI DI INTERESSE	La policy ISS relativa alla dichiarazione e gestione del conflitto di interessi è stata applicata e non è stato identificato nessun interesse rilevante o potenzialmente rilevante. Tutti i membri del panel presenti alla riunione hanno votato, determinando la direzione e la forza della raccomandazione.

VALUTAZIONE

Problema		
Il problema è una priorità?		
GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> No <input type="radio"/> Probabilmente no <input type="radio"/> Probabilmente si <input checked="" type="radio"/> Si <input type="radio"/> Varia <input type="radio"/> Non so 	<p>Il nuovo modello organizzativo dei Trauma Center anche in Italia apre la strada per una diffusione sempre maggiore di una nuova funzione di coordinamento per l'Infermiere, non solo nel suo aspetto ospedaliero, ma anche in un ruolo di governo generale del Trauma System. A tal proposito, nel Nord America, sono state create tre nuove posizioni infermieristiche per concretizzare il ruolo e le responsabilità del Trauma Nurse Coordinator: Trauma Director, Clinical Nurse Specialist and Trauma Researcher. Attraverso l'utilizzo di tale approccio innovativo, si è verificato un notevole miglioramento della qualità della cura del trauma grave come dimostrato dalla diminuzione della percentuale di complicanze, dei tempi di ricovero ospedaliero e dei costi sanitari. Inoltre, si è avuto un notevole incremento della formazione specifica e della ricerca nell'ambito dell'approccio al trauma grave. Il ruolo dell'Infermiere nell'ambito della gestione del trauma grave fa emergere anche l'importanza dell'esistenza di una documentazione specifica integrata a quella del Medico nella cartella clinica. Negli ultimi anni la stessa ha assunto sempre più importanza dimostrandosi in più casi, anche giudiziari, complementare a quella medica. Logica e praticità vorrebbero che la documentazione clinica che seguirà il paziente sia integrata prevedendo spazi di pertinenza medica ed infermieristica. Se al Medico competono gli spazi relativi al percorso diagnostico e terapeutico l'Infermiere dovrà disporre di quelli relativi alla registrazione dell'attività assistenziale avanzata pianificata ed attuata nonché ai rilievi direttamente effettuati. La disponibilità, sempre più diffusa, di documentazioni informatizzate rende l'integrazione dei diversi campi ancora più semplice. Il valore della documentazione infermieristica è di grande importanza sia ai fini della tutela professionale che per la revisione critica e di qualità dell'intero processo di cura: misurare per migliorare (1).</p> <p><i>In Italia, non è stato ancora adottato e condiviso sul territorio nazionale l'implementazione del ruolo di Trauma coordinator. Questa figura ad oggi è presente da pochi mesi con un ruolo funzionale solo in un'unica realtà ospedaliera, l'ASST Grande Ospedale Metropolitano Niguarda.</i></p>	
Effetti desiderabili		
Quanto considerevoli sono gli effetti desiderabili attesi?		
GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> Irrilevanti <input checked="" type="radio"/> Piccoli <input type="radio"/> Moderati <input type="radio"/> Grandi <input type="radio"/> Variano <input type="radio"/> Non so 	<p>È stato effettuato un aggiornamento della revisione sistematica NICE NG40 con ricerca della letteratura sulle banche dati Embase, Medline e Cochrane CENTRAL aggiornata al 31 Marzo 2022 (Appendice A riporta la search strategy adottata). Sono stati individuati 1062 record da cui sono stati selezionati 5 record che soddisfano i criteri di inclusione per rispondere al quesito clinico proposto. Inoltre, la linea guida NICE aveva selezionato al 2015 6 studi derivanti da 7 pubblicazioni. In totale, sono stati inclusi 10 studi (da 11 pubblicazioni): 1 studio randomizzato e controllato e 9 studi retrospettivi</p>	

(Appendice B riporta la bibliografia degli studi inclusi. Appendice C riporta il diagramma di flusso della selezione degli studi).

In totale gli studi permettono di indagare:

-6 comparazioni differenti nella popolazione di adulti con trauma maggiore

- Comparazione 1a. Trauma Case Management (TCM) versus no TCM
- Comparazione 2a. Certified Nurse Practitioners (CRNP's) versus physician led care
- Comparazione 3a. Nurse Practitioner impact on length of stay (LOS) versus LOS values in National Trauma Databank (NTDB)
- Comparazione 4a. Trauma nurse practitioners versus hospitalist service
- Comparazione 5a. Nurse Practitioners provided in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday–Friday
- Comparazione 6a. Trauma Nurse Lead vs no Trauma Nurse Lead

-1 comparazione nella popolazione pediatrica con trauma maggiore

- Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only versus physician led care (RES)

Si riportano gli outcome critici:

	Mortality	Ongoing consequences morbidity	Health related quality of life
Comparazione 1a. Trauma Case Management (TCM) versus no TCM	RR 1.01 (95% CI 0.65 – 1.58) 1 studio obs, n = 1541	Occupational therapy/physiotherapy/ RR 1.22 (95% CI 1.05 – 1.43) Physiotherapy RR 1.22 (95% CI 1.10 – 1.35) Social work 1.15 (95% CI 1 -1.32) 1 studio obs, n = 1541	Not measured
Comparazione 2a. Certified Nurse Practitioners (CRNP's) versus physician led care	Narrative synthesis - mortality: 4.2 per 1000 (CRNP) vs 4.7 per 1000 (physician) 1 studio obs	Not measured	Not measured
Comparazione 3a. Nurse Practitioner impact on LOS	Not measured	Not measured	Not measured

	<table border="1"> <tr> <td>versus LOS values in National Trauma Databank (NTDB)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Comparazione 4a. Trauma nurse practitioners versus hospitalist service</td> <td>OR 6.49 (95% CI 0.40 - 104.6) 1 studio obs, n=1400</td> <td>Not measured</td> <td>Not measured</td> </tr> <tr> <td>Comparazione 5a. Nurse Practitioners provided in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday-Friday</td> <td>Not measured</td> <td>Not measured</td> <td>Not measured</td> </tr> <tr> <td>Comparazione 6a. Trauma Nurse Lead vrsus no Trauma Nurse Lead</td> <td>OR 1.01 (95% CI 0.79 - 1.29) 1 studio obs, n=9625</td> <td>Not measured</td> <td>Not measured</td> </tr> <tr> <td>Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only vs physician led care (RES)</td> <td>Not measured</td> <td>Not measured</td> <td>Not measured</td> </tr> </table>	versus LOS values in National Trauma Databank (NTDB)				Comparazione 4a. Trauma nurse practitioners versus hospitalist service	OR 6.49 (95% CI 0.40 - 104.6) 1 studio obs, n=1400	Not measured	Not measured	Comparazione 5a. Nurse Practitioners provided in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday-Friday	Not measured	Not measured	Not measured	Comparazione 6a. Trauma Nurse Lead vrsus no Trauma Nurse Lead	OR 1.01 (95% CI 0.79 - 1.29) 1 studio obs, n=9625	Not measured	Not measured	Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only vs physician led care (RES)	Not measured	Not measured	Not measured	
versus LOS values in National Trauma Databank (NTDB)																						
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Comparazione 5a. Nurse Practitioners provided in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday-Friday	Not measured	Not measured	Not measured																			
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Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only vs physician led care (RES)	Not measured	Not measured	Not measured																			
	Si rimanda all'Appendice C per la completa lista con relative sintesi dell'evidenze per gli outcome critici e importanti.																					

Effetti indesiderabili

Quanto considerevoli sono gli effetti indesiderabili attesi?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> Grandi <input type="radio"/> Moderati <input type="radio"/> Piccoli <input checked="" type="radio"/> Irrilevanti <input type="radio"/> Variano <input type="radio"/> Non so 	<p>È stata effettuata un update della revisione sistematica NICE NG40 con ricerca della letteratura sulle banche dati Embase, Medline e Cochrane CENTRAL aggiornata al 31 Marzo 2022. Sono stati individuati 1062 records da cui sono stati selezionati 5 records che soddisfano i criteri di inclusione per rispondere al quesito clinico proposto. Inoltre, la linea guida NICE aveva selezionato al 2015 6 studi derivanti da 7 pubblicazioni.</p> <p>In totale, sono stati inclusi 10 studi (da 11 pubblicazioni): 1 studio randomizzato e controllato e 9 studi retrospettivi.</p> <p>Non si evidenziano effetti indesiderabili dovuti all'introduzione di un trauma coordinator.</p>	

Qualità delle prove

Qual è la qualità complessiva delle prove di efficacia e sicurezza?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> o Molto bassa o Bassa o Moderata o Alta o Nessuno studio incluso 	<p>La qualità complessiva è MOLTO BASSA per ogni comparazione, prevalentemente a causa della natura osservazionale degli studi a rischio di bias e per l'imprecisione delle stime.</p> <p>L'Appendice D riporta la valutazione della qualità metodologica degli studi e l'Appendice E riporta le GRADE Summary of Findings.</p>	

Valori

C'è incertezza o variabilità nel valore attribuito agli esiti principali?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> o Importante incertezza o variabilità o Possibile importante incertezza o variabilità o Probabilmente nessuna incertezza o variabilità importante o Nessuna incertezza o variabilità importante 	<p>È stata effettuata una revisione sistematica con ricerca della letteratura sulle banche dati Embase, Medline che ha identificato 12 records di cui nessuno studio è stato incluso. Tuttavia, dalla fonte di ricerca per il quesito di efficacia è stata individuata una scoping review di Walter et al. 2015 (2) che conferma hospital che LOS e ICU length of stay sono tra gli outcome più riportati in letteratura, da pazienti e stakeholders. Inoltre, la scoping review riporta che: "Staff and patient surveys have indicated the positive attitude toward the TNP with some qualities examined to be more favorable than their medical staff counterparts".</p>	

Bilancio degli effetti

Il bilancio tra effetti desiderabili ed indesiderabili favorisce l'intervento o il confronto?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> È in favore del confronto <input type="radio"/> Probabilmente è in favore del confronto <input type="radio"/> Non è in favore né dell'intervento né del confronto <input checked="" type="radio"/> Probabilmente è in favore dell'intervento <input type="radio"/> È in favore dell'intervento <input type="radio"/> Varia <input type="radio"/> Non lo so 	<p>Dalla revisione della letteratura sono stati identificati studi osservazionali di qualità molto bassa.</p>	<p>Il panel ritiene che l'istituzione di una figura di coordinamento del percorso assistenziale del traumatizzato possa facilitare le varie fasi del processo.</p>

Risorse necessarie

Qual è l'entità delle risorse necessarie (costi)?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> Costi elevati <input checked="" type="radio"/> Costi moderati <input type="radio"/> Costi e risparmi irrilevanti <input type="radio"/> Risparmi moderati <input type="radio"/> Risparmi elevati <input type="radio"/> Varia <input type="radio"/> Non so 	<p>Al fine di rispondere al quesito in oggetto si rileva la mancanza di dati inerenti al contesto italiano estrapolabili da evidenze di letteratura scientifica.</p> <p>Si fa dunque riferimento alla metodologia di stima adottata dal NICE che assimila il costo di un trauma coordinator a quello di un infermiere specializzato (nurse specialist) di livello 6 o 7 che corrisponde ad un range compreso fra £ 52 e £ 41 per ora. Inoltre, stima 3 unità di personale necessarie per far funzionare la Trauma Unit per 24 ore al giorno, 7 giorni su 7. In Italia si può far riferimento al salario medio lordo annuo del personale infermieristico del SSN che è pari ad € 33.317 (3). Partendo da tale dato, il costo aziendale è pari a circa €40.000, cioè pari a 19 € orari.</p>	<p>In considerazione della normativa europea sulla turnistica delle professioni sanitarie la copertura del servizio 7/7 24/24 prevede un numero minimo di 5 professionisti.</p>

Qualità delle prove relative alle risorse necessarie

Qual è la qualità delle prove relative alle risorse necessarie (costi)?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> Molto bassa <input type="radio"/> Bassa <input type="radio"/> Moderata <input checked="" type="radio"/> Alta <input type="radio"/> Nessuno studio incluso 	<p>Sebbene la base da cui parte la stima del costo del trauma coordinator in Italia sia fondata su statistiche ufficiali (3) sul costo del personale infermieristico del SSN, è da notare come la retribuzione considerata (€40.000/anno) possa essere sottostimata in quanto non tiene conto dei livelli di anzianità e di altre indennità.</p>	<p>I valori tabellari delle retribuzioni delle funzioni infermieristiche aggiuntive sono noti (incarico funzionale livello 3 : 5000 euro annui</p>

		lordi /Ospedale Niguarda, unico esempio)
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Costo-efficacia

L'analisi di costo efficacia favorisce l'intervento o il confronto?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<input type="radio"/> È in favore del confronto <input type="radio"/> Probabilmente è in favore del confronto <input type="radio"/> Non è in favore né del confronto né dell'intervento <input type="radio"/> Probabilmente è in favore dell'intervento <input type="radio"/> È in favore dell'intervento <input type="radio"/> Varia <input checked="" type="radio"/> Nessuno studio incluso	È stata effettuata una revisione sistematica con ricerca della letteratura sulle banche dati Embase, Medline e che ha identificato 255 record. Nessuno studio è stato incluso.	

