

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (Error! Hyperlink reference not valid.) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	Cohort Profile: The Acquired Brain Injury Community Rehabilitation and Support Services Outcomes CohoRT (ABI-REStART), Western Australia, 1991-2020
<b>AUTHORS</b>	Mann, Georgina; Troeung, Lakkhina; Wagland, Janet; Martini, Angelita

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Jöhr, Jane Lausanne University Hospital, Clinical Neurosciences
<b>REVIEW RETURNED</b>	07-May-2021

<b>GENERAL COMMENTS</b>	<p>PEER REVIEW _ Cohort Profile: The Acquired Brain Injury Community Rehabilitation and Support Services Outcomes CohoRT (ABI-REStART) Study, Western Australia, 1991-2020</p> <p>SUMMARY</p> <p>The authors present a large cohort study from Western Australia (WA) followed over 3 decades, and consisting of patients with acquired brain injury (n=1011) who received rehabilitation services at Brightwater Care Group from 1991 to 2020. The study's goal is to comprehensively document post-acute neurorehabilitation and transitional care in order to determine the longitudinal needs of this specific population and to improve the quality of rehabilitation services in the long-term. To do this, the authors combined a relevant internal clinical dataset with external data from the Australian health system. The results to date consist of significantly heterogeneous baseline demographic, clinical, and rehabilitation data. Future plans include regular updating of this dynamic cohort, further analysis to determine the consequences of brain injury and changing needs, and promotion of rehabilitation service evaluation and information to post-acute services.</p> <p>GENERAL COMMENTS</p> <p>Overall, this cohort study makes a valuable and diverse contribution to the broad collection of data on people with brain injury and post-acute neurorehabilitation programs. Its unique</p>
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method of collection, combining data sources and ensuring long-term follow-up with numerous outcome measures provides a solid foundation for accurate analyses exploring the longitudinal needs of this complex population, as well as the effectiveness of existing neurorehabilitation and transition programs in the Australian community. This article is well-written overall, although it would benefit from further editing to raise the level of language. The tables and figures used are consistent with a global understanding. The list of references is well provided but the results of the cited studies are not sufficiently detailed in the introduction.

As a neuropsychologist and neurorehabilitation therapist, I am impressed by this rigorous data collection and consistent longitudinal follow-up, which is an important contribution to the field of neurorehabilitation.

However, my main concerns are a) the incompletely developed introduction and unclear research questions, b) some imprecise or missing methodological aspects in the description of the cohort, c) and the lacking presentation of outcome measures described as fundamental, regardless of their analysis.

a) Introduction

The introduction would benefit from further discussion on the various consequences of brain injury, including disorders of consciousness, which are only briefly mentioned later in the description of the cohort. Similarly, I think it is important to present and detail the results of

the smaller cohorts in Australia, the results from other cohorts worldwide, and to summarize recent research on the effectiveness of various neurorehabilitation programs in Australia and the world for acquired brain injury (ABI) patients. This would better justify the rationale for this study, highlight gaps in current understanding of the subject, and argue for the value of conducting such a study in Australia, other than reasons of cohort size and length of follow-up. Many good studies are listed in the references and should be explored in more detail to strengthen the introductory context of the current study.

There is some confusion between the purpose of the ABI-RESTART program and the objectives of the present study. The research questions for the study are weakly defined and should be more clearly distinguished from those of future research. As I understand, the primary objectives of the current study are to fully assess the clinical characteristics and outcomes of patients with ABI, and to identify their longitudinal needs. Secondary objectives include describing the formation of the ABI-RESTART program and its unique combined measures design, and the presentation of future research questions motivating analyses of the predictive factors and effectiveness of the neurorehabilitation programs implemented. If this is not the case, it is necessary to differentiate better the objectives of the program from those of this study to avoid confusion.

The second half of the introduction presents the ABI-REStART program and the cohort extensively, whereas this information concerns the study design and should preferably appear in the methodology section.

b) Cohort description

Some aspects are not clear and would benefit from more detail:

- The division into sub-cohorts lacks precision; I do not understand the meaning of "These sub-cohorts reflect periods of service delivery change across the different programs" (p.6, l.48-49). Please clarify. How long ago was each program put in place? Were they all already in action when the study began?

