

AHRQ Systematic Review Surveillance Program

CER #72: Multidisciplinary Postacute Rehabilitation for Moderate to Severe Traumatic Brain Injury in Adults

Original Release Date: June 2012

Surveillance Report: August 2016

Summary of Key Findings from Surveillance Report:

- Key Question 1-5: Original systematic review conclusions are likely current.
- We identified no studies that met inclusion criteria.
- Though this assessment does not assess the currency of the scope of the original review, we note that an expert who declined to participate in the surveillance assessment voiced concerns about the narrow inclusion and exclusion criteria for the original review, and the absence of studies that would meet these criteria.

Signal Assessment: The signal for this report is weak, suggesting that the systematic review is current; however, concern was raised about the original review's scope.

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Conflict of Interest:

None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

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Introduction

The purpose of the surveillance process for the Evidence-based Practice Center (EPC) Program is to determine whether the conclusions of a systematic review are current. The surveillance process examines the conclusions to the key questions as written, and does not evaluate the currency of the original scope (i.e., key questions, included interventions). Approximately 25 systematic reviews are selected for surveillance annually based on popularity, use in obtaining continuing medical education certificates, potential impact for changing the field, and use in clinical practice guidelines.

CER #72, titled *Multidisciplinary Postacute Rehabilitation for Moderate to Severe Traumatic Brain Injury in Adults*, was originally released in June 2012.¹

The key questions for the original systematic review are as follows:

Key Question 1. How have studies characterized multidisciplinary postacute rehabilitation for TBI in adults?

Key Question 2. What is the effectiveness and comparative effectiveness of multidisciplinary postacute rehabilitation for TBI?

- a. Do effectiveness and comparative effectiveness vary by rehabilitation timing, setting, intensity, duration, and composition?
- b. Do effectiveness and comparative effectiveness vary by injury characteristics?
- c. Do effectiveness and comparative effectiveness vary by patient characteristics, preinjury or post-injury?

Key Question 3. What evidence exists to establish a minimum clinically important difference (MCID) in community reintegration as measured by the Mayo-Portland Adaptability Inventory (MPAI) for postacute rehabilitation for TBI in adults?

Key Question 4. Are improvements in outcomes achieved via multidisciplinary postacute rehabilitation for TBI sustained over time?

Key Question 5. What adverse effects are associated with multidisciplinary postacute rehabilitation for TBI?

Our surveillance assessment began in May 2016. We conducted an electronic search for literature published since the end date of the original systematic review. After completing a scan of this literature to identify evidence potentially related to the key questions in this systematic review, we contacted experts involved in the original systematic review to request their opinions as to whether the conclusions had changed.

Methods

Literature Searches

We conducted a literature search of PubMed covering January 2012 to May 2016, using the identical search strategy used for the original review¹ and searching for studies published since the end date of the original systematic review. The search was conducted to assess the

currency of conclusions. This process included selecting journals from among the top 10 journals from relevant specialty subject areas (derived by searching ISI's Journal Citation Reports by relevant disciplinary field[s] and sorting the results by five-year average impact factor from highest to lowest; Appendix A), and among those most highly represented among the references for the original review (Appendix B). The included journals were five high-profile general medical interest journals (Annals of Internal Medicine, British Medical Journal, Journal of the American Medical Association, Lancet, and the New England Journal of Medicine) and five specialty journals (Archives of Physical Medicine and Rehabilitation, Journal of Neurology: Neurosurgery & Psychiatry, Neuropsychological Rehabilitation, The Journal of Head Trauma Rehabilitation, and Journal of Rehabilitation Medicine; Appendix B). The search strategy is reported in Appendix C.

Study Selection

Using the same inclusion and exclusion criteria as the original systematic review (see Appendix D), one investigator reviewed the titles and abstracts of the ten high-impact journal search results (Appendix E). We included systematic reviews and meta-analyses, whether or not they were included (as a study design) in the original systematic reviews. For systematic reviews and meta-analyses, we considered findings only if all included studies met criteria that a) all studies were not included or excluded from the original systematic review, b) all studies were not included in a prior surveillance report (if applicable), and c) all studies met inclusion criteria for the original systematic review. Reviews for which one or more study did not meet our criteria were used to identify potentially relevant primary research. For searches identifying greater than 200 unique titles, we randomly selected a total of 200 articles to examine. For searches identifying greater than 200 unique titles, we randomly selected a total of 200 articles to examine in our assessment of the currency of conclusions in the original systematic review.

Expert Opinion

We shared the conclusions of the original systematic review and most recent surveillance assessment, findings from the literature analysis, and the newly identified studies with 10 experts in the field to request their assessment of the currency of original review conclusions and their recommendations of any relevant new studies. Three subject matter experts responded to our request. Appendix F shows the form experts were asked to complete.

Check for Qualitative Signals

The authors of the original systematic review conducted a synthesis of data examining the prevalence of and screening for depression among individuals with TBI, as well as the concomitant psychiatric conditions, and the short and long term effects of treatment, including differences by subpopulation. We compared the conclusions of the included abstracts to the conclusions of the original systematic review and assessed expert input, horizon scan results, and FDA alert information to identify qualitative signals about the currency of conclusions.

Compilation of Findings and Conclusions

For this assessment we constructed a summary table (Appendix G) that includes the key questions and conclusions from the original systematic review, findings of the new literature search, and the expert assessments that pertained to each key question. We categorized the currency of conclusions using a 3-category scheme:

- Original conclusion is still valid and this portion of the systematic review is likely current
- Original conclusion is possibly out of date and this portion of the systematic review may not be current
- Original conclusion is out of date.

We considered the following factors when making our assessments:

- If we found no new evidence or only confirmatory evidence and all responding experts assessed the systematic review conclusion as still valid, we classified the systematic review conclusion as likely current.
- If we found some new evidence that might change the systematic review conclusion, and /or a minority of responding experts assessed the systematic review conclusion as having new evidence that might change the conclusion, then we classified the systematic review conclusion as possibly not current.
- If we found new evidence that rendered the systematic review conclusion out of date or no longer applicable, we classified the systematic review conclusion as out of date. Recognizing that our literature searches were limited, we reserved this category only for situations where a limited search would produce prima facie evidence that a conclusion was out of date, such as the withdrawal of a drug or surgical device from the market, a black box warning from FDA, etc.