Equità

Quale sarebbe l'impatto in termini di equità?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<input type="radio"/> Riduce l'equità <input type="radio"/> Probabilmente riduce l'equità <input type="radio"/> Probabilmente nessun impatto <input checked="" type="radio"/> Probabilmente migliora l'equità <input type="radio"/> Migliora l'equità <input type="radio"/> Varia <input type="radio"/> Non so	Non sono stati identificati studi relativi al contesto internazionale e italiano.	Il panel ritiene che nel contesto ei trauma center italiani la figura infermieristica del trauma coordinator potrebbe migliorare l'equità di accesso alle cure, ottimizzando i flussi del percorso assistenziale sui diversi livelli di assistenza.

Accettabilità

L'intervento è accettabile per i principali stakeholders?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<input type="radio"/> No <input type="radio"/> Probabilmente no	È stata condotta una revisione sistematica su Medline ed Embase che ha portato a individuare 167 records relativi	Il panel sottolinea, sulla base

<p> <input type="radio"/> Probabilmente si <input type="radio"/> Sì <input checked="" type="radio"/> Varia <input type="radio"/> Non so </p>	<p>all'accettabilità/fattibilità. Due studi sono stati inclusi (4,5).</p> <p>KOREA (4): Gli infermieri specializzati nella cura del trauma hanno un tasso di turnover più elevato rispetto ad altri infermieri a causa di fattori negativi come descrizioni del lavoro poco chiare e attività lavorative incoerenti. L'accettabilità del ruolo da parte del trauma coordinator era associata alla necessità di formazione lavorativa periodica, a soddisfazione sul lavoro e al carico di lavoro percepito elevato con necessità di supporto organizzativo, mentre era negativamente correlata allo stress lavorativo.</p> <p>AUSTRALIA (5): indagine pre-post tra il personale infermieristico di emergenza (che lavora a livello di sala di rianimazione) prima e dopo l'implementazione di un ruolo di leader infermieristico, con riferimento alla percezione di leadership, comunicazione e documentazione. Tutti i nurse team leader intervistati (100%) dopo la formalizzazione e l'implementazione del ruolo hanno dichiarato di avere una comprensione da buona a eccellente del proprio ruolo, rispetto al 93,2% prima dello studio. Il Nurse team leader ha migliorato la percezione della leadership infermieristica e la precisione della documentazione clinica è migliorata (P = 0,025).</p> <p><u>Ohio, USA</u> (7): Nei sistemi dove è stato implementato il nuovo ruolo, la percezione del personale non è stata di completa accettazione. Sono stati necessari incontri finalizzati al miglioramento del processo, ma anche corsi di formazione alla leadership, relazione con i colleghi, e gestione/risoluzione dei conflitti.</p> <p>Solo dopo i primi 6 mesi di attività i TNL sono stati accettati positivamente e visti come una risorsa benefica nell'emergency department (ED).</p>	<p>dell'unica esperienza italiana, "resistenze" possibili nell'accettazione del ruolo da parte di altre figure professionali deputate al coordinamento; viene sottolineata la necessità di riconoscimento del ruolo e definizione chiara da parte della direzione aziendale.</p> <p>Il Trauma Coordinator va inserito nel dipartimento di urgenza-emergenza alle dipendenze del Trauma Director con cui si rapporta e confronta quotidianamente.</p>
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Fattibilità

È fattibile l'implementazione dell'intervento?

GIUDIZI	RICERCA DELLE PROVE	CONSIDERAZIONI AGGIUNTIVE
<ul style="list-style-type: none"> <input type="radio"/> No <input type="radio"/> Probabilmente no <input checked="" type="radio"/> Probabilmente si <input type="radio"/> Sì <input type="radio"/> Varia <input type="radio"/> Non so 	<p>È stata condotta una revisione sistematica su Medline ed Embase che ha portato a individuare 167 records relativi all'accettabilità/fattibilità e 4 da altre fonti (search strategy efficacia). Alla fine, quattro studi sono stati inclusi (6,7, 8,9).</p> <p><u>Carolina del Sud, USA</u> (6): Esperienza Ospedale a Myrtle Beach, Carolina del Sud (Level I adult, Level II pediatric trauma center): sviluppo e implementazione di un programma di Trauma Nurse Lead (TNL). Il programma TNL ha portato a riduzione della durata della degenza in ospedale e in unità di terapia intensiva, con il miglioramento del protocollo di trasfusione massiva e la prevenzione della coagulopatia e con la maggior facilità della dimissione. Il programma TNL ha assicurato la presenza in ogni momento all'interno dell'ospedale di infermieri di traumatologia altamente qualificati.</p> <p><u>Ohio, USA</u> (7): A seguito di un programma di formazione mirata (Education was done through presentation, case studies, journal reviews, and often-provided nursing continuing educational credits) in un gruppo centrale di infermieri, trauma nurse leader (TNL), si è raggiunto una maggior completezza della documentazione clinica e diminuzione delle tempistiche di Sala di Emergenza (10 minuti in meno per l'attivazione del trauma team nei casi più critici). Investire nella formazione non impatta sul budget del pronto soccorso: da notare che i TNL sono stati pagati anche per la loro presenza al di fuori delle attività assistenziali. Questo costo è stato considerato marginale sul budget complessivo, soprattutto se confrontato con i costi potenziali per fornire una maggiore istruzione annuale per l'intero staff del pronto soccorso.</p> <p><u>USA</u> (8): 517 partecipanti che si sono identificati in una delle seguenti 4 posizioni professionali: Trauma Program Manager (TPM), Trauma Nurse Coordinator (TNC), trauma program coordinator (TPC), o trauma program administrator (TPA). In tabella 2 si presenta la percentuale di soggetti che hanno diversi livelli di istruzione, competenze nei differenti livelli di complessità di cura del trauma (tabella 2). Soltanto il 20.6% ha seguito il Corso Trauma Base offerto da ATS, e un numero inferiore (8.3%) ha seguito il Corso Avanzato. Il corso Optimal Trauma Center Organization Course, che è co-sponsorizzato da ACS e STN, è stato completato dal 12.9%. Infine il 5.1% ha seguito il Finance and Business Course sponsorizzato da Trauma Center Association of America (TCAA) e il 4.3% ha seguito il TCAA's Comprehensive Performance Improvement Course.</p>	<p>Da una disamina della situazione italiana il ruolo del trauma coordinator appare fattibile. Si auspica che tale ruolo venga rivestito da una figura infermieristica a condizione che venga individuato il percorso formativo adeguato e il ruolo professionale corrispondente, inserito nell'organizzazione clinica del trauma center.</p>

TABLE 2 Education and Training by Trauma Center Level								
	Trauma Center Level (Verified, State-Designated, or Seeking)						Total Responding to This Item	Overall %
	Level I	Level II	Level III	Level IV	Peds Level I	Peds Level II		
Educational preparation								
AD	7	19	42	54	3	1	126	29.4
BSN/BS	49	63	50	39	13	4	218	50.9
MSN/MS	28	24	11	8	7	2	80	18.7
Advanced degree or advanced certification	1	1	0	2	0	0	4	0.9
Subtotal	85	107	103	103	23	7	428	
Educational courses completed								
TOPIC—STN	75	96	62	50	19	7	309	34.1
Optimal Trauma Center Organization Course—STN/ACS	31	54	16	2	12	2	117	12.9
Trauma Coordinator—Basic Course—ATS	41	42	42	44	11	7	187	20.6
Trauma Coordinator—Advanced Course—ATS	25	25	14	4	5	2	75	8.3
Comprehensive PI Course—TCAA	11	18	5	0	5	0	39	4.3
Finance and Business Course—TCAA	14	18	4	0	8	2	46	5.1
AIS Course—AAAM	24	40	27	30	10	3	134	14.8
Subtotal	221	293	170	130	70	23	907	
<i>Note. AAAM = Association for the Advancement of Automotive Medicine; ACS = American College of Surgeons; AIS = Abbreviated Injury Scale; ATS = American Trauma Society; PI = performance improvement; STN = Society of Trauma Nurses; TCAA = Trauma Center Association of America; TOPIC = Trauma Outcomes and Performance Improvement Course.</i>								

England (9): Risorse. È stata condotta un'indagine elettronica sul coordinatore infermiere del trauma (TNC) nell'ambito di 18 trauma systems. Alcuni intervistati hanno individuato una carenza di risorse umane in termini di copertura per fornire **un servizio 7 giorni su 7**. Inoltre, è stata individuata una mancanza di supporto segretariale e di strutture (uffici, scrivania/computer). Il ruolo del TNC è in gran parte gestionale, tuttavia, dati i domini di ruolo individuati, un luogo di lavoro adatto è essenziale. Rispetto alle TNC in Australia e Nuova Zelanda, le TNC inglesi hanno riferito di aver speso meno ore non retribuite nel ruolo (3 ore a settimana) rispetto alle loro controparti internazionali (6 ore a settimana). Con una valutazione formale del ruolo e l'esplorazione critica del tempo speso in compiti amministrativi che potrebbero essere svolti in modo più efficace da altre figure, i TNC potrebbero essere in grado di addurre un argomento economico per sostenere la necessità di personale segretariale di supporto e di conseguenza aumentare l'efficacia della loro attività.

RIASSUNTO DEI GIUDIZI

		GIUDIZI						
PROBLEMA		No	Probabilmente no	Probabilmente si	Si		Varia	Non so
EFFETTI DESIDERABILI		Irrelevanti	Piccoli	Moderati	Grandi		Varia	Non so
EFFETTI INDESIDERABILI		Grandi	Moderati	Piccoli	Irrelevanti		Varia	Non so
QUALITA' DELLE PROVE		Molto bassa	Bassa	Moderata	Alta			Nessuno studio incluso
VALORI		Importante incertezza o variabilità	Probabilmente importante incertezza o variabilità	Probabilmente nessuna importante incertezza o variabilità	Nessuna importante incertezza o variabilità			
BILANCIO DEGLI EFFETTI		A favore del confronto	Probabilmente a favore del confronto	Non è favorevole né al confronto né all'intervento	Probabilmente a favore dell'intervento	A favore dell'intervento	Varia	Non so
RISORSE NECESSARIE		Costi elevati	Costi moderati	Costi e risparmi irrilevanti	Risparmi moderati	Grandi risparmi	Varia	Non so
QUALITA' DELLE PROVE RELATIVE ALLE RISORSE NECESSARIE		Molto bassa	Bassa	Moderata	Alta			Nessuno studio incluso
COSTO EFFICACIA		A favore del confronto	Probabilmente a favore del confronto	Non è favorevole né al confronto né all'intervento	Probabilmente a favore dell'intervento	A favore dell'intervento	Varia	Nessuno studio incluso
EQUITA'	Riduce l'equità	Probabilmente riduce l'equità	Probabilmente nessun impatto sull'equità	Probabilmente aumenta l'equità	Aumenta l'equità	Varia	Non so	
ACCETTABILITÀ	No	Probabilmente no	Probabilmente si	Si		Varia	Non so	
FATTIBILITÀ	No	Probabilmente no	Probabilmente si	Si		Varia	Non so	

TIPO DI RACCOMANDAZIONE

Raccomandazione forte contro l'intervento <input type="radio"/>	Raccomandazione condizionata contro l'intervento <input type="radio"/>	Raccomandazione condizionata per l'intervento o per il confronto <input type="radio"/>	Raccomandazione condizionata a favore dell'intervento <input checked="" type="radio"/>	Raccomandazione forte a favore dell'intervento <input type="radio"/>
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CONCLUSIONI

Raccomandazione

Raccomandazione 36. Si suggerisce, da parte delle Direzioni aziendali, l'identificazione di una figura professionale deputata al coordinamento dei percorsi assistenziali per le persone con trauma maggiore che utilizzano i servizi sanitari.

Il trauma coordinator deve:

- agire come punto di riferimento per i pazienti e per la famiglia, quale intermediario con le diverse figure professionali che hanno in cura il paziente;
- provvedere a fornire le informazioni a paziente e famiglia sulle strategie e i percorsi assistenziali;
- partecipare alle riunioni dello staff;
- farsi portavoce delle richieste del paziente e della famiglia;
- facilitare il percorso del paziente, coordinare la presa in carico globale del paziente da parte dei diversi professionisti, cercando di risolvere eventuali difficoltà e contribuendo a ridurre i tempi di ricovero.
- garantire la continuità assistenziale pianificando tempestivamente le necessità di riabilitazione, il percorso di dimissione protetta, tenendo in considerazione i bisogni fisici e psicosociali.

[Raccomandazione condizionata a favore dell'intervento, qualità delle prove molto bassa]

Giustificazione

Il panel ritiene che l'istituzione di una figura di coordinamento del percorso assistenziale del traumatizzato possa facilitare le varie fasi del processo.

Considerazioni relative ai sottogruppi

Considerazioni per l'implementazione

Al momento non vi è un ruolo specifico per il coordinatore del percorso assistenziale del trauma. In alcune regioni sono stati definiti degli incarichi organizzativi funzionali per coordinare attività/percorsi specifici quali ad esempio l'infermiere coordinatore dei trapianti e il bed manager.

Monitoraggio e valutazione

Vista la forte innovatività della raccomandazione proposta, si suggerisce un adeguato monitoraggio dei processi e degli esiti clinico-assistenziali correlabili all'implementazione della figura del Trauma Coordinator.