- No missing data are specified. But is this really the case? It is stated in the abstract (p.3, last bullet; and p.15, l.15-18) that pre- or post-entry follow-up data for cohort members based in another state or abroad will not be captured, which necessarily implies missing data.

- Similarly, no missing data are specified for the outcome measures. Given the rigor required to complete the various questionnaires and tests, it is unlikely that all data could have been collected for all 1011 patients. Nevertheless, if this is the case, please mention it.

- How is the data archived? There is no mention of the security required for its storage and use.

c) Findings to date

The authors describe a unique combined data-use design, and mention outcome measures as fundamental, but they are absent from the description of the main results. Upon reading the abstract, summary, and introduction, the reader expects to see the presentation of results for various key measures including functional independence, health status and comorbidities, goal attainment, mental health and well-being, and quality of life. If one of the main objectives

of the study is to examine the longitudinal needs of patients with ABI, it is necessary to describe the data collected, if any, or at least to adequately justify their absence. While this is not one of the objectives of the present study, it is necessary to define them better beforehand to avoid creating a false expectation for the reader.

SPECIFIC COMMENTS

- The abstract is already a summary of the article. The "Article summary" should be replaced by "Key points" or something similar.

	<ul style="list-style-type: none"> <li>- Although it may be a cultural difference between Australia and Europe, I am surprised by the recurrent use throughout the text of the term "client" instead of "patient" as is commonly used in European rehabilitation programs.</li> <li>- P.4, l.19-20: "Up to 75% of brain injuries occur in adults under 65 years of age", please specify for the Australian population.</li> <li>- P.4, l.29: "Adjustment" to what? It is not clear if this is emotional, occupational, instrumental, community as in the cited study. Please specify or give more details of results of the study you are referring to.</li> <li>- P.4, l.31: Please define the term "post-acute care" and what it consists of in relation to the cited study.</li> <li>- P.4, l.32-33: "Post-acute care is important throughout this often difficult and stressful transition period." This statement appears to be a value judgment, please elaborate objectively on this statement in reference to the results of the cited study.</li> <li>- P.4, l.44: "poorly understood"; P.12, l.22; "fortunately": these are subjective assessments, to be avoided.</li> <li>- P.6, l.12-18: "The study cohort will be periodically updated with new admissions to allow a dynamic cohort of individuals to be followed through changing services over time, a unique possibility not seen in previous cohorts"; P.9, l.33. : "The study cohort and data linkage will be periodically updated with new admissions to allow cohort growth and dynamic follow-up."; To be stated rather in the section: Future directions.</li> <li>- P.7, l.40: Please define the term "minimally conscious", or expand it adequately in the introduction.</li> <li>- P.11, l.54-55: "the most comprehensive set of measures available for a cohort of this kind to date."; To be removed here as not part of the methodology.</li> <li>- There is overuse of the term "unique" throughout the text to describe the method. Please limit its use as it appears as a value judgment when repeated so much.</li> </ul>
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<b>REVIEWER</b>	Kettlewell, Jade University of Nottingham, Centre for Health Innovation, Leadership & Learning
<b>REVIEW RETURNED</b>	13-May-2021

<b>GENERAL COMMENTS</b>	A well written manuscript, very clear and concise. Interesting findings that have been sufficiently described. Tables add the necessary detail to the results and are well presented. It would be good to see a table summarising the outcome measures. The authors describe some of the outcomes
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	to date in the text, but a more detailed summary (i.e. table) would improve the manuscript. It is not clear whether this data has been analysed yet, or is the next step. Very minor revisions required.
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<b>REVIEWER</b>	Watter, Kerrin The University of Queensland
<b>REVIEW RETURNED</b>	19-May-2021