Signal Assessment for Currency of the Systematic Review

We used the following considerations in our assessment of currency of the systematic review:

- **Strong signal:** A report is considered to have a strong signal if new evidence is identified that clearly renders conclusions from the original systematic review out of date, such as the addition or removal of a drug or device from the market or a new FDA boxed warning.
- **Medium signal:** A report is considered to have a medium signal when new evidence is identified which may change the conclusions from the original systematic review. This may occur when abstract review and expert assessment indicates that some conclusions from the original systematic review may not be current, or when it is unclear from abstract review how new evidence may impact the findings from the original systematic review.
- **Weak signal:** A report is considered to have a weak signal if no new evidence is identified that would change the conclusions from the original systematic review. This may occur when no new evidence is identified, or when some new evidence is identified but it is clear from abstract review and expert assessment that the new evidence is unlikely to change the conclusions of the original systematic review.

Results

Literature Search

The literature search identified 146 unique titles from the ten selected high profile general medical and specialty journals (Appendix E). Upon abstract review, all 146 studies were

excluded because they did not meet the original systematic review inclusion criteria (see Appendix D).

Expert Opinion

We shared the conclusions of the original review with 10 experts in the field to request their assessment of the currency of systematic review conclusions and their recommendations of any relevant new studies. Three subject matter experts responded.

All experts believed all conclusions in the original review to be current. Neither expert recommended any studies published since the original review.

Of note, one expert we contacted declined to participate in the surveillance assessment and expressed strong concerns about limitations posed by the narrow inclusion criteria. “Clinical realities and methodologic constraints...limit the kind of ‘Class I’ evidence we would ideally like.” The expert also stated that one of the factors currently constraining evidence development in rehabilitation is the lack of an agreed upon system of defining the structure or treatment components for which evaluation is needed. The expert concluded by stating that the type of research required to meet inclusion criteria is not feasible and/or will not be funded.

Identifying Qualitative Signals

Conclusions related to all Key Questions are likely up to date. However, given that no studies met inclusion criteria, and the concerns about the limitations imposed by the narrow criteria raised by an expert, it is possible that the scope of the review may need to be re-evaluated.

Signal Assessment

The conclusions based on the results of the prior surveillance assessment, literature published since the original report, and expert assessment is that:

- Key Question 1: Original systematic review conclusions are likely current.
- Key Question 2: Original systematic review conclusions are likely current.
- Key Question 3: Original systematic review conclusions are likely current.
- Key Question 4: Original systematic review conclusions are likely current.
- Key Question 5: Original systematic review conclusions are likely current.
- We identified no studies that met inclusion criteria.
- An expert who declined to participate in the surveillance assessment voiced strong concerns about the narrow criteria/scope developed for the original review, and the absence of studies that would meet these criteria.

The signal for this report is weak; however, one expert suggested that the scope of the original systematic review may be too narrow.

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Appendices

Appendix A: Top 10 Journals

Appendix B: Most Cited Journals from Original Systematic Review

Appendix C: Search Strategy

Appendix D: Inclusion and Exclusion Criteria from Original Systematic Review

Appendix E: Literature Search Results

Appendix F: Questionnaire Sent to Expert Reviewers

Appendix G: Summary Table

Appendix A. Top 10 Journals

In the Journal Citation Reports database, the science and social science sections were searched by subject area discipline(s) for each surveillance reports topic area. For each subject area discipline, the list was constructed by selecting the top 10 journals from the 5-year citation impact factor average list. Selected citations were downloaded in .csv format.

Top 10 General Medical:

1. Annals of Internal Medicine
2. Archives of Internal Medicine
3. BMC Medicine
4. The BMJ
5. Journal of Cachexia, Sarcopenia and Muscle
6. JAMA Internal Medicine
7. JAMA
8. Lancet
9. New England Journal of Medicine
10. PLOS Medicine

Top 10 Neurology (Clinical):

1. Annals of Internal Medicine
2. Archives of Internal Medicine
3. BMC Medicine
4. The BMJ
5. Journal of Cachexia, Sarcopenia and Muscle
6. JAMA Internal Medicine
7. JAMA
8. Lancet
9. New England Journal of Medicine
10. PLOS Medicine

Top 10 Behavioral Science:

1. Advances in the Study of Behavior
2. Autism Research
3. Behavioral and Brain Sciences
4. Biological Psychology
5. Cognitive, Affective, & Behavioral Neuroscience
6. Cortex
7. Hormones and Behavior
8. Neurophysiologia
9. Neuroscience Biobehavioral Reviews
10. Trends in Cognitive Sciences

Top 10 Rehabilitation:

1. Archives of Physical Medicine and Rehabilitation
2. Clinical Rehabilitation
3. IEEE Transactions on Neural Systems and Rehabilitation Engineering
4. Journal of Head Trauma Rehabilitation
5. Journal of Neuroengineering and Rehabilitation
6. The Journal of Orthopaedic and Sports Physical Therapy
7. Journal of Physiotherapy
8. Journal of Speech, Language, and Hearing Research
9. Neurorehabilitation and Neural Repair
10. Physical Therapy

Top 10 Psychology:

1. Annual Review of Clinical Psychology
2. Annual Review of Psychology
3. Cognitive Psychology
4. Depression and Anxiety
5. Journal of Child Psychology and Psychiatry, and Allied Disciplines
6. Psychological Bulletin
7. Psychological Medicine
8. Psychological Review
9. Psychotherapy and Psychosomatics
10. Social Cognitive and Affective Neuroscience

Top 10 Psychiatry:

1. The American Journal of Psychiatry
2. Archives of General Psychiatry
3. Biological Psychiatry
4. British Journal of Psychiatry
5. Journal of the American Academy of Child and Adolescent Psychiatry
6. JAMA Psychiatry
7. Molecular Psychiatry
8. Neuropsychopharmacology
9. Schizophrenia Bulletin
10. World Psychiatry

Appendix B. Most Cited Journals from Original Systematic Review

Rank	Journal	# of Citations
1	Archives of Physical Medicine and Rehabilitation	7
2	Journal of Neurology, Neurosurgery & Psychiatry	2
3	JAMA	1
3	The BMJ	1
3	Neuropsychological Rehabilitation	1
3	The Journal of Head Trauma Rehabilitation	1
3	Neuropsychology	1
3	Journal of Rehabilitation Medicine	1
3	Brain Injury	1