Priorità della ricerca

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Appendice A – Quesito clinico e strategia di ricerca

Review question: What trauma coordination approach is the most clinically and cost effective?

Population	People who have suspected major trauma and use trauma healthcare services.
Intervention	Trauma service which involves the trauma coordinator in the care of people who have suspected major trauma.
Comparison	Trauma service which does not involve the trauma coordinator in the care of people who have suspected major trauma.
Outcomes	<p>Critical:</p> <ul style="list-style-type: none"> • Mortality • Health-related quality of life (immediate and long term) • Ongoing consequential morbidity <p>Important:</p> <ul style="list-style-type: none"> • Metrics of continuity of care <ul style="list-style-type: none"> ◦ Length of stay (LOS [total across transfers, MTC]) ◦ Adverse incident report severity (red, amber, green) • Time in acute setting • Number of procedures • Time to rehab prescription • ICU LOS • Impact of traumatic event on concurrent morbidities • Patient and carer satisfaction • Staff satisfaction
Study design	RCTs or observational

Search strategy

Medline search terms

1.	(trauma* adj2 (nurse* or coordinat* or co-ordinat* or key worker* or case manag* or lead or keyworker* or administrat*)):ti,ab.
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Embase search terms

1.	(trauma* adj2 (nurse* or coordinat* or co-ordinat* or key worker* or case manag* or lead or keyworker* or administrat*)):ti,ab.
----	---

Cochrane search terms

#1.	(trauma* near/2 (nurse* or coordinat* or co-ordinat* or key worker* or case manag* or lead or keyworker* or administrat*)):ti,ab
-----	--

CINAHL search terms

S1.	(trauma* n2 (nurse* or coordinat* or co-ordinat* or key worker* or case manag* or lead or keyworker* or administrat*))
-----	--

HEED search terms

1.	TI=trauma*
2.	AB=trauma*
3.	CS=1 or 2
4.	TI=co-ordinat* or nurse* or coordinat* or lead or keyworker* or administrat*
5.	AB=co-ordinat* or nurse* or coordinat* or lead or keyworker* or administrat*
6.	TI=key and worker*
7.	AB=key and worker*
8.	TI=case and manag*
9.	AB=case and manag*
10.	CS=4 or 5 or 6 or 7 or 8 or 9
11.	CS=3 and 10

Appendice B – Lista degli studi inclusi e degli studi esclusi con motivazione

Bibliografia degli studi inclusi

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11. Jarrett LA, Emmett M. Utilizing trauma nurse practitioners to decrease length of stay. <i>J Trauma Nurs</i> . 2009 Apr-Jun;16(2):68-72. doi: 10.1097/JTN.0b013e3181ac91c1. PMID: 19543014.

Lista degli studi esclusi con motivazione

Titolo	Anno	Rivista	Autori	Motivo di esclusione
Improving efficiency within a trauma nurse practitioner team	2020	Journal of the American Association of Nurse Practitioners	Atkinson, Shelley and Crutcher Terri, D. and King Joan, E.	Out of scope
The effect of a nurse team leader on communication and leadership in major trauma resuscitations	2014	International emergency nursing	Clements, Alana and Curtis, Kate and Horvat, Leanne and Shaban Ramon, Z.	Wrong population
Impact of Trauma -Certified Registered Nurse Anesthetists Team on Intra-Operative Resuscitation and Postoperative Outcomes of Trauma Patients	2018	The American surgeon	Duchesne, Juan and Majoue, Chad and Duke, Marquinn and Robledo, Rosemarie and Achord, Chad and McHale, Leslie and Davis, Br and y and Nahapetyan, Lusine	Wrong intervention - only management /anesthetists
A Multidisciplinary Approach to Improve Pain Management and Satisfaction in a Trauma Population	2020	Journal of trauma nursing : the official journal of the Society of Trauma Nurses	Elkbuli, Adel and Stotsenburg, Madonna and Epstein, Caroline and Calvert, Kathy and Boneva, Dessy and McKenney, Mark and Deaton, Keri	Wrong intervention - only pain management
The role and impact of the specialist trauma nurse : an integrative review	2015	Journal of trauma nursing : the official journal of the Society of Trauma Nurses	Walter, Elizabeth and Curtis, Kate	Wrong study design (scoping review)
Bridging the Gap: Utilizing a Pediatric Trauma Care Coordinator to Reduce Disparities for Pediatric Trauma Follow-Up Care.	2019	J Trauma Nurs.	McRoberts CM, Bohlen N, Wills HE	No outcome

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SELEZIONE DEGLI STUDI

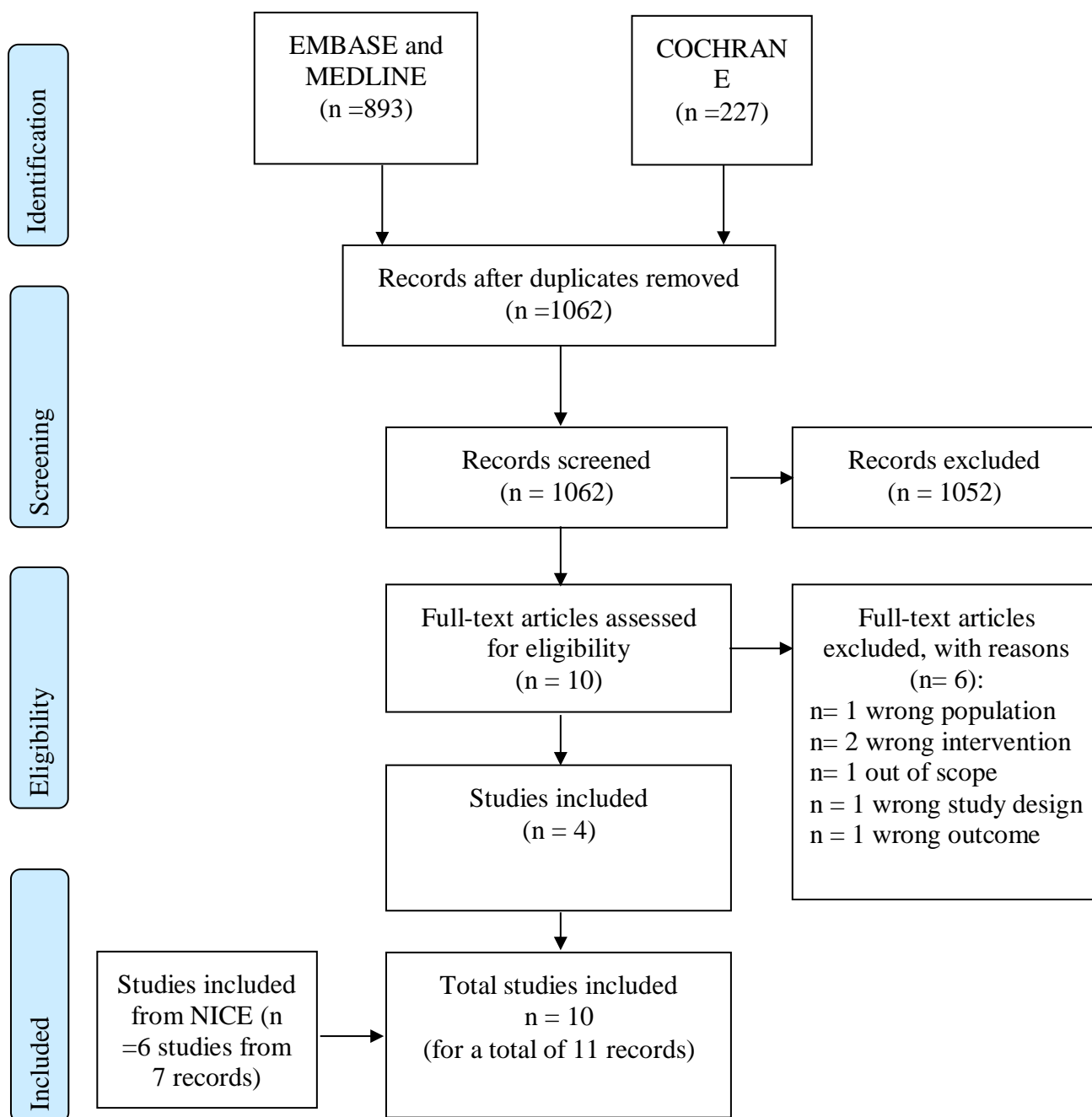


Figure 1. Diagramma di flusso della selezione degli studi.

È stata effettuata un update della revisione sistematica NICE NG40 con ricerca della letteratura sulle banche dati Embase, Medline e Cochrane CENTRAL aggiornata al 31 Marzo 2022. Sono stati individuati 1062 records da cui sono stati selezionati 4 records che soddisfano i criteri di inclusione per rispondere al quesito clinico proposto. Inoltre, la linea guida NICE aveva selezionato al 2015 6 studi derivanti da 7 pubblicazioni.

In totale, sono stati inclusi 10 studi (da 11 pubblicazioni): 1 studio randomizzato e controllato e 9 studi retrospettivi.

La tabella 1, sottostante, riporta le caratteristiche generali degli studi inclusi con le comparazioni indagate.

In totale gli studi permettono di indagare:

- 6 comparazioni differenti nella *popolazione di adulti* con trauma maggiore
 - o Comparazione 1a. Trauma Case Management (TCM) versus no TCM
 - o Comparazione 2a. Certified Nurse Practitioners (CRNP's) vs physician led care
 - o Comparazione 3a. Nurse Practitioner impact on LOS versus LOS values in National Trauma Databank (NTDB)
 - o Comparazione 4a. Trauma nurse practitioners versus hospitalist service
 - o Comparazione 5a. Nurse Practitioners provide in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday–Friday
 - o Comparazione 6a. Trauma Nurse Lead vs no Trauma Nurse Lead

- 1 comparazione nella *popolazione pediatrica* con trauma maggiore
 - o Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only vs physician led care (RES)

Tabella 1. Caratteristiche generali degli studi inclusi.

Study	Intervention and comparison	Population	Outcomes	Comments
Curtis 2002	Trauma Case Management (TCM) 5 days a week versus no TCM	n=476 Study population with ISS<16 and age 15-69 years (inclusive)	<ul style="list-style-type: none"> Total Hospital LOS Ongoing consequential morbidity 	<ul style="list-style-type: none"> Study conducted in Australia Population not necessarily Major Trauma 5 month cohort study
Curtis 2006	TCM 7 days a week versus no TCM	n=1541 Average overall ISS=9 in both groups and age 15-69 years (inclusive)	<ul style="list-style-type: none"> Mortality Number of procedures Total Hospital LOS Ongoing consequential morbidity Time to rehab prescription 	<ul style="list-style-type: none"> Study conducted in Australia Population not necessarily Major Trauma 5 month cohort study
Fanta 2006	Paediatric Trauma Nurse Practitioners (PNP) working weekdays only versus physician led care (RES)	n=76 Paediatric population aged between 2 months and 17 years. Average ISS 4.39 (PNP) and 6.60 (RES)	<ul style="list-style-type: none"> Total Hospital LOS Ongoing consequential morbidity Patient and carer satisfaction Healthcare Staff satisfaction 	<ul style="list-style-type: none"> Study conducted in the USA Serious Indirectness due to low ISS value in both groups Randomised survey study over 8 month period
Haan 2007	Certified Nurse Practitioners (CRNP's) working weekdays versus physician led care (Control)	n=14,040 ISS score>14 in both groups	<ul style="list-style-type: none"> Mortality Number of procedures Total Hospital LOS Time in acute settings 	<ul style="list-style-type: none"> Study conducted in the USA Average ISS >14 so no indirectness 24 month Cohort study
Spisso 1990	Nurse Practitioners (NPs) working 40 hour week (pre-NP) versus physician led care (Post-NP)	n=2615 ISS>13 in both groups. However uncertain if the same population used for all outcomes for example, discharge summaries	<ul style="list-style-type: none"> Ongoing consequential morbidity Number of procedures Total Hospital LOS Patient and carer satisfaction Healthcare Staff satisfaction 	<ul style="list-style-type: none"> Study conducted in the USA Average ISS >13, however may be indirectness 12 month Cohort study
Jarrett 2009	Nurse Practitioner impact on LOS versus LOS values in National Trauma Databank (NTDB)	Population divided into subgroups by ISS score ranges No further details provided	<ul style="list-style-type: none"> Total Hospital LOS 	<ul style="list-style-type: none"> Study conducted in the USA 5 year retrospective study
Hardway 2022	trauma patients managed by trauma nurse practitioners versus hospitalist service	n=574 ISS in groups: TNP service: 6.87 ± 3.34; hospitalists service 6.83 ± 3.24	<ul style="list-style-type: none"> Time in acute setting (ED Length of stay; ED discharge order) Number of procedures (Average number of 	<ul style="list-style-type: none"> Study conducted in the USA Serious Indirectness due to low ISS value in