<b>GENERAL COMMENTS</b>	<p>I recommend minor revisions to the paper, to clarify information related to the cohort (methodology), plus some minor additional revisions (introduction, future directions, strengths / limitations). See attached file below for specific feedback and areas for review. This paper will be of significance, particularly in the Australian setting, and presents a cohort comprising of a broad and complex dataset for ABI, involving demographic, clinical, service and other data. This dataset represents a longterm investment in data collection and management across a range of areas from the project team, and will provide many opportunities for future investigation, with a strong potential to inform future clinical practice.</p> <p><b>Response to ABI cohort paper</b></p> <p>This paper details the data collection and service characteristics of a longitudinal ABI cohort in Australia and presents initial findings regarding demographic and injury data. This is a well-established project and data cohort with strong opportunity for ongoing and future data extraction.</p> <p>Please see my comments for review below:</p> <p><b>1. Introduction:</b></p> <p>The paper would benefit from a definition of “post-acute” care, to help the reader fully understand this cohort and their context.</p> <p>For example, you state various types of post-acute care exist - expanding on this and/or defining “post-acute” care in your context will aid the reader. Additionally, your cohort involves people immediately post-hospital discharge undertaking early rehabilitation (e.g., TRP program) as well as clients who are residing in the community and referred in the chronic phase of their injury. Are you classifying your entire cohort as “post-acute”? (My understanding of “post-acute” was a timepoint close to hospital d/c (i.e., earlier post-injury) as opposed to those living at home in the community.) Providing a definition of “post-acute” care for your study context will help clarify this for the reader.</p> <p><b>2. Introduction:</b></p>
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On page 6, paragraph 2, you report in addition to TBI and NTBI, eligible neurological conditions are also accepted. Please provide some additional detail for the reader at this stage in the manuscript regarding the eligible neurological conditions, or refer them to the appropriate Table. (I note they are mentioned later on in the paper /referred to in Table 3).

### **3. Cohort Description: Program details**

I have some comments / questions regarding the different clinical components of the 5 programs that the cohort accessed:

- Page 6, paragraph 3: You state that there have been 4 main periods of different service delivery / service provision within this time. Providing a brief summary on these changes / the four different focusses will be beneficial for the reader. If this data is to be presented in a future publication, please indicate this.
- What is the difference between the *TRP program* (and neurorehab) for the clients who are residing at home versus *Capacity Building program* (with neurorehab)? Is the difference between their funding source (e.g., Dept Health vs NDIS) or are the programs themselves providing different services / rehabilitation? Please expand / specify in the text.
- Page 6-8: Have all programs been available since start of your service (eg 1991)? Or have these developed over time? e.g., was the *Supported Independent Living* program previously available before the NDIS commenced in Australia, or is this a new program or service? Providing information on when these components have been available for clients to access will aid the reader in interpreting your service data and cohort statistics.
- Are there specific timeframes for the 5 different services? If so, please add this information to the manuscript.

### **4. Cohort - service description and access**

The manuscript will also benefit from providing some additional information on the different programs and how these relate to the described cohort – see specific query areas below.

- Do clients only access one of your 5 services, or can they access multiple or concurrent services? e.g. move from *TRP* program to *Capacity Building*, or transition from *TRP* to *SIL*? If they utilise >1 service, how is this data counted or reported regarding the cohort? e.g., is only the first

service accessed counted? When I review Table 4, it appears only one service encounter is logged per individual. Are people referred back to your service? If so, how is this accounted for in your data count / cohort?

Please clarify these factors within the manuscript.

- You report that some clients who access your service have had >1 brain injury. Are these: new clients to your service (did not access following first ABI)?; a second referral or re-referral to your service?; or part of an ongoing / longterm admission? How are these counted with respect to the cohort numbers above and in Table 4?. Please clarify this within the manuscript.

##### **5. Demographic information of the cohort group:**

I note an age limit existed for you clients accessing *Oat St TRP*. Does this age limit extend to all your services? This was not specified for the other service groups.

Please specify this for all 5 service groups within the manuscript. This impacts interpretation of your demographic data and supports your reporting of the cohort's age as a limitation of your study

##### **6. Future Directions**

In your 'future directions' section, you are reporting on the MH findings of a subsection of your data. Is this from a specific component of your cohort? e.g. those admitted to one particular arm of your service (e.g., TRP)?; or those admitted straight from hospital?; or 263 consecutive admissions?

Please provide a brief statement / sentence on the MH cohort referenced is (if possible) to help the reader better interpret this important point.

##### **7. Strengths and Limitations**

You state that the cohort allows for effects of policy and treatment changes to be examined over time, and can evaluate the efficacy of programs and post-acute rehabilitation. I agree, but in this paper, you have only reported on the demographic and injury information, not the impact of treatment or effects or outcomes of the program. Consider some of your tense / wording: eg the sentence "*The cohort was formed over 29 years, allowing the effects of policy and treatment changes over time to be examined.*" implies that this has been examined (either within this paper or via a separate publication). If it has, please note this here, if it is an ongoing / future direction consider rewording the sentence.