Appendix C. Search Strategy

Journals used:

Archives of Physical Medicine and Rehabilitation
 Journal of Neurology, Neurosurgery & Psychiatry
 Neuropsychological Rehabilitation
 The Journal of Head Trauma Rehabilitation
 Journal of Rehabilitation Medicine
 Annals of internal medicine
 BMJ
 JAMA
 Lancet
 NEJM

Database: Ovid MEDLINE(R) <1946 to May Week 2 2016>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <May 18, 2016>	
Date: May 19, 2016	
Original Search	<ol style="list-style-type: none"> 1 Epidemiologic studies/ (7120) 2 exp case control studies/ (779866) 3 exp cohort studies/ (1534155) 4 Case control.tw. (93080) 5 (cohort adj (study or studies)).tw. (115261) 6 Cohort analy\$.tw. (4776) 7 (Follow up adj (study or studies)).tw. (41015) 8 (observational adj (study or studies)).tw. (60155) 9 Longitudinal.tw. (167821) 10 randomized controlled trial/ (416302) 11 clinical trial/ (500056) 12 clinical trial, phase i.pt. (16112) 13 clinical trial, phase ii.pt. (26010) 14 clinical trial, phase iii.pt. (11141) 15 clinical trial, phase iv.pt. (1169) 16 controlled clinical trial.pt. (90707) 17 randomized controlled trial.pt. (416302) 18 multicenter study.pt. (201381) 19 clinical trial.pt. (500056) 20 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 (2485870) 21 Craniocerebral Trauma/ (20476) 22 exp Brain Injuries/ (55688) 23 Cerebrovascular Trauma/ (99) 24 brain injur*.ti,ab. (45208) 25 head injur*.ti,ab. (20777) 26 tbi.ti,ab. (16112) 27 21 or 22 or 23 or 24 or 25 or 26 (102073) 28 20 and 27 (18866) 29 Rehabilitation/ (17145) 30 rehab*.ti,ab. (122960) 31 neurorehabilitation.ti,ab. (1650) 32 29 or 30 or 31 (130446) 33 28 and 32 (1912) 34 limit 33 to "all child (0 to 18 years)" (872)

	<p>35 limit 34 to "all adult (19 plus years)" (720)</p> <p>36 33 not 34 (1040)</p> <p>37 35 or 36 (1760)</p> <p>38 limit 37 to (addresses or autobiography or bibliography or biography or case reports or clinical conference or congresses or dictionary or directory or in vitro or interactive tutorial or interview or lectures or legal cases or legislation or news or newspaper article or patient education handout or periodical index or portraits or video-audio media or webcasts) (76)</p> <p>39 37 not 38 (1684)</p> <p>40 remove duplicates from 39 (1667)</p>
Date Limits	41 limit 40 to yr="2012 -Current" (479)
Journal Limits	<p>42 "archives of physical medicine & rehabilitation".jn. (12502)</p> <p>43 "journal of neurology neurosurgery & psychiatry".jn. (16564)</p> <p>44 neuropsychological rehabilitation.jn. (527)</p> <p>45 "journal of head trauma rehabilitation".jn. (1044)</p> <p>46 "journal of rehabilitation medicine".jn. (1759)</p> <p>47 "annals of internal medicine".jn. (31072)</p> <p>48 bmj.jn. (65622)</p> <p>49 jama.jn. (67801)</p> <p>50 lancet.jn. (131480)</p> <p>51 "new england journal of medicine".jn. (73503)</p> <p>52 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 (401874)</p> <p>53 41 and 52 (146)</p>
N=146	

Appendix D. Inclusion and Exclusion Criteria from Original Systematic Review

We included controlled trials and prospective cohort studies assessing multidisciplinary postacute rehabilitation for moderate to severe TBI in adults age 16 and over (consistent with the definition of adult used by the TBI Model Systems programs and similar research conducted in other countries). We aimed to include all studies of multidisciplinary interventions. We chose the term multidisciplinary for this topic because a clear definition of comprehensive programs does not exist. However, screening studies to determine whether interventions were multidisciplinary was challenging and could result in an inappropriate set of included studies. For example, the multidisciplinary screening criterion could lead to inconsistent inclusion of studies of similar interventions simply because some more clearly specified the disciplines involved. Further, clinical practice typically involves many disciplines in delivering these interventions, thus the interventions are to a degree inherently —multidisciplinary. For these reasons, we chose not to explicitly screen by the term —multidisciplinary. Finally, our emphasis on community integration outcomes helped assure exclusion of studies examining very specific interventions, such as those aimed at improving memory or gait. We also specifically excluded domain- or impairment-specific interventions such as specific skill building to enhance memory or social skills training even if provided by a multidisciplinary team.

We limited studies to those enrolling at least 75 percent moderate to severe TBI patients. Certain rehabilitation programs are geared to the broader brain injury populations or can include mild TBI patients. However, because our emphasis was on moderate to severe TBI, we felt that including studies addressing the broader brain injury population would not provide the relevant data to draw conclusions specific to this population.

Studies were deemed eligible if they reported one of our preselected primary or secondary outcomes. Primary outcomes included:

- Return to school, work, or training (or other measures of productivity)
- Community Integration as measured with (described in Table 2):
 - The Mayo-Portland Adaptability Inventory (MPAI)
 - Craig Handicap Assessment and Reporting Technique (CHART)
 - Craig Handicap Assessment and Reporting Technique Short Form (CHART-SF)
 - Community Integration Questionnaire (CIQ)

As the most relevant outcome, we selected participation demonstrated by productivity or community integration measures. We accepted any definitions of productivity and selected measures deemed most appropriate for measuring community integration. We selected four primary outcome measurement instruments, as follows. First, we selected the MPAI as the most appropriate outcome measurement scale for the population addressed in this review (current version, MPAI-4). The MPAI was specifically developed to evaluate rehabilitation programs in the postacute brain injury population. Additionally, the MPAI was recommended by the TBI Common Data Elements Outcomes Workgroup as a supplemental global outcome measure that summarizes overall impact and incorporates functioning, activities, and participation. This group also cited the utility of this measure in evaluating progress in rehabilitation. The second scale we selected, the Craig Handicap Assessment and Reporting Technique (CHART), is another promising measure that incorporates community integration assessment in the postacute TBI population. The CHART addresses the ICF's participation domain and has been tested in TBI populations. This scale is available both in the full version and a short form (SF) version. The

CHART-SF has been suggested as a core measure of social participation by the TBI Common Data Elements Outcomes Workgroup. Finally, we selected the Community Integration Questionnaire (CIQ), which was developed for and has been used extensively in TBI populations and within the TBI model systems programs.