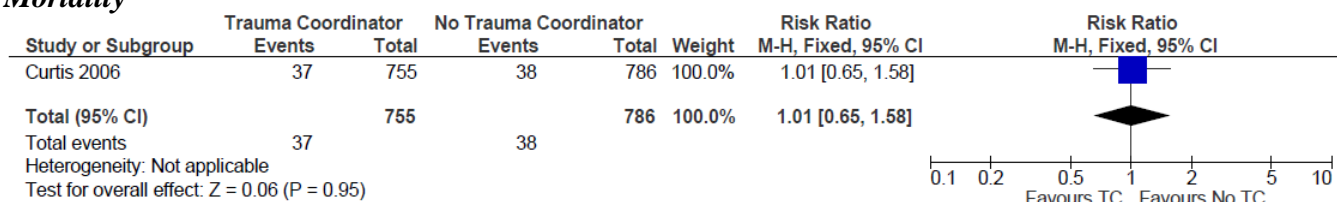
			consult) • Time to surgery	both groups • observational retrospective cohort, 12 months study
Hardway 2021	trauma patients managed by trauma nurse practitioners versus hospitalist service	n=1400 ISS in groups: TNP service: 6.76 ± 3.03 ; hospitalists service 6.84 ± 3.05	• Mortality • Metrics of continuity of care (Length of stay) • Time to rehab prescription • Discharge location • In-hospital complications • Discharge order before noon • 30-days of readmission • Time to surgery	• Study conducted in the USA • Serious Indirectness due to low ISS value in both groups • observational retrospective cohort, 12 months study
Holliday 2018	Nurse Practitioners provide in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday–Friday	n= 3,284 1,088 prior to implementation, 1,009 during the 12 months of implementation, and 1,187 in the first 12 months following implementation of the NP service ISS significantly declined over the study period (13.09 vs. 12.08 vs. 11.77, p=0.000)	• Metrics of continuity of care (Hospital LOS) • Time to place rehabilitation consult • ICU length of stay • Discharge order before noon • 30-day re-admission • Missing injuries • Unplanned ICU admission	• Study conducted in the USA • Average ISS <13, may be indirectness • Retrospective study between September 2012 and August 2015, three periods of evaluation
Polovitch 2019	Trauma Nurse Lead versus no Trauma Nurse Lead	n= 9625 pre-TNL program implementation patients (n = 5,328) and post-TNL program implementation patients (n = 4,297). ISS median of 5 in both groups.	• Mortality • Metrics of continuity of care (Hospital length of stay) • ICU length of stay	• Study conducted in the USA • Serious Indirectness due to low ISS value in both groups • Retrospective study pre-TNL (January 2014–August 2015) and post-TNL (September 2015–December 2016).

A. Popolazione: adulti

Comparazione 1a. Trauma Case Management (TCM) versus no TCM

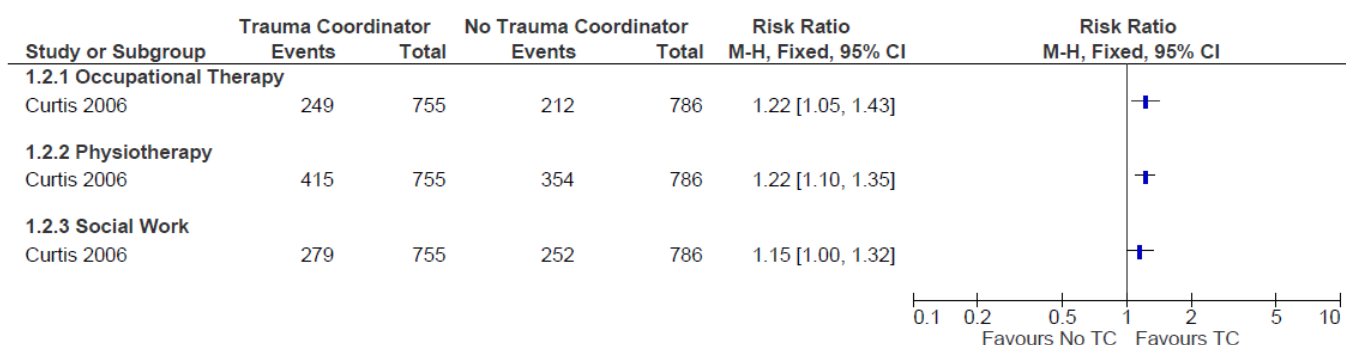
Due studi, Curtis 2002 e Curtis 2006, valutano l'efficacia del Trauma Case Management. Nello specifico, Curtis 2002 valuta il TCM applicato per 5 giorni a settimana mentre Curtis 2006 per 7 giorni su 7.

Mortality



Ongoing consequential morbidity

Number of people receiving Allied Health Intervention



Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

o Length of stay (LOS [total across transfers, MTC])

Total Hospital stay

Curtis 2002 reported Median LOS data along with corresponding p values, subcategorised into overall LOS values, LOS values for patients with ISS 8-15 and LOS data for patients over the age of 50 years. These are given below:

Outcome	TCM Group	Control	p value
Overall LOS value (days)	3	4	0.606
LOS ISS 8-15(days)	3	5	0.712
LOS age >50 years (days)	4	6	0.084

Curtis 2006 reported the median LOS to be unchanged in both the TCM and control groups in the age groups of 15 years and age 15-44 years. The data for all the groups as well as the overall value for LOS are shown below:

Age Group (years)	TCM Group	Control	p value
Age 15	2	2	0.05
Age 15-44	4	4	0.753
Age 45-64	5	7	0.353
Age>64	10	9	0.243
Overall	5	4	0.423

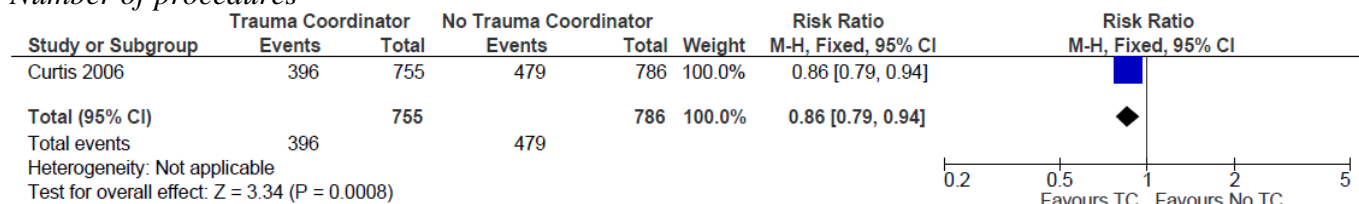
o Adverse incident report severity (red, amber, green)

Time in acute setting

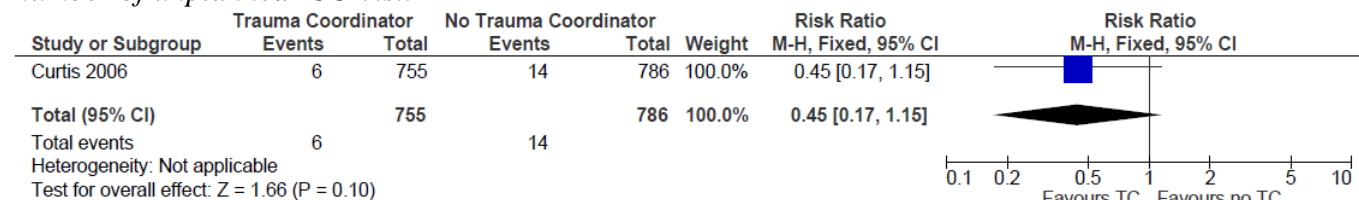
No outcome data

Number of procedures

Number of procedures



Number of unplanned ICU visit



Time to rehab prescription

No outcome data

ICU LOS

No outcome data

Impact of traumatic event on concurrent morbidities

No outcome data

Patient and carer satisfaction

No outcome data

Staff satisfaction

No outcome data

Other outcomes

Unexpected readmissions per 100 discharges

Curtis 2002 reported a reduction in both the unexpected readmissions per 100 live discharges as well as unexpected readmission to the ICU per 100 ICU discharges in the CRNP group compared with the control group. The values are given below:

Parameter	CRNP Group	Control Group
Unexpected readmissions per 100 live discharges	1.1	3.2
Unexpected readmission to the ICU per 100 ICU discharges	3.3	7.7

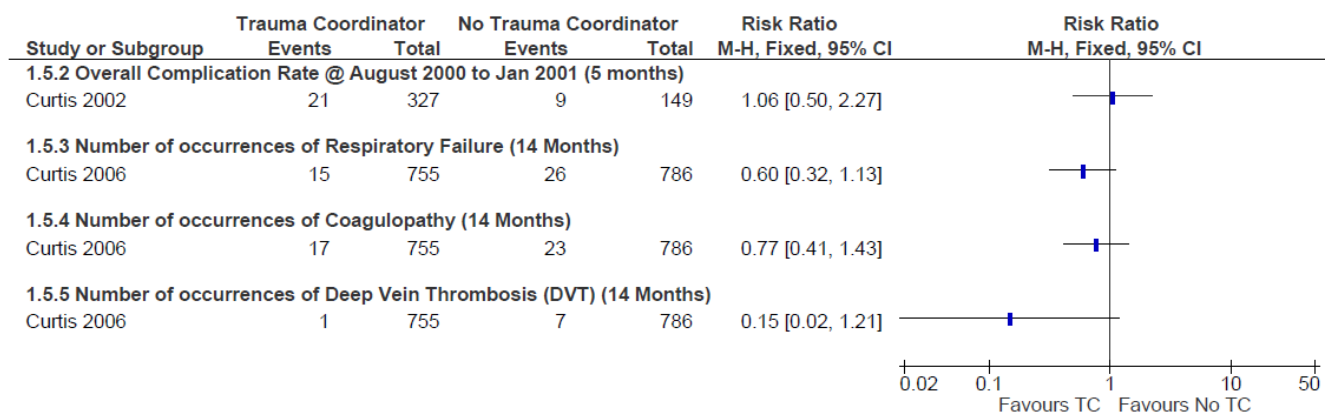
Days to allied health intervention

Curtis 2006 reported a reduction in median days to Allied Health intervention in the TCM group compared with the control except in the case of Social Work where the days to intervention remained the same as shown below:

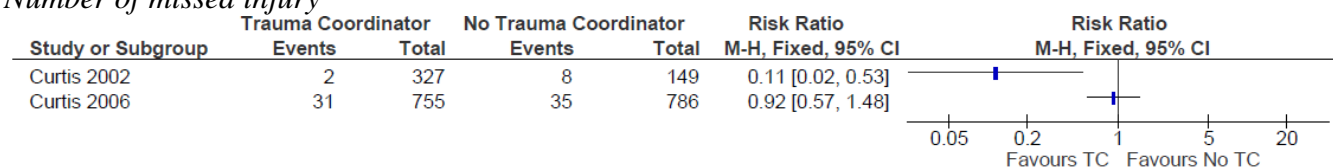
Allied Health Group	TCM Group	Control Group	p value
Physiotherapy	1.5	1.9	0.036
Occupational Therapy	3.5	5	0.004
Social Work	3	3	0.445

Curtis 2002 also reported a reduction in the days to Allied Health Intervention from 3.25 days in the control group to 2.71 days in the TCM group with a reported p value of 0.625.

Number of occurrences of complications



Number of missed injury



Comparazione 2a. Certified Nurse Practitioners (CRNP's) vs physician led care

Due studi rispondono alla comparazione di interesse: Haan 2007, che valuta un programma con Certified nurse practitioners working weekdays e Spisso 1990 che valuta un programma con Certified Nurse practitioner working 40 hours.

Mortality

Deaths per 100 admissions

Haan 2007 reported a reduction in the deaths per 100 admissions in the Trauma Coordinator group (CRNP) group compared with the control group. This was reported to be 4.2 in the CRNP group and 4.7 in the control group.

Ongoing consequential morbidity

No outcome data

Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

- o Length of stay (LOS [total across transfers, MTC])

Total Hospital stay

Haan 2007 reported both the Average LOS and the LOS for patients admitted for greater than 24 hours to be higher in the CRNP than in the control group. The Average LOS was 8.2 in the CRNP group compared with 7.5 in the control group. No standard deviations or p values were reported.