	<p><b>8. Technical and editing comments</b></p> <ul style="list-style-type: none"> <li>● Within the text, acronym use and provision of definitions is a little variable. .e.g, <ul style="list-style-type: none"> <li>○ p 11 – IRSP – please provide the word in full in the text, as well as a brief description of this in the text. This may also benefit from being referenced.</li> </ul> </li> <li>● Check your REStaRt acronym and capitalisation – this is different between the title and the text</li> <li>● Table 2: please include a key and expand acronyms (e.g., SEIFA, ASGS), and reference these as required</li> <li>● You state no grants supported this study, but then report funding in the acknowledgements – could you please clarify this inconsistency.</li> </ul>
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**VERSION 1 – AUTHOR RESPONSE**

**Reviewer 1: Dr. Jane Jöhr**

Reviewer Comment	Response
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**Introduction**

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<p>1. The introduction would benefit from further discussion on the various consequences of brain injury, including disorders of consciousness, which are only briefly mentioned later in the description of the cohort.</p>	<p>Thank you for your feedback.</p> <p>A more detailed description of the complexities associated with acquired brain injury has been introduced in the Introduction section. These consequences include neurological, medical, cognitive, personality, behavioural and lifestyle consequences. The inclusion of these facets of disability ensure the reader is able to understand the range of consequences seen following acquired brain injury:</p> <p><i>“ABI can cause long-term physical disability and complex neuro-behavioural effects. These can include neurological impairment (e.g. motor function, sensory loss), medical complications (e.g. spasticity, epilepsy), cognitive impairment (e.g. memory deficits, language impairments, reduced consciousness), personality and behavioural changes (e.g. impaired social skills) and lifestyle consequences (e.g. loss of independence, reduced quality of life)<sup>5</sup>.” (Lines 7-12)</i></p>
<p>2. I think it is important to present and detail the results of the smaller cohorts in Australia, the results from other cohorts worldwide, and to summarize recent research on the effectiveness of various neurorehabilitation programs in Australia and the world for acquired brain injury (ABI) patients.</p>	<p>Thank you for this suggestion.</p> <p>An elaboration on the findings of other Australian cohorts has been included in the Introduction, including when and where these cohorts were studied. These cohorts examine the outcomes of individuals with ABI throughout their stay in post-acute rehabilitation services, and demonstrate the value of those services across physical domains. Psychosocial domains demonstrate mixed findings.</p> <p>These changes can be seen in lines 38-53.</p>

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<p>3. There is some confusion between the purpose of the ABI-RESTART program and the objectives of the present study. The research questions for the study are weakly defined and should be more clearly distinguished from those of future research. As I understand, the primary objectives of the current study are to fully assess the clinical characteristics and outcomes of patients with ABI, and to identify their longitudinal needs. Secondary objectives include describing the formation of the ABI-RESTART program and its unique combined measures design, and the presentation of future research questions motivating analyses of the predictive factors and effectiveness of the neurorehabilitation programs implemented. If this is not the case, it is necessary to differentiate better the objectives of the program from those of this study to avoid confusion.</p>	<p>We agree that the goals of the overarching research program and of the paper itself were not clearly extricated. The overarching goal of the research program is to examine the short-term and long-term outcomes of the cohort. The specific aims of the cohort profile paper were to describe the demographic, clinical and admission characteristics of the cohort.</p> <p>As this was unclear to the reviewers, we have included additional details to the manuscript for clarification.</p> <ol style="list-style-type: none"><li>1. Mention of outcome variables was removed from the aims in the Introduction (Line 81) to ensure that the reader does not come to expect detailed analysis of the outcomes for clients from the rehabilitation program.</li><li>2. A data table was included (Table 4) to specify the clients with available outcome measures, including the amount of missing data.</li><li>3. Additional detail around the availability of outcome data has been specified in the Key Measures, Variables and Outcomes section (Lines 235-239) as well as a statement specifying that the current paper evaluates only demographic and brain injury characteristics.</li><li>4. Added sub-heading Aims, to distinguish the aims of the study in the present paper from the aims of the ongoing research program</li></ol>
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<p>4. The second half of the introduction presents the ABI-REStART program and the cohort extensively, whereas this information concerns the study design and should preferably appear in the methodology section.</p>	<p>Thank you for this suggestion.</p> <p>To improve the distinction between Introduction and Methods sections, the paragraph of the Introduction describing the research program has been modified to include only a brief description of ABI-REStART. Details such as the number of individuals in the cohort and the specific data collections utilised have been removed to prevent repetition from the Cohort Description section. The brief description has been given a subheading prior to the aims of the paper (Lines 58-75)</p>
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**Cohort description**