We did not prespecify all secondary outcome measurement instruments. Instead, we chose to include studies with scales that incorporated community integration or quality, satisfaction with life or other measures of global functioning applicable to community settings. Prespecified secondary outcomes scales included the Extended Glasgow Outcome Scale (GOS-E), the Disability Rating Scale (DRS), and the Satisfaction with Life Scale (SWLS). We identified other scales during the screening process. Descriptions of all secondary outcome measures appear in Table 3. Other measures considered secondary outcomes during the screening process (i.e. not selected a priori) included the EuroQOL (EQ 5D); the Perceived Quality of Life Scale (PQOL); the Brain Injury Community Rehabilitation Outcome-39 (BICRO-39); the Quality of Life Inventory (QOLI); Quality of Community Integration Questionnaire (QCIQ); and the Newcastle Independence Assessment Form (NIAF). We deemed outcomes patient-centered if they (1) directly related to life participation; (2) encompassed indicators of resumption to previous roles in the family and community or quality of life; or (3) addressed functioning in as community settings.

We also included prospective cohort studies because of the ethical and operational challenges inherent in conducting rehabilitation RCTs. We considered only studies with comparators of no or alternative interventions, because the extent and timing of spontaneous recovery is not clear (e.g. studies with controls at later stages postinjury were not considered adequate). Additionally, given the number of known and unknown confounding variables affecting rehabilitation outcomes, we paid special consideration to risk of bias in grading of evidence. Limiting included studies to those published in English is not ideal; however, studies conducted in English are more likely to be applicable to U.S. multidisciplinary postacute rehabilitation programs.

Exclusion Criteria:

Publication Type

- Published as abstract only
- No original data
- Full text not available in English

Population

- Pediatric Population
- Not 75% moderate to severe TBI

Intervention

- No intervention
- Not postacute intervention
- Impairment-specific intervention

Comparison

- No comparison group
- Not relevant comparison (eg, comparison group receives same treatment at the same time)

Outcome

- No primary or secondary outcome reported

Study Design

- Case series, retrospective study design

Appendix E. Literature Search Results

1. Angelakis E, Liouta E, Andreadis N, et al. Transcranial direct current stimulation effects in disorders of consciousness. *Archives of Physical Medicine & Rehabilitation*. 2014;95(2):283-289.
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Appendix F. Questionnaire Sent to Expert Reviewers

AHRQ Systematic Review Surveillance Program

Reviewer Form

Title of Original Systematic Review: Multidisciplinary Postacute Rehabilitation for Moderate to Severe Traumatic Brain Injury in Adults

[Link to Report](#)

Name of Reviewer: _____

Instructions:

The AHRQ Scientific Resource Center (SRC) periodically conducts surveillance of published AHRQ systematic reviews to assess the currency of review conclusions. The goal of this process is to identify signals that a report may be out of date. One part of this process includes soliciting expert review of our synthesis of recently published literature and identified FDA black box warnings.

The original systematic review was published in June 2012. The original systematic review search dates covered 1980 to January 2012. We conducted a bridged literature search of select high impact journals from January 2012 to May 2016 and identified evidence potentially related to the key questions of the original systematic review.

The table below highlights the conclusions from the original systematic review and a summary of the relevant recently published literature. No FDA black box warnings were identified. Abstracts from relevant literature are included at the end of the document. If you would like a list of our full search results, please let us know.

Please review the table and provide responses to the questions for each key question below. The primary goal of this review is to identify any important new studies, drugs, interventions, or devices you know of that we may have missed in our literature search and to understand if any new evidence exists which may alter the conclusions of the original systematic review.

Key Question 1:

- How have studies characterized multidisciplinary postacute rehabilitation for TBI in adults?

Current Literature Analysis:

- We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Reviewer Questions:

1. Are the original report conclusions still supported by the current evidence?

[Click here to enter text.](#)

2. Are there any published or unpublished studies that you know of that we may have overlooked?

[Click here to enter text.](#)

Key Question 2:

- What is the effectiveness and comparative effectiveness of multidisciplinary postacute rehabilitation for TBI?
 - a. Do effectiveness and comparative effectiveness vary by rehabilitation timing, setting, intensity, duration, and composition?
 - b. Do effectiveness and comparative effectiveness vary by injury characteristics?
 - c. Do effectiveness and comparative effectiveness vary by patient characteristics, preinjury or postinjury?

Current Literature Analysis:

- We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Reviewer Questions:

1. Are the original report conclusions still supported by the current evidence?

[Click here to enter text.](#)

2. Are there any published or unpublished studies that you know of that we may have overlooked?

[Click here to enter text.](#)

Key Question 3:

What evidence exists to establish a minimum clinically important difference (MCID) in community reintegration as measured by the Mayo-Portland Adaptability Inventory (MPAI) for postacute rehabilitation for TBI in adults?

Current Literature Analysis:

- We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Reviewer Questions:

3. Are the original report conclusions still supported by the current evidence?

[Click here to enter text.](#)

4. Are there any published or unpublished studies that you know of that we may have overlooked?

Click here to enter text.

Key Question 4:

Are improvements in outcomes achieved via multidisciplinary postacute rehabilitation for TBI sustained over time?

Current Literature Analysis:

- We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Reviewer Questions:

5. Are the original report conclusions still supported by the current evidence?

Click here to enter text.

6. Are there any published or unpublished studies that you know of that we may have overlooked?

Click here to enter text.

Key Question 5:

What adverse effects are associated with multidisciplinary postacute rehabilitation for TBI?

Current Literature Analysis:

- We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Reviewer Questions:

7. Are the original report conclusions still supported by the current evidence?

Click here to enter text.