Spisso 1990 reported a reduction in the trauma patient hospital LOS by an average of 1.05 days (from 8.10 days in the pre-NP group to 7.05 in the NP group). No standard deviations or p values were reported.

o Adverse incident report severity (red, amber, green)

No outcome data

Time in acute setting

No outcome data

Number of procedures

No outcome data

Time to rehab prescription

No outcome data

ICU LOS

No outcome data

Impact of traumatic event on concurrent morbidities

No outcome data

Patient and carer satisfaction

No outcome data

Staff satisfaction

Spisso 1990 evaluated the role of the NP using a standard evaluation tool by a sample of randomly chosen registered nurse hospital staff. Of the 30 nurses surveyed, the proportion shown below felt that the NP role was very effective in the following areas:

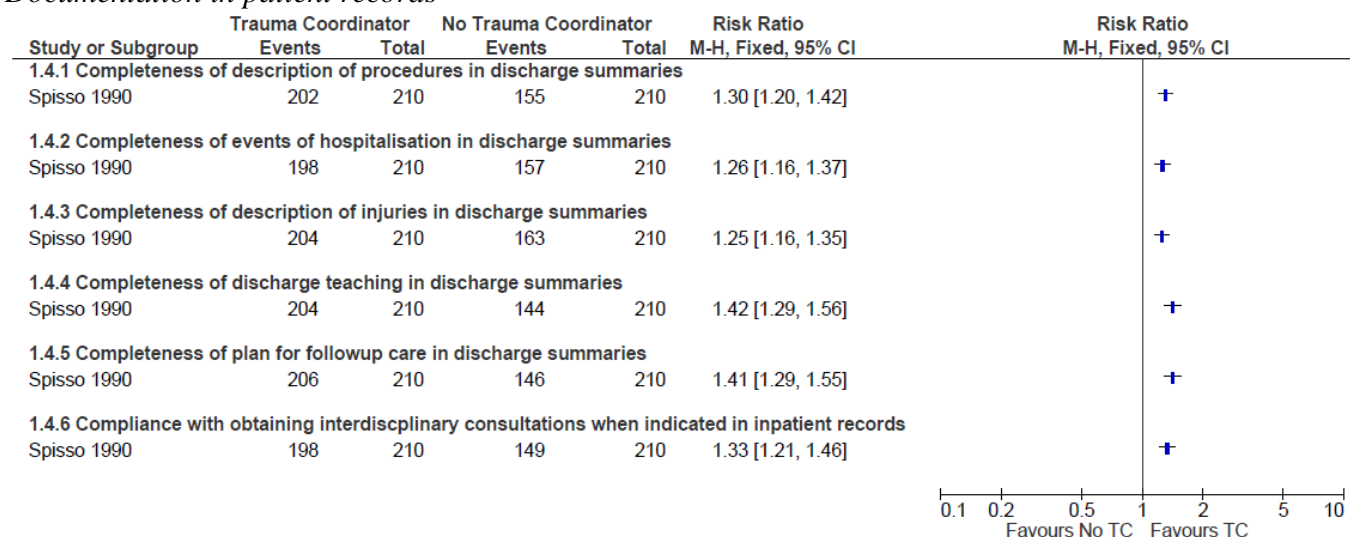
How effective is the role in:	Very effective	
Discharging patients	93%	28/30
Interaction with patients and family on plan of care	97%	29/30
Performing extended role procedures	60%	18/30
Interacting with RN staff and providing liaison with physicians	97%	29/30

Other outcome

Number of hours that MTC was on bypass

Haan 2007 also reported that the number of hours the trauma centre was unable to accept new admissions (bypass status) was much lower in the CRNP group (3.5 hours) compared with 10 hours in the control group

Documentation in patient records



Comparazione 3a. Nurse Practitioner impact on LOS versus LOS values in National Trauma Databank (NTDB)

Uno studio riporta dati sulla comparazione di interesse: Jarrett 2009.

Mortality

No outcome data

Ongoing consequential morbidity

No outcome data

Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

- o Length of stay (LOS [total across transfers, MTC])

Total hospital stay

Jarrett 2009 reported the LOS data for Charleston Area Medical Centre (CAMC) for three different years (from 2001-2006) by dividing the patients in two subgroups of ISS ranges. LOS data was reported separately for patient with ISS scores ranging from 16-24 and 25-74 for the years 2001, 2004 and 2006 respectively. The total number of patients and the number of patients in each arm were not reported at all in this low quality study. The results reported are shown below:

ISS score	Average LOS 2001	Average LOS 2004	Average LOS 2006
ISS range 16-24	8.7	8.7	7.1
ISS range 25-74	14.7	11.6	13.8

Also reported in the study was LOS data for the trauma centre (CAMC) compared against LOS data held in a national trauma database. The benchmark utilised by the CAMC to measure LOS is the 'National Trauma Data Bank (NTDB)'. It is not clear if the data held in the NTDB database is representative of data for LOS in MTC's functioning without trauma coordinators and is therefore a valid as our control group (no trauma coordinator). The results show a reduction in LOS for the trauma centre compared with the national database in the subgroup of patients with ISS 16-24. The results are reported are as below:

ISS score	CAMC LOS (2001-2006)	NTDB LOS (2001-2006)
ISS range 16-24	8.22	8.5
ISS range 25-74	13.4	13.3

- o Adverse incident report severity (red, amber, green)

No outcome data

Time in acute setting

No outcome data

Number of procedures

No outcome data

Time to rehab prescription

No outcome data

ICU LOS

No outcome data

Impact of traumatic event on concurrent morbidities

No outcome data

Patient and carer satisfaction

No outcome data

Staff satisfaction

No outcome data

Comparazione 4a. Trauma nurse practitioners versus hospitalist service

Due studi osservazionali riportano dati in merito alla comparazione di interesse: Hardway 2022 e Hardway 2021.

Mortality

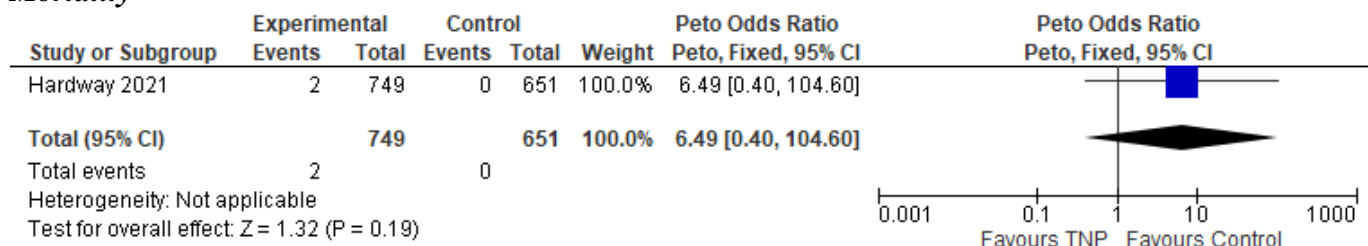


Figure. In-hospital mortality

Ongoing consequential morbidity

No outcome data

Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

o Length of stay (LOS [total across transfers, MTC])

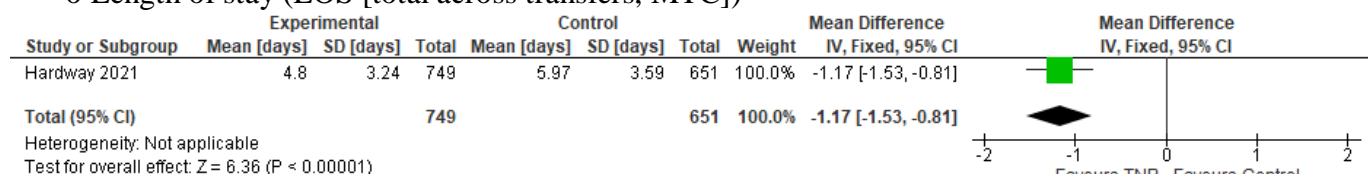


Figure. Hospital length of stay (days)

o Adverse incident report severity (red, amber, green)

No outcome data

Time in acute setting

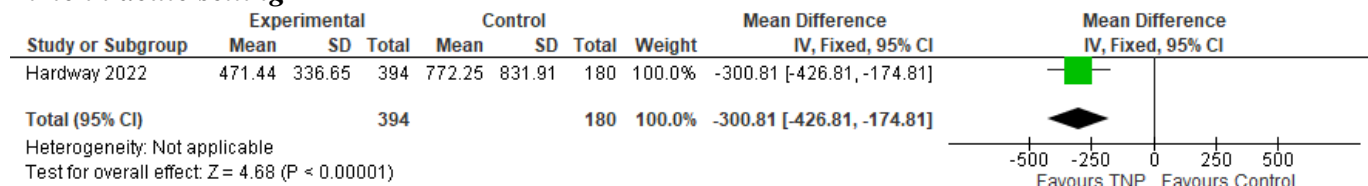


Figure. ED Length of stay

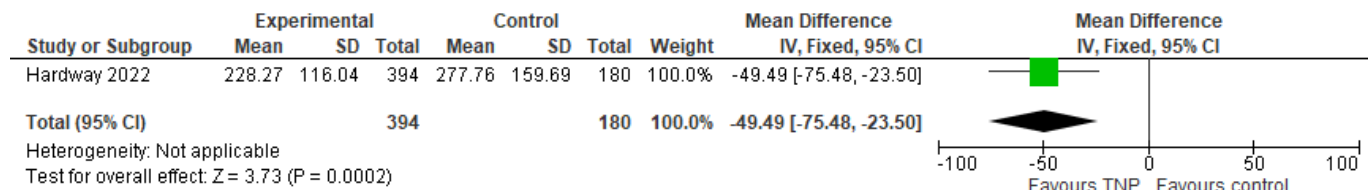


Figure. ED discharge order (min)

Number of procedures

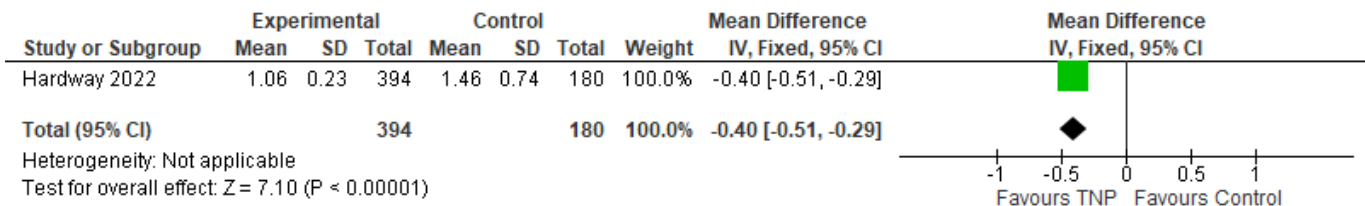
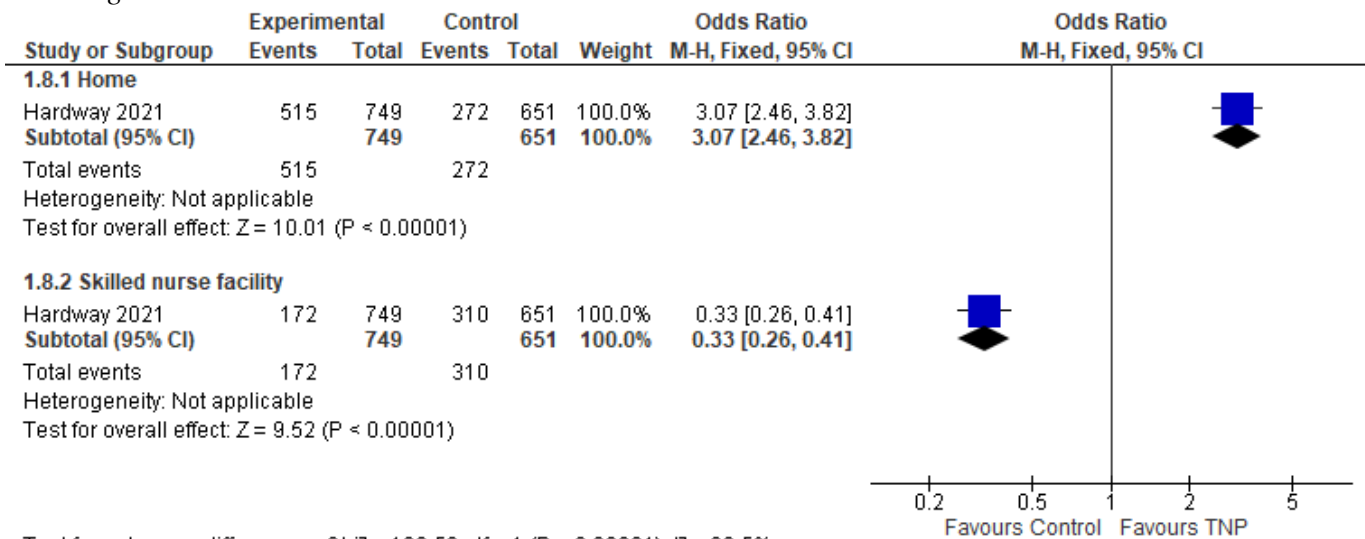


Figure. Average number of consult.

Time to rehab prescription

Discharge location



ICU LOS

No outcome data

Impact of traumatic event on concurrent morbidities

No outcome data

Patient and carer satisfaction

No outcome data

Staff satisfaction

No outcome data

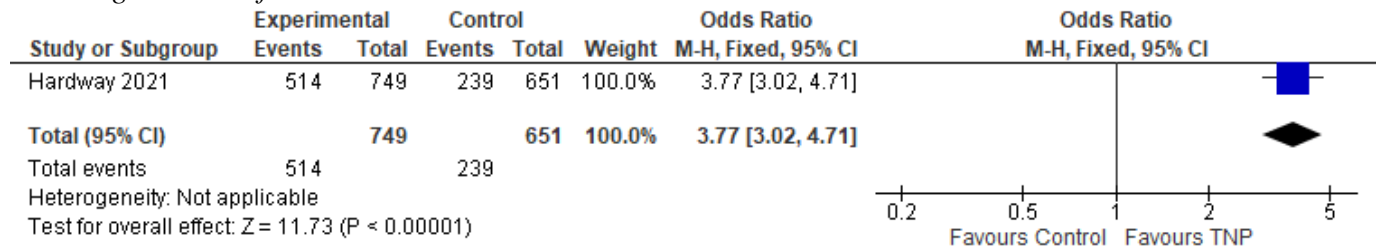
Other outcomes

In-hospital complications (Hardway 2021)

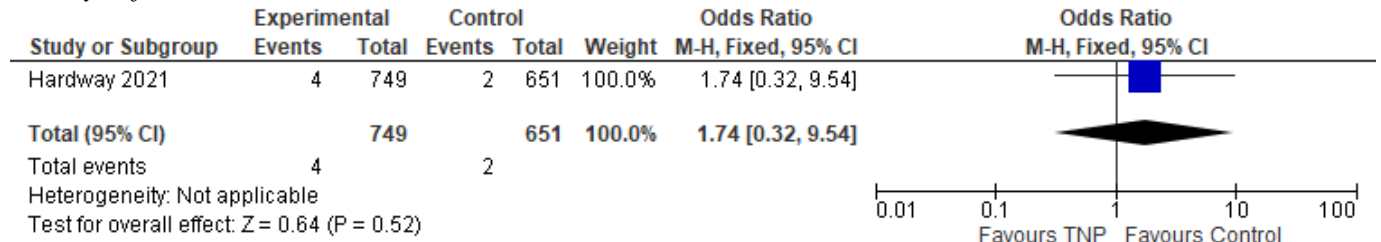
Complications	TNP Service	Hospitalist Service	p
	N = 749	N = 651	
Hematological	64 (8.5%)	6 (0.9%)	<.001
Acute kidney injury	3 (0.4%)	7 (1.1%)	.397
Cardiovascular	20 (2.7%)	23 (3.5%)	.764
Infection	9 (1.2%)	15 (2.3%)	.743
Venous thromboembolism	2 (0.3%)	0 (0.0%)	.991
Pulmonary	4 (0.5%)	5 (0.8%)	.464
Genitourinary	4 (0.5%)	1 (0.2%)	.213
Musculoskeletal and integumentary	1 (0.1%)	0 (0.0%)	.989
Substance withdrawal	2 (0.3%)	0 (0.0%)	.990
Gastrointestinal	0 (0.0%)	1 (0.2%)	.997
Neurological	1 (0.1%)	0 (0.0%)	.982

Note. TPN = trauma nurse practitioner. Bold face indicates statistical significance p ≤ .05.