<p>1. The division into sub-cohorts lacks precision; I do not understand the meaning of "These sub-cohorts reflect periods of service delivery change across the different programs" (p.6, l.48-49). Please clarify. How long ago was each program put in place? Were they all already in action when the study began?</p>	<p>We have included a new table (Table 2) to detail significant changes to service delivery programs that occurred across the four service delivery periods. For clarity we have removed the term "sub-cohorts" which are now referred to as service delivery periods. In addition, the commencement date of each program has been included to ensure the reader is able to understand the development of the programs over time.</p> <p>The programs have all begun since 1991, making this cohort study a complete examination of every brain injury client that has accessed Brightwater's brain injury services since commencement.</p>
<p>2. No missing data are specified. But is this really the case? It is stated in the abstract (p.3, last bullet; and p.15, l.15-18) that pre- or post-entry follow-up data for cohort members based in another state or abroad will not be captured, which necessarily implies missing data.</p>	<p>The number of clients with pre-admission and post-discharge linked data captured by the WA Data Linkage System has been included in Table 4.</p> <p>For clients with missing linked data, it is not possible to distinguish between people who have missing pre- or post-entry data due to a move interstate or abroad (i.e. lost to follow-up) or those who remained in WA but did not engage in a health service with an associated linked health database.</p>

	<p>This has been clarified across Lines 398-400.</p>
<p>3. Similarly, no missing data are specified for the outcome measures. Given the rigor required to complete the various questionnaires and tests, it is unlikely that all data could have been collected for all 1011 patients. Nevertheless, if this is the case, please mention it.</p>	<p>As correctly observed by the reviewer, outcome measures were not completed for every client in the cohort due to the pragmatic nature of the cohort. A new table specifying data availability for key outcome measures (Table 4) has been included to make this clearer.</p> <p>Different outcome measures were used across services over time. Comprehensive outcome measures were introduced in 2011 and as such only a subset of the cohort have available data for the outcome measures.</p> <p>This has been clarified in the manuscript under Key Measures, Variables and Outcomes:</p> <p><i>“Table 4 outlines the availability of key outcome measures data for the cohort. As the cohort is a retrospective pragmatic cohort, available outcome measures data for each client differs depending on the service period, the outcome measures used at the time, and the program the client was admitted to. Comprehensive outcome measures were introduced across services in 2011, therefore, only a subset of the cohort have complete outcome measures.”</i> Line 235-239</p>
<p>4. How is the data archived? There is no mention of the security required for its storage and use.</p>	<p>Thank you for this suggestion. Details about data extraction, storage, security and use have been included in the paper (Lines 240-254) to answer these questions.</p>

**Findings to date**

<p>1. The authors describe a unique combined data-use design, and mention outcome measures as fundamental, but they are absent from the description of the main results. Upon reading the abstract, summary, and introduction, the reader expects to see the presentation of results for various key measures including functional independence, health status and comorbidities, goal attainment, mental health and well-being, and quality of life. If one of the main objectives of the study is to examine the longitudinal needs of patients with ABI, it is necessary to describe the data collected, if any, or at least to adequately justify their absence. While this is not one of the objectives of the present study, it is necessary to define them better beforehand to avoid creating a false expectation for the reader.</p>	<p>As described in Introduction point 3, the Introduction has been modified to specify that the aims of the research program as distinct from the aims of the cohort profile paper specifically. We have also clarified at the end of the aims that outcome measure data will not be included in detail in the current paper: <i>“Future publications will examine the specific outcomes of the cohort.”</i> Line 83</p> <p>Also in the statistical analysis (Methods): <i>“Extraction and analysis of baseline data was completed in February 2021. Basic demographic and brain injury characteristics are presented in the current cohort profile, with subsequent research examining the health status and outcomes of those in the cohort.”</i> Line 263-266</p> <p>A new table (Table 4) has included outlining the key outcome measures and the number of clients with available data. The future research described in the paper will specifically rely on these outcome measures, and this has been clarified in the Key Measures, Variables and Outcomes section Line 235-239</p> <p>Given the large number of different outcome measures, complexity of different time ranges and sub-populations of clients with available data, we decided not to include outcome measures data in the cohort profile paper as to not confuse/overwhelm the reader. Subsequent research papers will describe outcome measures in the level of detail required.</p>
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**Specific comments**