8. Are there any published or unpublished studies that you know of that we may have overlooked?

Click here to enter text.

Original Systematic Review Conclusions and Literature Analysis

Title of Original Systematic Review: Multidisciplinary Postacute Rehabilitation for Moderate to Severe Traumatic Brain Injury in Adults

Original Systematic Review Published: June 2012

Original Systematic Review Search Dates: 1980 to January 2012

Current Literature Search Dates: January 2012-May 2016

The conclusions from the original systematic review and a summary of the relevant recently published literature. No FDA black box warnings/Class I recalls as applicable to the report were identified. Abstracts are provided at the end of the document.

Table 1. Key Question 1: How have studies characterized multidisciplinary postacute rehabilitation for TBI in adults?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
<p>Model of Care: Holistic Day Treatment</p> <ul style="list-style-type: none"> • Intensive cognitive rehabilitation <ul style="list-style-type: none"> ○ Outpatient rehab center, 15 hours/week for 16 weeks • Comprehensive day treatment program <ul style="list-style-type: none"> ○ Outpatient rehab center, 8-16 hours/week for 3-6 months • Neuropsychological rehabilitation <ul style="list-style-type: none"> ○ Outpatient rehab center, 24 hours/week for 6 months • Treatment mix (balanced, interpersonal, and cognitive) <ul style="list-style-type: none"> ○ Outpatient rehab center, 5 hours/week for 4 weeks • Inpatient cognitive rehab <ul style="list-style-type: none"> ○ Inpatient, 6 weeks (hours/week not reported) • Comprehensive neurorehabilitation <ul style="list-style-type: none"> ○ Inpatient, 37.5 hours/week for 6 weeks 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Model of Care: Outward Bound</p> <ul style="list-style-type: none"> • Outdoor Experiential Education <ul style="list-style-type: none"> ○ Camp-like community setting, 9 week experience, follow up groups for 3-4 months 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Model of Care: Cognitive Didactic</p> <ul style="list-style-type: none"> • Cognitive Didactic <ul style="list-style-type: none"> ○ Inpatient, 7.5-15 hours/week for 32 days 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Model of Care: Functional-Experiential</p> <ul style="list-style-type: none"> • Functional treatment concepts <ul style="list-style-type: none"> ○ Inpatient, 21.5-30 hours/week for 33 days 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison</p>

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
Model of Care: Community-based residential rehabilitation <ul style="list-style-type: none"> • Cognitive rehabilitation and community adaptation <ul style="list-style-type: none"> ○ Residential, 1-3 years (hours/week not reported) 	group, or did not examine outcomes of interest We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.
Model of Care: Not Reported <ul style="list-style-type: none"> • Telephone Counseling <ul style="list-style-type: none"> ○ Home (telephone), 30-45 minutes/week for 9 months • Case Management <ul style="list-style-type: none"> ○ Home, intensity and duration not reported • Community-based therapy program <ul style="list-style-type: none"> ○ Community, intensity and duration not reported • Hospital-based outpatient treatment <ul style="list-style-type: none"> ○ Outpatient rehabilitation center, intensity and duration not reported • Outreach <ul style="list-style-type: none"> ○ Home or Community, 2-6 hours/week for 27 weeks • Information <ul style="list-style-type: none"> ○ Home, 1 hour for 1 session • Home rehabilitation <ul style="list-style-type: none"> ○ Home, 0.5 hours/week for 8 weeks • Multidisciplinary rehabilitation <ul style="list-style-type: none"> ○ Combination inpatient/outpatient rehabilitation center, intensity and duration not reported 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Abbreviations: TBI=Traumatic Brain Injury

Table 2. Key Question 2: What is the effectiveness and comparative effectiveness of multidisciplinary postacute rehabilitation for TBI?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
Intensive cognitive rehabilitation versus standard neurorehabilitation <ul style="list-style-type: none"> • Productivity (1 RCT, 1 prospective cohort): SOE Low <ul style="list-style-type: none"> ○ Intensive cognitive rehabilitation resulted in a significantly larger increase in productivity at 16 weeks (RR=2.29 [1.08 to 4.84], p=.03). One study found no difference between groups at 6 month follow-up. • CIQ Post Treatment (1 RCT, 1 prospective cohort): SOE Low <ul style="list-style-type: none"> ○ Across studies, there was no significant difference in the CIQ at 16 weeks. 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
<ul style="list-style-type: none"> • CIQ at 6 month follow-up (1 prospective cohort): SOE Insufficient <ul style="list-style-type: none"> ○ One study found no difference between groups at 6 month follow-up. • Perceived Quality of Life (QoL) (1 RCT): SOE NR <ul style="list-style-type: none"> ○ There was no difference between groups post-treatment, nor at 6 month follow-up • Quality of Community Integration (1 RCT): SOE NR <ul style="list-style-type: none"> ○ The intensive cognitive rehabilitation group showed statistically significant improvement at post-treatment assessment. 	
<p>Functional-experiential versus cognitive-didactic</p> <ul style="list-style-type: none"> • Productivity (1 RCT): SOE Low <ul style="list-style-type: none"> ○ There was no significant difference between function-experiential and cognitive-didactic rehabilitation at 1 year post protocol treatment (RR: 0.91 [0.69 to 1.20] p=0.50). • Disability Rating Scale (1 RCT): SOE NR <ul style="list-style-type: none"> ○ Results of the post-treatment assessment were not reported. There was no difference between groups at 1 year post-treatment follow up. • QoL (1 RCT): SOE NR <ul style="list-style-type: none"> ○ Results of the post-treatment assessment were not reported. There was no difference between groups at 1 year post-treatment follow up. 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Hospital treatment versus home treatment</p> <ul style="list-style-type: none"> • Productivity (RTW) (1 RCT): SOE Low <ul style="list-style-type: none"> ○ There was no significant difference between hospital and home treatment at 12 months post treatment (RR: 0.95 [0.85 to 1.05] P=0.33). • Productivity (fitness for duty) (1 RCT): SOE Low <ul style="list-style-type: none"> ○ There was no significant difference between hospital and home treatments at 12 months post-treatment (RR: 1.11 [0.7 to 1.41] P=0.41). 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Case management versus conventional rehabilitation</p> <ul style="list-style-type: none"> • Productivity (1 RCT): SOE Insufficient <ul style="list-style-type: none"> ○ There was no significant difference between case management and conventional rehabilitation at 6 months post-injury (RR: 0.84 [0.42 to 1.68] P=0.62). • Glasgow Outcome Score (1 RCT): SOE NR 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
<ul style="list-style-type: none"> ○ There was no significant difference between groups at post-treatment assessment, 1-year post-injury follow up, or 2-year post-injury follow up. ● Disability Rating Score (1 RCT): SOE NR <ul style="list-style-type: none"> ○ Results of the post-treatment assessment were not reported. The case management group had lower scores on the DRS 2-years post-injury. 	
<p>Comprehensive neurorehabilitation (INSURE) versus conventional rehabilitation</p> <ul style="list-style-type: none"> ● Productivity (1 Prospective Cohort): SOE Insufficient <ul style="list-style-type: none"> ○ Comprehensive neurorehabilitation resulted in a significantly larger increase in productivity at 2 years post-treatment (RR: 1.63 [1.06 to 2.49] P=0.02). 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Neuropsychological rehabilitation versus controls</p> <ul style="list-style-type: none"> ● Productivity (1 Prospective Cohort): SOE Insufficient <ul style="list-style-type: none"> ○ There was no significant difference between neuropsychological rehabilitation and controls at 6 month follow-up (P=0.49). 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>
<p>Treatment mix 1 (balanced) versus treatment mix 2 (interpersonal) versus treatment mix 3 (cognitive)</p> <ul style="list-style-type: none"> ● Productivity (1 Prospective Cohort): SOE Insufficient <ul style="list-style-type: none"> ○ There was no significant difference between treatment groups at 9 months post-treatment (P=0.33). 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>