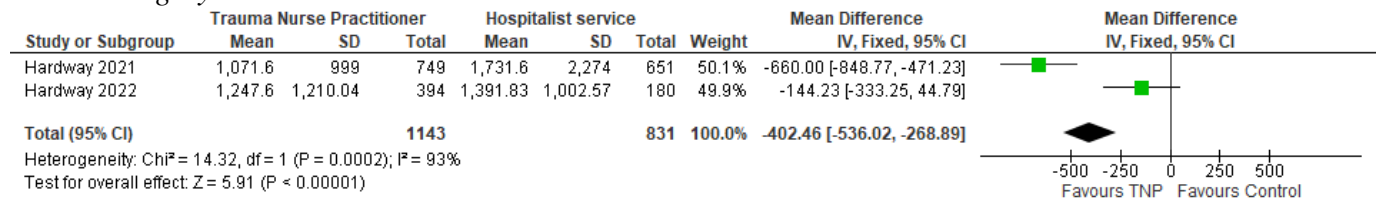
Discharge order before noon



30-days of readmission



Time to surgery



Comparazione 5a. Nurse Practitioners provide in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday–Friday

Uno studio risponde alla comparazione di interesse: Holliday 2018. L'autore valuta gli effetti dell'implementazione della copertura di 7 giorni da parte di una nurse practitioner in tre tempi diversi: prima dell'implementazione, durante e dopo l'implementazione.

Mortality

No outcome data

Ongoing consequential morbidity

No outcome data

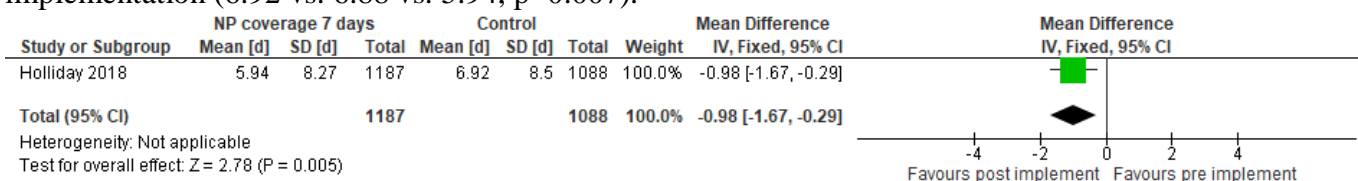
Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

- o Length of stay (LOS [total across transfers, MTC])

Hospital LOS significantly declined over time. During the year of NP service implementation, hospital LOS decreased by 0.04 days and it further declined by 0.98 days in the first year following implementation (6.92 vs. 6.88 vs. 5.94, $p=0.007$).



- o Adverse incident report severity (red, amber, green)

No outcome data

Time in acute setting

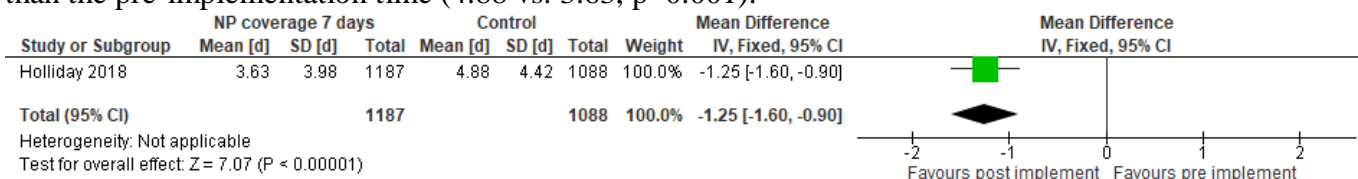
No outcome data

Number of procedures

No outcome data

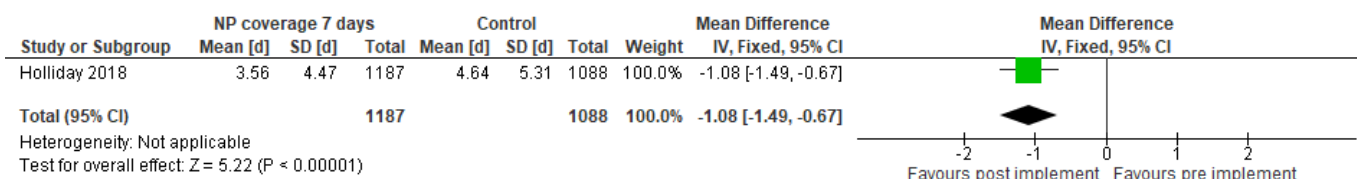
Time to rehab prescription

The time from admission to placement of rehabilitation consultations also significantly improved following NP service implementation (4.88 vs. 2.66 vs. 3.63, $p=0.000$). Although the time to rehabilitation consult increased during the first year post-implementation, it remained significantly lower than the pre-implementation time (4.88 vs. 3.63, $p=0.001$).



ICU LOS

ICU LOS significantly decreased (4.64 vs. 4.27 vs. 3.56, $p=0.001$) during the study periods.



Impact of traumatic event on concurrent morbidities

No outcome data

Patient and carer satisfaction

No outcome data

Staff satisfaction

No outcome data

Other outcomes

Discharge order before noon

Discharge orders placed before noon also significantly improved over the course of the study (47.0% vs. 50.3% vs. 64.3%, p=0.000). (Table below).

30-day re-admission

Changes in thirty-day readmission (3.8% vs. 3.1% vs. 2.0%, p=0.078) improved but did not reach statistical significance. (Table below).

Missing injuries

Missed injury rate (1.0% vs. 0.4% vs. 0.3%, p=0.061) improved, but did not reach statistical significance. (Table below).

Unplanned ICU admission

Rates of unplanned ICU admissions did not significantly change (Table below).

	Sep 2012 to Aug 2013 (N=1088)	Sep 2013 to Aug 2014 (N=1009)	Sep 2014 to Aug 2015 (N=1187)	P-Value
Hospital length of stay <i>d</i>	6.92±8.50	6.88±9.13	5.94±8.27	0.007
ICU length of stay <i>d</i>	4.64±5.31	4.27±5.17	3.56±4.47	0.001
Time to place rehabilitation consult <i>d</i>	4.88±4.42	2.66±3.19	3.63±3.98	0.000
30-day readmission	3.8%	3.1%	2.0%	0.078
Missed injury rate	1.0%	0.4%	0.3%	0.061
Unplanned ICU admission	3.0%	3.5%	2.2%	0.346
Discharge order placed before noon	47.0%	50.3%	64.3%	0.000

Boldface indicates statistical significance (p≤0.05)

Complications

	Sep 2012 to Aug 2013 (N=1088)	Sep 2013 to Aug 2014 (N=1009)	Sep 2014 to Aug 2015 (N=1187)	P-Value
Pneumonia	8.6%	8.3%	5.1%	0.002
Urinary tract infection	2.5%	4.1%	2.6%	0.125
Surgical site infection/deep surgical infection	0.9%	0.7%	0.8%	0.806
Acute renal failure	4.5%	4.5%	3.0%	0.084
Deep vein thrombosis	3.4%	3.5%	1.9%	0.028
Pulmonary embolism	1.2%	0.7%	0.8%	0.454
Sepsis	0.9%	1.7%	0.8%	0.135

Boldface indicates statistical significance (p≤0.05)

Comparazione 6a. Trauma Nurse Lead vs no Trauma Nurse Lead

Uno studio risponde alla comparazione di interesse: Polovitch 2019.

Mortality

The mortality rate of the two comparison groups remained equivalent ($p = .934$).

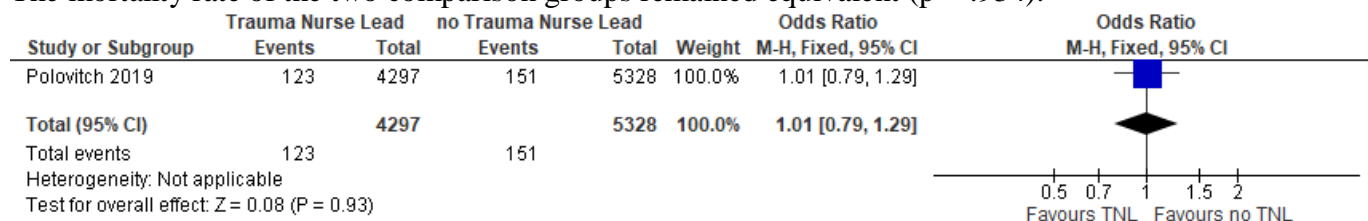


Figure. Forest plot of mortality.

Ongoing consequential morbidity

No outcome data

Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

o Length of stay (LOS [total across transfers, MTC])

Hospital LOS

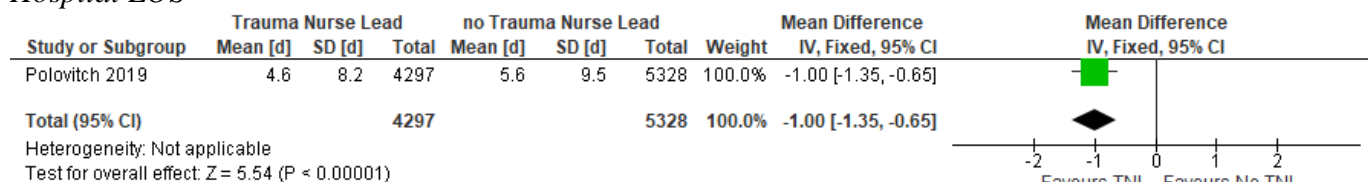


Figure. Forest plot of Hospital length of stay, days (d).

o Adverse incident report severity (red, amber, green)

No outcome data

Time in acute setting

No outcome data

Number of procedures

No outcome data

Time to rehab prescription

No outcome data

ICU LOS

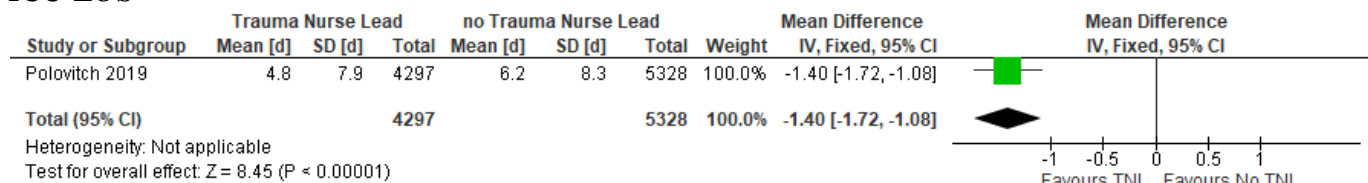


Figure. Forest plot of ICU length of stay, days (d).

Impact of traumatic event on concurrent morbidities

No outcome data

Patient and carer satisfaction

No outcome data

Staff satisfaction

No outcome data

B. Popolazione: pediatrica

Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only vs physician led care (RES)

Uno studio riporta la comparazione di interesse: Fanta 2006.

Mortality

No outcome data

Ongoing consequential morbidity

No outcome data

Health-related quality of life (immediate and long term)

No outcome data

Metrics of continuity of care

- o Length of stay (LOS [total across transfers, MTC])

The LOS was significantly higher in the RES group.

Table 4 LOS, ISS, and cost of patient care

	PNP (n = 31)	RES (n = 45)	P
LOS (d)	1.03 ± 0.18 ^a	1.31 ± 0.73	.042
ISS	4.39 ± 2.99	6.60 ± 4.95	.076
Hospital charges (US\$)	5540 ± 3061	6556 ± 4220	.255

Values are presented as mean ± SD.

^a Statistically significant for $P < .05$.