<p>1. The abstract is already a summary of the article. The "Article summary" should be replaced by "Key points" or something similar.</p>	<p>This has been amended to “Strengths and Limitations” in line with the journal formatting requirements.</p>
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<p>2. Although it may be a cultural difference between Australia and Europe, I am surprised by the recurrent use throughout the text of the term "client" instead of "patient" as is commonly used in European rehabilitation programs.</p>	<p>Thank you for this observation – this is correct. In the Australian healthcare setting, the term “patient” is typically used to describe individuals who are receiving inpatient and hospital-based healthcare services, including out-patient medical services.</p> <p>The term “client” is commonly used to describe individuals engaging in community-based healthcare services, particularly allied health services.</p>
<p>3. P.4, l.19-20: "Up to 75% of brain injuries occur in adults under 65 years of age", please specify for the Australian population.</p>	<p>We have modified this sentence to specify this statistic relates to the Australian population (Lines. 13)</p>
<p>4. P.4, l.29: “Adjustment” to what? It is not clear if this is emotional, occupational, instrumental, community as in the cited study. Please specify or give more details of results of the study you are referring to.</p>	<p>This has been modified to read “... and adjustment to the cognitive, physical and behavioural impairments associated with ABI” (Lines 17-18)</p>
<p>5. P.4, l.31: Please define the term "post-acute care" and what it consists of in relation to the cited study.</p>	<p>We have included a definition of post-acute care in the Introduction to aid in the interpretation of subsequent findings. Lines 25-30.</p> <p><i>“Post-acute care is defined as care occurring after the acute care period, with individuals who have achieved acute recovery, are medically stable, and no longer requiring hospitalisation<sup>11</sup>. Post-acute care may occur immediately following discharge from hospital or at any time after the individual has achieved medical stability<sup>12</sup>. The focus of post-acute care is on functional improvement and/or to support individuals to achieve meaningful participation in life, as distinct from physiological recovery.”</i></p>

<p>6. P.4, l.32-33: "Post-acute care is important throughout this often difficult and stressful transition period." This statement appears to be a value judgment, please elaborate objectively on this statement in reference to the results of the cited study.</p>	<p>We have modified this statement to clarify the origin of these claims. It now reads as follows; <i>"Post-acute care is important throughout the transition from acute services, such as hospitalisation, to home or community care , with clients and families often reporting the transition to be difficult and stressful<sup>10</sup>."</i> (Lines 19-21)</p>
<p>7. P.4, l.44: "poorly understood"; P.12, l.22; "fortunately": these are subjective assessments, to be avoided.</p>	<p>These subjective assessments have been removed (Line 35-36); (Line 319)</p>
<p>8. P.6, l.12-18: "The study cohort will be periodically updated with new admissions to allow a dynamic cohort of individuals to be followed through changing services over time, a unique possibility not seen in previous cohorts"; P.9, l.33. : "The study cohort and data linkage will be periodically updated with new admissions to allow cohort growth and dynamic followup."; To be stated rather in the section: <i>Future directions</i>.</p>	<p>Thank you for this suggestion. These statements have been removed from these sections and reintroduced in the Future Directions section: <i>"To ensure that change over time can be examined into the future, the cohort will be periodically updated with new admissions to allow a dynamic cohort of individuals to be followed through changing services over time, a possibility not seen in previous cohorts of this type."</i> Lines 398-362</p>
<p>9. P.7, l.40: Please define the term "minimally conscious", or expand it adequately in the introduction.</p>	<p>A definition of minimally conscious state has been added to this section, Lines 148-150</p>
<p>10. P.11, l.54-55: "the most comprehensive set of measures available for a cohort of this kind to date."; To be removed here as not part of the methodology.</p>	<p>We have removed this assertion (Lines 234)</p>
<p>11. There is overuse of the term "unique" throughout the text to describe the method. Please limit its use as it appears as a value judgment when repeated so much.</p>	<p>Thank you, we agree. The term "unique" has been removed in several places throughout the manuscript to address this reviewer's comment, Lines 63, 210, 220, 361, 380</p>