Abbreviations: NR=Not Reported; QoL=Quality of Life; RCT=Randomized Controlled Trial; RR=Risk Ratio; RTW=Return to Work; SOE=Strength of Evidence; TBI=Traumatic Brain Injury

Table 3. Key Question 2a. Do effectiveness and comparative effectiveness vary by rehabilitation timing, setting, intensity, duration, and composition?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
<p>Intervention Characteristics</p> <p>Due to the heterogeneity of the studied interventions, our main findings from the primary studies pertain only to specific intervention characteristics. The most frequently studied intervention targeted to TBI survivors with chronic impairments from the injuries was the comprehensive holistic day program, however these programs did not substantially or permanently improve outcomes when compared to standard multidisciplinary programs.</p> <p>Due to limited evidence, lack of clear findings about comparative effectiveness,</p>	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
and heterogeneity in populations, interventions, comparisons, and outcomes definitions, we could not assess the impact of program intensity or duration on effectiveness.	

Abbreviations: TBI=Traumatic Brain Injury

Table 4. Key Question 2b. Do effectiveness and comparative effectiveness vary by injury characteristics?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
Injury Characteristics Studies often provide few or no details about injury characteristics for the enrolled populations, other than severity levels. The studies in this review failed to provide cause of injury, area of brain injured, or details regarding sustained impairment, and therefore meaningful conclusions about which interventions may be most effective for specific injury types, recovery periods, or impairment types and levels could not be made.	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Abbreviations: TBI=Traumatic Brain Injury

Table 5. Key Question 2c. Do effectiveness and comparative effectiveness vary by patient characteristics, preinjury or postinjury?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
Patient Characteristics The two largest RCTs only analyzed active-duty military personnel or military personnel + veterans. These studies provided key findings for the main analysis pertaining to military and veteran populations. Additionally, another post-hoc analysis showed that younger patients enrolled in cognitive-didactic arm had significantly greater rates of return to work or school than those in the functional-experiential arm.	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Abbreviations: RCT=Randomized Controlled Trial; TBI=Traumatic Brain Injury

Table 6. Key Question 3: What evidence exists to establish a minimum clinically important difference (MCID) in community reintegration as measured by the Mayo-Portland Adaptability Inventory (MPAI) for postacute rehabilitation for TBI in adults?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
We found no eligible studies that measured effectiveness using the MPAI. MCID does not appear to be established for the MPAI.	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.

Abbreviations: MCID=Minimum Clinically Important Differences; MPAI=Mayo-Portland Assessment Inventory; TBI=Traumatic Brain Injury

Table 7. Key Question 4: Are improvements in outcomes achieved via multidisciplinary postacute rehabilitation for TBI sustained over time?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
<p>Intensive cognitive rehabilitation versus standard neurorehabilitation</p> <ul style="list-style-type: none"> • Productivity (1 RCT): SOE Low <ul style="list-style-type: none"> ○ For both groups, outcomes attained at 16 week post-treatment were sustained at 6 month follow-up (RR=1.22 [.75 to 1.92]). • CIQ (1 RCT): SOE Low <ul style="list-style-type: none"> ○ For both groups, CIQ scores were sustained (ES=.07 [-.41 to .54]). • Productivity (1 RCT): SOE Insufficient <ul style="list-style-type: none"> ○ One study found no difference between groups at 6 month follow-up and at 12-month follow-up. This study measured outcomes through 24 months, but, due to limited data, the risk of bias was considered high. 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>

Abbreviations: CIQ=Community Reintegration Questionnaire; RCT=Randomized Controlled Trial; RR=Risk Ratio; SOE=Strength of Evidence; TBI=Traumatic Brain Injury

Table 8. Key Question 5: What adverse effects are associated with multidisciplinary postacute rehabilitation for TBI?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)
<p>Adverse events of postacute rehabilitation treatments are inadequately address in research. We identified one study that formally addressed adverse events, but these adverse events were not assessed in a systematic manner and reported that no adverse events were observed.</p>	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>

Abbreviations: TBI=Traumatic Brain Injury

Abstracts from Relevant Literature/References:

None identified.

Appendix G. Summary Table

No relevant FDA warnings or Horizon Scanning interventions were identified.