Study or Subgroup	Trauma Coordinator			No Trauma Coordinator			Weight	Mean Difference IV, Fixed, 95% CI	Mean Difference IV, Fixed, 95% CI
	Mean	SD	Total	Mean	SD	Total			
Fanta 2006	1.03	0.18	31	1.31	0.73	45	100.0%	-0.28 [-0.50, -0.06]	
Total (95% CI)			31			45	100.0%	-0.28 [-0.50, -0.06]	

Heterogeneity: Not applicable
Test for overall effect: $Z = 2.47$ ($P = 0.01$)

- o Adverse incident report severity (red, amber, green)

No outcome data

Time in acute setting

No outcome data

Number of procedures

No outcome data

Time to rehab prescription

No outcome data

ICU LOS

No outcome data

Impact of traumatic event on concurrent morbidities

No outcome data

Parent and carer satisfaction

Fanta 2006 asked caregivers (any parent or guardian of a child included in the study) to complete a family satisfaction survey. The Survey addressed the technical and interpersonal skills, information provision, and availability of the PNP or RES groups. Responses to the 14 questions on the overall parent satisfaction questionnaire were coded from 1-5, higher scores indicating greater satisfaction. These are shown below. Mann-Whitney U test was used to compare scores for individual questions.

Satisfaction of care	PNP Group rating	RES Group rating
Knowledge and experience of child's illness	4.17	4.21
Treat and medical follow-up	4.33	4.28
Attention to child's physical problems	4.44	4.24
Willingness to listen to concerns	4.61	4.34
Comfort and support given to child	4.56	4.45
Information given about child's injury	4.67	4.34
Information given about child's medical tests	4.50	4.14
Information given about child's treatment	4.56	4.17
Frequency of visits	4.39	4.00
Time devoted to visits	4.3	4.17
Follow-up	4.0	4.00
Control of Pain	4.39	4.29

Staff satisfaction

This outcome is reported in a separate paper (Shebesta 2006) that has been merged with Fanta 2006 and measures nursing staff satisfaction with the care provided by a Paediatric Nurse Practitioner (PNP). If child was hospitalised for more than one day, a randomisation table was used to choose a nurse who would be asked to fill out a survey to have one nurse survey per patient.

The survey measured the nurse's perception of the child's care and of the child's primary health provider before discharge from the hospital or after transfer to another surgical/medical service .It addressed the technical and interpersonal skills, information provision and the availability of the PNP or Resident Clinician. The nurse was asked to rate the satisfaction of each element to the patient care they received from the PNP or Resident Clinician on a 5 point scale; higher scores indicating greater satisfaction. Mann-Whitney U test was used to compare scores for individual questions and the standard deviations are given in brackets.

Satisfaction of care	PNP Rating Mean Score (SD)	RES Rating Mean Score (SD)
Knowledge and experience of the child's illness	4.26 (0.682)	3.45 (0.833)
Treat and medical follow-up	4.23 (0.617)	3.52 (0.755)
Attention to the child's physical problems	4.26 (0.815)	55 (0.938)
Comfort and support given to the child	4.19 (0.703)	3.29 (0.938)
Information given about the child's injury	4.16 (0.820)	.97 (1.07)
Information given about the child's medical tests	3.93 (0.740)	2.91 (1.13)
Information given about the child's treatment	16 (0.860)	4.309 (1.08)
Frequency of visit/consultation	4.25 (0.928)	3.06 (0.914)
Time devoted to visit/consultation	4.19 (0.749)	3.16 (0.820)
Management of child's pain	4.10 (0.481)	3.61 (0.747)
Response time to pages/questions	4.43 (0.626)	3.40 (1.03)

Appendice D – Valutazione della qualità metodologica degli studi inclusi

Valutazione della qualità metodologica RCT

Fanta 2006

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	HIGH RISK	“Patients were randomized prospectively based on the day of the week they were admitted to the hospital”
Allocation concealment (selection bias)	HIGH RISK	“Patients who met inclusion criteria were placed in the RES group (postgraduate year [1-3]) if they were admitted on Friday, Saturday, or Sunday or were placed in the PNP group if they were admitted on Monday, Tuesday, Wednesday, or Thursday”
Selective reporting (reporting bias)	LOW RISK	“Caregiver consent was obtained for each child according to a protocol approved by the institutional review board of Cincinnati Children’s Hospital and Medical Center (approval no. 03-2-3)”
Other source of bias	UNCLEAR RISK	No information for judgement
Blinding of participants and personnel (performance bias)	HIGH RISK	“Patients who met inclusion criteria were placed in the RES group (postgraduate year [1-3]) if they were admitted on Friday, Saturday, or Sunday or were placed in the PNP group if they were admitted on Monday, Tuesday, Wednesday, or Thursday”
Blinding of outcome assessment (detection bias)	UNCLEAR RISK	No information for judgement
Incomplete outcome data (attrition bias)	HIGH RISK	“no information for adverse outcomes during hospitalization”

Valutazione della qualità metodologica (Pre-Post) Studies With No Control Group

CRITERIA	Holliday 2018	Polovitch 2019	Haan 2007	Curtis 2006	Curtis 2002	Spisso 1990
1. Was the study question or objective clearly stated?	yes	yes	yes	yes	yes	yes
2. Were eligibility/selection criteria for the study population prespecified	yes	no	yes	yes	yes	yes

and clearly described?						
3. Were the participants in the study representative of those who would be eligible for the test/service/intervention in the general or clinical population of interest?	yes	yes	yes	yes	yes	yes
4. Were all eligible participants that met the prespecified entry criteria enrolled?	yes	cannot determine	yes	yes	yes	yes
5. Was the sample size sufficiently large to provide confidence in the findings?	yes	yes	yes	no	no	no
6. Was the test/service/intervention clearly described and delivered consistently across the study population?	yes	no	yes	yes	yes	yes
7. Were the outcome measures prespecified, clearly defined, valid, reliable, and assessed consistently across all study participants?	yes	yes	yes	yes	yes	yes
8. Were the people assessing the outcomes blinded to the participants' exposures/interventions?	no	no	no	no	no	no
9. Was the loss to follow-up after baseline 20% or less? Were those lost to follow-up accounted for	not reported	not reported	not reported	not reported	not reported	yes

in the analysis?						
10. Did the statistical methods examine changes in outcome measures from before to after the intervention? Were statistical tests done that provided p values for the pre-to-post changes?	yes	yes	no	yes	yes	no
11. Were outcome measures of interest taken multiple times before the intervention and multiple times after the intervention (i.e., did they use an interrupted time-series design)?	no	no	no	no	no	no
12. If the intervention was conducted at a group level (e.g., a whole hospital, a community, etc.) did the statistical analysis take into account the use of individual-level data to determine effects at the group level?	yes	no	no	no	no	no
	FAIR	POOR	POOR	POOR	POOR	POOR

<https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>

Valutazione della qualità metodologica per studi di corte Newcastle-Ottawa Scale

	Hardway 2022	Hardway 2021	Jarrett 2009
Representativeness of the exposed cohort	*	*	
Selection of the non exposed cohort	*	*	
Ascertainment of exposure	*	*	
Demonstration that outcome of interest was not present at start of study	*	*	
Comparability of cohorts on the basis of the design or analysis	*	*	*
Assessment of outcome			*
Was follow-up long enough for outcomes to occur	*	*	
Adequacy of follow up of cohorts			
	FAIR	FAIR	POOR

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A. Popolazione: adulti

Comparazione 1a. Trauma Case Management (TCM) versus no TCM (Curtis 2002, Curtis 2006)

Outcomes	Nº of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with no TCM	Risk difference with Trauma Case Management (TCM)
Mortality	1541 (1 observational study)	⊕○○○ Very low	RR 1.01 (0.65 to 1.58)	48 per 1.000	0 fewer per 1.000 (17 fewer to 28 more)
Number of people receiving Allied Health Intervention - Occupational Therapy	1541 (1 observational study)	⊕○○○ Very low	RR 1.22 (1.05 to 1.43)	270 per 1.000	59 more per 1.000 (13 more to 116 more)
Number of people receiving Allied Health Intervention - Physiotherapy	1541 (1 observational study)	⊕○○○ Very low	RR 1.22 (1.10 to 1.35)	450 per 1.000	99 more per 1.000 (45 more to 158 more)
Number of people receiving Allied Health Intervention – Social Work	1541 (1 observational study)	⊕○○○ Very low	RR 1.15 (1.00 to 1.32)	321 per 1.000	48 more per 1.000 (0 fewer to 103 more)
Health-related quality of life (immediate and long term) - not measured	-	-	-	-	-
Metrics of continuity of care (Hospital LOS)	(1 observational study)	⊕○○○ Very low ^a	Curtis 2002 reported Median LOS data along with corresponding p values, subcategorised into overall LOS values, LOS values for patients with ISS 8-15 and LOS data for patients over the age of 50 years. Curtis 2006 reported the median LOS to be unchanged in both the TCM and control groups in the age groups of 15 years and age 15-44 years		
Time in acute setting - not measured	-	-	-	-	-
Number of procedures	1541 (1 observational study)	⊕○○○ Very low ^a	RR 0.86 (0.79 to 0.94)	609 per 1.000	85 fewer per 1.000 (128 fewer to 37 fewer)
Number of procedures (Number of unplanned ICU visit)	1541 (1 observational study)	⊕○○○ Very low ^a	RR 0.45 (0.17 to 1.15)	18 per 1.000	10 fewer per 1.000 (15 fewer to 3 more)
Time to rehab prescription - not measured	-	-	-	-	-
ICU Length of stay - not measured	-	-	-	-	-

Outcomes	Nº of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with no TCM	Risk difference with Trauma Case Management (TCM)
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-
Patient and carer satisfaction - not measured	-	-	-	-	-
Staff satisfaction - not measured	-	-	-	-	-

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; RR: risk ratio

GRADE Working Group grades of evidence

High certainty: we are very confident that the true effect lies close to that of the estimate of the effect.

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Explanations

a. Risk of bias and imprecision

Comparazione 2a. Certified Nurse Practitioners (CRNP's) vs physician led care (Haan 2007, Spisso 1990)

Outcomes	N ^o of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with physician led care	Risk difference with Certified Nurse Practitioners (CRNP's)
Mortality	(1 observational study)	⊕○○○ Very low ^a	Haan 2007 reported a reduction in the deaths per 100 admissions in the Trauma Coordinator group (CRNP) group compared with the control group. This was reported to be 4.2 in the CRNP group and 4.7 in the control group.	-	-
Ongoing consequential morbidity - not measured	-	-	-	-	-
Health-related quality of life (immediate and long term) - not measured	-	-	-	-	-
Metrics of continuity of care (Total Hospital stay)	(2 observational study)	⊕○○○ Very low ^a	Haan 2007 reported both the Average LOS and the LOS for patients admitted for greater than 24 hours to be higher in the CRNP than in the control group. The Average LOS was 8.2 in the CRNP group compared with 7.5 in the control group. No standard deviations or p values were reported. Spisso 1990 reported a reduction in the trauma patient hospital LOS by an average of 1.05 days (from 8.10 days in the pre-NP group to 7.05 in the NP group). No standard deviations or p values were reported.	-	-
Time in acute setting - not measured	-	-	-	-	-
Number of procedures - not measured	-	-	-	-	-
Time to rehab prescription - not measured	-	-	-	-	-
ICU Length of stay - not measured	-	-	-	-	-
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-
Patient and carer satisfaction - not measured	-	-	-	-	-
Staff satisfaction	(1 observational study)	⊕○○○ Very low ^a	Of the 30 nurses surveyed, the proportion felt that the NP role was very effective in the following areas: Discharging patients /interaction with patients and family/performing extended role procedures/interacting with staff	-	-

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with physician led care	Risk difference with Certified Nurse Practitioners (CRNP's)

GRADE Working Group grades of evidence

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Explanations - a. Risk of bias and imprecision

Comparazione 3a. Nurse Practitioner impact on LOS versus LOS values in National Trauma Databank (NTDB) (Jarrett 2009)

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with LOS values in National Trauma Databank (NTDB)	Risk difference with Nurse Practitioner impact on LOS
Mortality - not measured	-	-	-	-	-
Ongoing consequential morbidity - not measured	-	-	-	-	-
Health-related quality of life (immediate and long term) - not measured	-	-	-	-	-
Metrics of continuity of care (Hospital length of stay)	(1 observational study)	⊕○○○ Very low ^a		It is not clear if the data held in the NTDB database is representative of data for LOS in MTC's functioning without trauma coordinators and is therefore a valid as our control group (no trauma coordinator). The results show a reduction in LOS for the trauma centre compared with the national database in the subgroup of patients with ISS 16-24.	
Time in acute setting - not measured	-	-	-	-	-
Number of procedures - not measured	-	-	-	-	-
Time to rehab prescription - not measured	-	-	-	-	-
ICU Length of stay - not measured	-	-	-	-	-
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with LOS values in National Trauma Databank (NTDB)	Risk difference with Nurse Practitioner impact on LOS
Patient and carer satisfaction - not measured	-	-	-	-	-
Staff satisfaction - not measured	-	-	-	-	-

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval

GRADE Working Group grades of evidence

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Explanations - a. Risk of bias and imprecision

Comparazione 4a. Trauma nurse practitioners versus hospitalist service (Hardway 2021; Hardway 2022)