Table 1. Key Question 1: How have studies characterized multidisciplinary postacute rehabilitation for TBI in adults?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<p>Model of Care: Holistic Day Treatment</p> <ul style="list-style-type: none"> • Intensive cognitive rehabilitation <ul style="list-style-type: none"> ○ Outpatient rehab center, 15 hours/week for 16 weeks • Comprehensive day treatment program <ul style="list-style-type: none"> ○ Outpatient rehab center, 8-16 hours/week for 3-6 months • Neuropsychological rehabilitation <ul style="list-style-type: none"> ○ Outpatient rehab center, 24 hours/week for 6 months • Treatment mix (balanced, interpersonal, and cognitive) <ul style="list-style-type: none"> ○ Outpatient rehab center, 5 hours/week for 4 weeks • Inpatient cognitive rehab <ul style="list-style-type: none"> ○ Inpatient, 6 weeks (hours/week not reported) • Comprehensive neurorehabilitation <ul style="list-style-type: none"> ○ Inpatient, 37.5 hours/week for 6 weeks 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>	<p>All experts believed conclusions to be up to date.</p>	<p>Conclusions are likely current.</p>
<p>Model of Care: Outward Bound</p> <ul style="list-style-type: none"> • Outdoor Experiential Education <ul style="list-style-type: none"> ○ Camp-like community setting, 9 week experience, follow up groups for 3-4 months 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>	<p>All experts believed conclusions to be up to date.</p>	<p>Conclusions are likely current.</p>
<p>Model of Care: Cognitive Didactic</p> <ul style="list-style-type: none"> • Cognitive Didactic <ul style="list-style-type: none"> ○ Inpatient, 7.5-15 hours/week for 32 days 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute</p>	<p>All experts believed conclusions to be up to date.</p>	<p>Conclusions are likely current.</p>

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
	rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.		
Model of Care: Functional-Experiential <ul style="list-style-type: none"> • Functional treatment concepts <ul style="list-style-type: none"> ○ Inpatient, 21.5-30 hours/week for 33 days 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest	All experts believed conclusions to be up to date.	Conclusions are likely current.
Model of Care: Community-based residential rehabilitation <ul style="list-style-type: none"> • Cognitive rehabilitation and community adaptation <ul style="list-style-type: none"> ○ Residential, 1-3 years (hours/week not reported) 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.
Model of Care: Not Reported <ul style="list-style-type: none"> • Telephone Counseling <ul style="list-style-type: none"> ○ Home (telephone), 30-45 minutes/week for 9 months • Case Management <ul style="list-style-type: none"> ○ Home, intensity and duration not reported • Community-based therapy program <ul style="list-style-type: none"> ○ Community, intensity and duration not reported • Hospital-based outpatient treatment <ul style="list-style-type: none"> ○ Outpatient rehabilitation center, intensity and duration not reported • Outreach <ul style="list-style-type: none"> ○ Home or Community, 2-6 hours/week for 27 weeks • Information <ul style="list-style-type: none"> ○ Home, 1 hour for 1 session • Home rehabilitation 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<ul style="list-style-type: none"> ○ Home, 0.5 hours/week for 8 weeks ● Multidisciplinary rehabilitation <ul style="list-style-type: none"> ○ Combination inpatient/outpatient rehabilitation center, intensity and duration not reported 			

Abbreviations: TBI=Traumatic Brain Injury

Table 2. Key Question 2: What is the effectiveness and comparative effectiveness of multidisciplinary postacute rehabilitation for TBI?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<p>Intensive cognitive rehabilitation versus standard neurorehabilitation</p> <ul style="list-style-type: none"> ● Productivity (1 RCT, 1 prospective cohort): SOE Low <ul style="list-style-type: none"> ○ Intensive cognitive rehabilitation resulted in a significantly larger increase in productivity at 16 weeks (RR=2.29 [1.08 to 4.84], p=.03). One study found no difference between groups at 6 month follow-up. ● CIQ Post Treatment (1 RCT, 1 prospective cohort): SOE Low <ul style="list-style-type: none"> ○ Across studies, there was no significant difference in the CIQ at 16 weeks. ● CIQ at 6 month follow-up (1 prospective cohort): SOE Insufficient <ul style="list-style-type: none"> ○ One study found no difference between groups at 6 month follow-up. ● Perceived Quality of Life (QoL) (1 RCT): SOE NR 	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>	<p>All experts believed conclusions to be up to date.</p>	<p>Conclusions are likely current.</p>

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<ul style="list-style-type: none"> ○ There was no difference between groups post-treatment, nor at 6 month follow-up ● Quality of Community Integration (1 RCT): SOE NR <ul style="list-style-type: none"> ○ The intensive cognitive rehabilitation group showed statistically significant improvement at post-treatment assessment. 			
Functional-experiential versus cognitive-didactic <ul style="list-style-type: none"> ● Productivity (1 RCT): SOE Low <ul style="list-style-type: none"> ○ There was no significant difference between function-experiential and cognitive-didactic rehabilitation at 1 year post protocol treatment (RR: 0.91 [0.69 to 1.20] p=0.50). ● Disability Rating Scale (1 RCT): SOE NR <ul style="list-style-type: none"> ○ Results of the post-treatment assessment were not reported. There was no difference between groups at 1 year post-treatment follow up. ● QoL (1 RCT): SOE NR <ul style="list-style-type: none"> ○ Results of the post-treatment assessment were not reported. There was no difference between groups at 1 year post-treatment follow up. 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date	Conclusions are likely current.
Hospital treatment versus home treatment <ul style="list-style-type: none"> ● Productivity (RTW) (1 RCT): SOE Low <ul style="list-style-type: none"> ○ There was no significant difference between hospital 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute	All experts believed conclusions to be up to date.	Conclusions are likely current.

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<ul style="list-style-type: none"> and home treatment at 12 months post treatment (RR: 0.95 [0.85 to 1.05] P=0.33). • Productivity (fitness for duty) (1 RCT): SOE Low <ul style="list-style-type: none"> ○ There was no significant difference between hospital and home treatments at 12 months post-treatment (RR: 1.11 [0.7 to 1.41] P=0.41). 	rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.		
Case management versus conventional rehabilitation <ul style="list-style-type: none"> • Productivity (1 RCT): SOE Insufficient <ul style="list-style-type: none"> ○ There was no significant difference between case management and conventional rehabilitation at 6 months post-injury (RR: 0.84 [0.42 to 1.68] P=0.62). • Glasgow Outcome Score (1 RCT): SOE NR <ul style="list-style-type: none"> ○ There was no significant difference between groups at post-treatment assessment, 1-year post-injury follow up, or 2-year post-injury follow up. • Disability Rating Score (1 RCT): SOE NR <ul style="list-style-type: none"> ○ Results of the post-treatment assessment were not reported. The case management group had lower scores on the DRS 2-years post-injury. 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.
Comprehensive neurorehabilitation (INSURE) versus conventional rehabilitation <ul style="list-style-type: none"> • Productivity (1 Prospective Cohort): SOE Insufficient 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute	All experts believed conclusions to be up to date.	Conclusions are likely current.

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<ul style="list-style-type: none"> ○ Comprehensive neurorehabilitation resulted in a significantly larger increase in productivity at 2 years post-treatment (RR: 1.63 [1.06 to 2.49] P=0.02). 	rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.		
Neuropsychological rehabilitation versus controls <ul style="list-style-type: none"> ● Productivity (1 Prospective Cohort): SOE Insufficient <ul style="list-style-type: none"> ○ There was no significant difference between neuropsychological rehabilitation and controls at 6 month follow-up (P=0.49). 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.
Treatment mix 1 (balanced) versus treatment mix 2 (interpersonal) versus treatment mix 3 (cognitive) <ul style="list-style-type: none"> ● Productivity (1 Prospective Cohort): SOE Insufficient <ul style="list-style-type: none"> ○ There was no significant difference between treatment groups at 9 months post-treatment (P=0.33). 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.

Abbreviations: NR=Not Reported; QoL=Quality of Life; RCT=Randomized Controlled Trial; RR=Risk Ratio; RTW=Return to Work; SOE=Strength of Evidence; TBI=Traumatic Brain Injury

Table 3. Key Question 2a. Do effectiveness and comparative effectiveness vary by rehabilitation timing, setting, intensity, duration, and composition?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
Intervention Characteristics Due to the heterogeneity of the studied interventions, our main findings from the primary studies pertain only to specific intervention characteristics. The most	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked	All experts believed conclusions to be up to date.	Conclusions are likely current.

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<p>frequently studied intervention targeted to TBI survivors with chronic impairments form the injuries was the comprehensive holistic day program, however these programs did not substantially or permanently improve outcomes when compared to standard multidisciplinary programs.</p> <p>Due to limited evidence, lack of clear findings about comparative effectiveness, and heterogeneity in populations, interventions, comparisons, and outcomes definitions, we could not assess the impact of program intensity or duration on effectiveness.</p>	<p>a comparison group, or did not examine outcomes of interest.</p>		

Abbreviations: TBI=Traumatic Brain Injury

Table 4. Key Question 2b. Do effectiveness and comparative effectiveness vary by injury characteristics?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<p>Injury Characteristics Studies often provide few or no details about injury characteristics for the enrolled populations, other than severity levels. The studies in this review failed to provide cause of injury, area of brain injured, or details regarding sustained impairment, and therefore meaningful conclusions about which interventions may be most effective for specific injury types, recovery periods, or impairment types and levels could not be made.</p>	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>	<p>All experts believed conclusions to be up to date.</p>	<p>Conclusions are likely current.</p>

Abbreviations: TBI=Traumatic Brain Injury

Table 5. Key Question 2c. Do effectiveness and comparative effectiveness vary by patient characteristics, preinjury or postinjury?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
Patient Characteristics The two largest RCTs only analyzed active-duty military personnel or military personnel + veterans. These studies provided key findings for the main analysis pertaining to military and veteran populations. Additionally, another post-hoc analysis showed that younger patients enrolled in cognitive-didactic arm had significantly greater rates of return to work or school than those in the functional-experiential arm.	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.

Abbreviations: RCT=Randomized Controlled Trial; TBI=Traumatic Brain Injury

Table 6. Key Question 3: What evidence exists to establish a minimum clinically important difference (MCID) in community reintegration as measured by the Mayo-Portland Adaptability Inventory (MPAI) for postacute rehabilitation for TBI in adults?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
We found no eligible studies that measured effectiveness using the MPAI. MCID does not appear to be established for the MPAI.	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.	All experts believed conclusions to be up to date.	Conclusions are likely current.

Abbreviations: MCID=Minimum Clinically Important Differences; MPAI=Mayo-Portland Assessment Inventory; TBI=Traumatic Brain Injury

Table 7. Key Question 4: Are improvements in outcomes achieved via multidisciplinary postacute rehabilitation for TBI sustained over time?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
Intensive cognitive rehabilitation versus standard neurorehabilitation <ul style="list-style-type: none"> • Productivity (1 RCT): SOE Low <ul style="list-style-type: none"> ○ For both groups, outcomes attained at 16 week post-treatment were sustained at 6 	We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not	All experts believed conclusions to be up to date.	Conclusions are likely current.

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<p>month follow-up (RR=1.22 [.75 to 1.92]).</p> <ul style="list-style-type: none"> • CIQ (1 RCT): SOE Low <ul style="list-style-type: none"> ○ For both groups, CIQ scores were sustained (ES=.07 [-.41 to .54]). • Productivity (1 RCT): SOE Insufficient <ul style="list-style-type: none"> ○ One study found no difference between groups at 6 month follow-up and at 12-month follow-up. This study measured outcomes through 24 months, but, due to limited data, the risk of bias was considered high. 	<p>examine outcomes of interest.</p>		

Abbreviations: CIQ=Community Reintegration Questionnaire; RCT=Randomized Controlled Trial; RR=Risk Ratio; SOE=Strength of Evidence; TBI=Traumatic Brain Injury

Table 8. Key Question 5: What adverse effects are associated with multidisciplinary postacute rehabilitation for TBI?

Conclusions From Original Systematic Review Link to Report	Literature Analysis (May 2016)	Expert Opinion	Surveillance Assessment
<p>Adverse events of postacute rehabilitation treatments are inadequately address in research. We identified one study that formally addressed adverse events, but these adverse events were not assessed in a systematic manner and reported that no adverse events were observed.</p>	<p>We identified no studies meeting inclusion criteria. Specifically, excluded studies examining multidisciplinary post-acute rehabilitation for TBI either lacked a comparison group, or did not examine outcomes of interest.</p>	<p>All experts believed conclusions to be up to date.</p>	<p>Conclusions are likely current.</p>

Abbreviations: TBI=Traumatic Brain Injury