Outcomes	Nº of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Hospitalist service	Risk difference with Trauma nurse practitioners
In-hospital mortality	1400 (1 observational study)	⊕○○○ Very low ^{a,b}	OR 6.49 (0.40 to 104.60)	0 per 1.000	0 fewer per 1.000 (0 fewer to 0 fewer)
Ongoing consequential morbidity – not measured	-	-	-	-	-
Health-related quality of life (immediate and long term) – not measured	-	-	-	-	-
Metrics of continuity of care (Hospital LOS)	1400 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean metrics of continuity of care (Hospital LOS) was 5.97	MD 1.17 lower (1.53 lower to 0.81 lower)
Time in acute setting (ED Length of stay)	574 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean time in acute setting (ED Length of stay) was 772.25	MD 300.81 lower (426.81 lower to 174.81 lower)
Time in acute setting (ED discharge order (mins))	574 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean time in acute setting (ED discharge order (mins)) was 277.76	MD 49.49 lower (75.48 lower to 23.5 lower)
Number of procedures (Average number of consults)	574 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean number of procedures (Average number of consults) was 1.46	MD 0.4 lower (0.51 lower to 0.29 lower)
Time to rehab prescription (Discharge location - Home)	1400 (1 observational study)	⊕○○○ Very low ^{a,b}	OR 3.07 (2.46 to 3.82)	418 per 1.000	270 more per 1.000 (221 more to 315 more)
Time to rehab prescription (Discharge location - Skilled nurse facility)	1400 (1 observational study)	⊕○○○ Very low ^{a,b}	OR 0.33 (0.26 to 0.41)	476 per 1.000	245 fewer per 1.000 (285 fewer to 205 fewer)
ICU LOS – not measured	-	-	-	-	-
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-
Patient and carer satisfaction - not measured	-	-	-	-	-

Outcomes	Nº of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Hospitalist service	Risk difference with Trauma nurse practitioners
Staff satisfaction - not measured	-	-	-	-	-

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; MD: mean difference; OR: odds ratio

GRADE Working Group grades of evidence

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Explanations

- a. Serious risk of bias due to outcome assessment and adequacy of follow up
- b. Very serious Indirectness due to low ISS value in both groups

Comparazione 5a. Nurse Practitioners provide in hospital service coverage 7 days a week versus original service model provided in hospital coverage Monday–Friday (Holliday 2018)

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with original service model provided in hospital coverage Monday–Friday	Risk difference with Nurse practitioner coverage 7 days
Mortality - not measured	-	-	-	-	-
Ongoing consequential morbidity - not measured	-	-	-	-	-
Health-related quality of life (immediate and long term) - not measured	-	-	-	-	-
Metrics of continuity of care (Hospital LOS)	2275 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean metrics of continuity of care (Hospital LOS) was 6.92	MD 0.98 lower (1.67 lower to 0.29 lower)
Time in acute setting - not measured	-	-	-	-	-
Number of procedures - not measured	-	-	-	-	-
Time to place rehabilitation consult	2275 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean time to place rehabilitation consult was 4.88	MD 1.25 lower (1.6 lower to 0.9 lower)
ICU length of stay	2275 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean ICU length of stay was 4.64	MD 1.08 lower (1.49 lower to 0.67 lower)
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-
Patient and carer satisfaction - not measured	-	-	-	-	-
Staff satisfaction - not measured	-	-	-	-	-

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; MD: mean difference; OR: odds ratio

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with original service model provided in hospital coverage Monday–Friday	Risk difference with Nurse practitioner coverage 7 days

GRADE Working Group grades of evidence

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Explanations

a. Serious risk of bias

b. Average ISS <13

Comparazione 6a. Trauma Nurse Lead vs no Trauma Nurse Lead (Polovitch 2019)

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with no Trauma Nurse Lead	Risk difference with Trauma Nurse Lead
Mortality	9625 (1 observational study)	⊕○○○ Very low ^{a,b}	OR 1.01 (0.79 to 1.29)	28 per 1.000	0 fewer per 1.000 (6 fewer to 8 more)
Ongoing consequential morbidity - not measured	-	-	-	-	-
Health-related quality of life (immediate and long term) - not measured	-	-	-	-	-
Hospital LOS	9625 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean hospital LOS was 5.6	MD 1 lower (1.35 lower to 0.65 lower)
Time in acute setting - not measured	-	-	-	-	-
Time to rehab prescription - not measured	-	-	-	-	-
Number of procedures - not measured	-	-	-	-	-
ICU LOS	9625 (1 observational study)	⊕○○○ Very low ^{a,b}	-	The mean ICU LOS was 6.2	MD 1.4 lower (1.72 lower to 1.08 lower)

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with no Trauma Nurse Lead	Risk difference with Trauma Nurse Lead
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-
Patient and carer satisfaction - not measured	-	-	-	-	-
Staff satisfaction - not measured	-	-	-	-	-

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; MD: mean difference; OR: odds ratio

GRADE Working Group grades of evidence

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Explanations

a. Serious risk of bias

b. Serious Indirectness due to low ISS value in both groups

B. Popolazione: pediatrica

Comparazione 1b. Paediatric Trauma Nurse Practitioners (PNP) working weekdays only vs physician led care (RES) (Fanta 2006)

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with physician led care (RES)	Risk difference with Paediatric Trauma Nurse Practitioners (PNP) working weekdays only
Mortality - not measured	-	-	-	-	-
Ongoing consequential morbidity - not measured	-	-	-	-	-
Health-related quality of life (immediate and long term) - not measured	-	-	-	-	-
Metrics of continuity of care (length of stay)	76 (1 RCT)	⊕○○○ Very low ^{a,b}	-	The mean metrics of continuity of care (length of stay) was 1.31	MD 0.28 lower (0.5 lower to 0.06 lower)
Time in acute setting - not measured	-	-	-	-	-
Number of procedures - not measured	-	-	-	-	-
Time to rehab prescription - not measured	-	-	-	-	-
ICU Length of stay - not measured	-	-	-	-	-
Impact of traumatic event on concurrent morbidities - not measured	-	-	-	-	-
Parent and carer satisfaction	(1 RCT)	⊕○○○ Very low ^{a,b}		The family caregiver of nurse practitioners' patients also rated the frequency of visits/consultations higher than the family caregiver of the RESs. In addition, the willingness to listen to concerns approached statistical significance, with the nurse practitioners scoring higher	
Staff satisfaction	(1 RCT)	⊕○○○ Very low ^{a,b}		Overall, satisfaction levels were high for both the nurse practitioners and the RESs. Nurse practitioner and RES family caregiver ratings did not differ significantly on 10 of the 14 questions regarding child's care; however, nurse practitioners scored significantly higher on providing information regarding a child's injury, medical tests, and the treatment given.	

Outcomes	№ of participants (studies) Follow-up	Certainty of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with physician led care (RES)	Risk difference with Paediatric Trauma Nurse Practitioners (PNP) working weekdays only

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; MD: mean difference

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Explanations

a. Very serious risk of bias

b. Serious Indirectness due to low ISS value in both groups

Appendice F – Costi e costo-efficacia.

Introduzione

L'obiettivo di questo documento è di presentare le evidenze economiche relative alla stesura delle linee guida sul trauma maggiore con particolare riferimento all'impiego di un trauma coordinator nell'assistenza di pazienti con sospetto trauma maggiore. Finalità di questo documento è di presentare evidenze che supportino il panel di esperti per classificarne la forza secondo la metodica GRADE rispetto a: risorse necessarie, qualità delle prove sulle risorse ed evidenze di costo efficacia.

Metodi

È stata condotta una revisione sistematica della letteratura sulle banche dati pubmed, embase e cochrane con attenzione ai seguenti outcomes: costi, costo-efficacia, net monetary benefit, costo-beneficio, costo-utilità.

Risultati

Selezione degli articoli

La revisione sistematica non ha prodotto lavori eleggibili. In particolare, la stringa di ricerca ha estrapolato 255 lavori di cui 248 sono stati esclusi perché il titolo non era corrente con il PICO, e 7 alla lettura del full text di cui 3 poiché l'outcome non era di tipo economico, 3 poiché out of scope ed 1 poiché non analizzava l'intervento oggetto della clinical question. La Figura 1. mostra i risultati della selezione degli articoli con il diagramma PRISMA relativo al processo di selezione dei lavori.

Risorse necessarie

Al fine di rispondere al quesito in oggetto si rileva la mancanza di dati inerenti il contesto italiano estrapolabili da evidenze di letteratura scientifica.

Si fa dunque riferimento alla metodologia di stima adottata dal NICE che assimila il costo di un trauma coordinator a quello di un infermiere specializzato (nurse specialist) di livello 6 o 7 che corrisponde ad un range compreso fra £ 52 e £ 41 per ora. Inoltre stima 3 unità di personale necessarie a far funzionare la Trauma Unit per 24 ore 7 giorni su 7.

In Italia si può far riferimento al salario medio lordo annuo del personale infermieristico del SSN che è pari ad € 33.317 (1-3). Partendo da tale dato, il costo aziendale è pari a circa €40.000, cioè pari a 19 € orari.

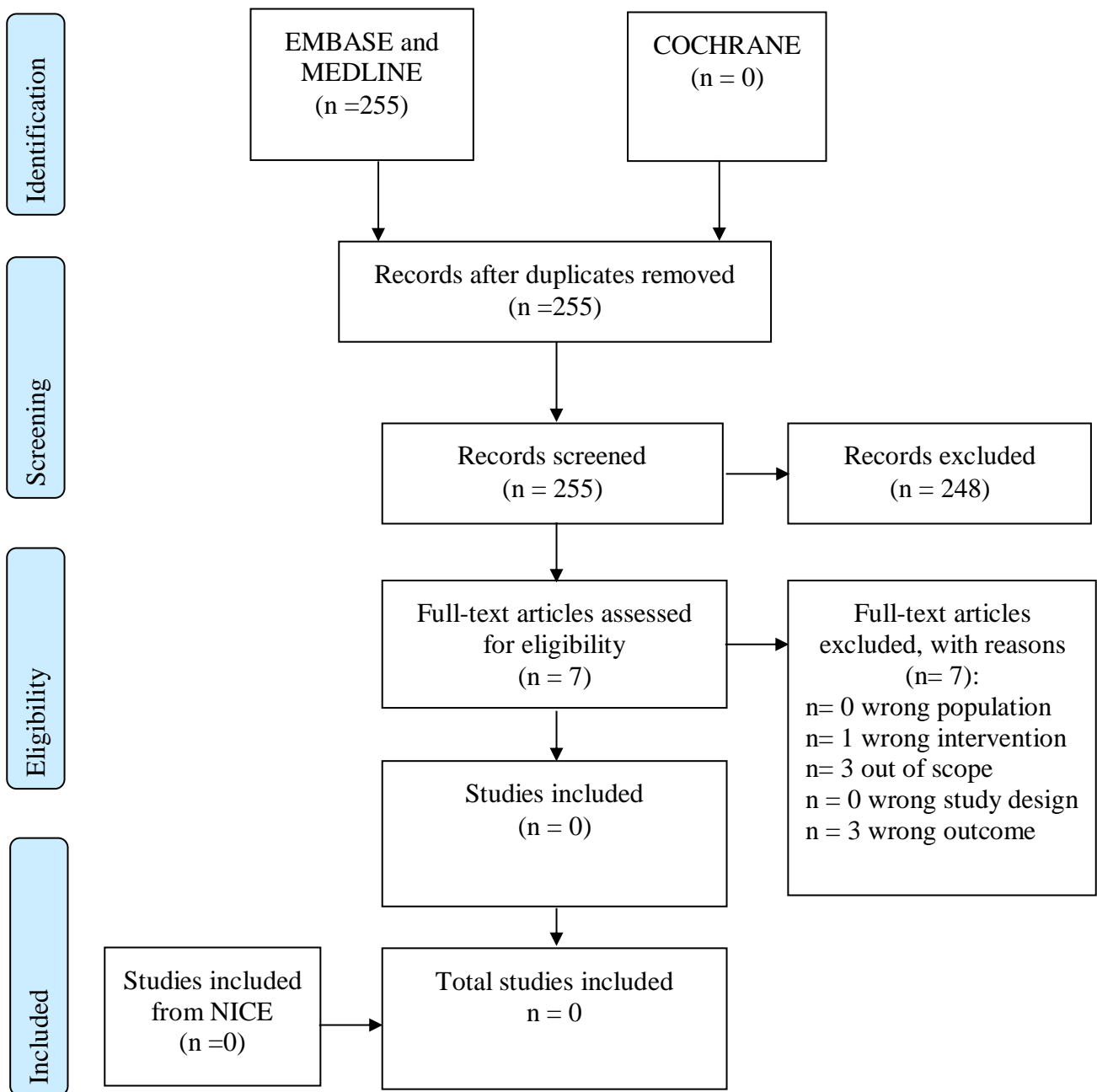
Qualità delle prove su risorse necessarie

Sebbene la base da cui parte la stima del costo del trauma coordinator in Italia sia fondata su statistiche ufficiali (1-3) sul costo del personale infermieristico del SSN, è da notare come la retribuzione considerata (€40.000/anno) possa essere sottostimata in quanto non tiene conto dei livelli di anzianità e di altre indennità.

Costo efficacia

Non sono stati reperiti studi di costo efficacia che potessero essere considerati inerenti al quesito clinico di riferimento.

Figura 1. PRISMA flow chart costo efficacia



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