**Reviewer 2: Dr. Jade Kettlewell**

Reviewer Comment	Response
<b>Findings to date</b>	
<p>1. It would be good to see a table summarising the outcome measures. The authors describe some of the outcomes to date in the text, but a more detailed summary (i.e. table) would improve the manuscript. It is not clear whether this data has been analysed yet, or is the next step.</p>	<p>An excellent suggestion from this reviewer to improve the clarity of the manuscript. A table has been included to show the number of clients with available data (Table 4).</p> <p>In addition to this, it has been clarified that outcome measure data (both at baseline and at discharge) will be examined in separate publications, where the data can be given full elaboration.</p> <p>See response to Reviewer 1, Findings to Date, Point 1.</p>

**Reviewer 3: Dr. Kerrin Watter**

Reviewer comment	Response
<b>Introduction</b>	



<p>1. The paper would benefit from a definition of “post-acute” care, to help the reader fully understand this cohort and their context.</p> <p>For example, you state various types of post-acute care exist - expanding on this and/or defining “post-acute” care in your context will aid the reader. Additionally, your cohort involves people immediately post-hospital discharge undertaking early rehabilitation (e.g., TRP program) as well as clients who are residing in the community and referred in the chronic phase of their injury. Are you classifying your entire cohort as “post-acute”? (My understanding of “post-acute” was a timepoint close to hospital d/c (i.e., earlier post-injury) as opposed to those living at home in the community.) Providing a definition of “post-acute” care for your study context will help clarify this for the reader.</p>	<p>Thank you for this suggestion. A definition of post-acute care has been added to the introduction of the paper to clarify the findings throughout.</p> <p><i>“Post-acute care is defined as care occurring after the acute care period, with individuals who have achieved acute recovery, are medically stable, and no longer requiring hospitalisation<sup>11</sup>. Post-acute care may occur immediately following discharge from hospital or at any time after the individual has achieved medical stability<sup>12”</sup> Lines 25-28</i></p> <p>As the chronicity of the injury is determined based on the time between injury and admission to services, this does not provide specific information detailing the length of time spent in the community. Individuals in the “chronic” phase of injury may only recently been discharged from an inpatient setting.</p>
<p>2. On page 6, paragraph 2, you report in addition to TBI and NTBI, eligible neurological conditions are also accepted. Please provide some additional detail for the reader at this stage in the manuscript regarding the eligible neurological conditions, or refer them to the appropriate Table. (I note they are mentioned later on in the paper /referred to in Table 3).</p>	<p>The authors agree that clarity could be added here by specifying the specific neurological conditions accepted into the cohort. Changes have been made to reference Table 3 (now Table 1) such that the reader will be able to refer to the specific conditions eligible for the cohort at an earlier stage of the manuscript. (Lines 98)</p>

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**Cohort description**

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<p><b>Program details</b></p> <p>1. Page 6, paragraph 3: You state that there have been 4 main periods of different service delivery / service provision within this time. Providing a brief summary on these changes / the four different focusses will be beneficial for the reader. If this data is to be presented in a future publication, please indicate this.</p>	<p>Addressed in response to Reviewer 1, Cohort Description, Point 1.</p>
<p>2. What is the difference between the <i>TRP program</i> (and neurorehab) for the clients who are residing at home versus <i>Capacity Building program</i> (with neurorehab)? Is the difference between their funding source (e.g., Dept Health vs NDIS) or are the programs themselves providing different services / rehabilitation? Please expand / specify in the text.</p>	<p>The authors thank the reviewer for this comment. This is an important distinction that was not highlighted adequately in the manuscript.</p> <p>The key difference between TRP (at home) and Capacity Building is the structure of the programs. Individuals undergoing TRP (at home) undergo a structured and comprehensive rehabilitation program that follows the same format of the TRP (on-site) program.</p> <p>Individuals in the Capacity Building program are able to choose which specific resources they wish to use their NDIS funding for. While they may choose some of the same rehabilitation services offered in TRP (e.g. occupational therapy, speech therapy, physiotherapy etc), these services are not structured and are offered on an ad hoc basis.</p> <p>The manuscript has been updated to reflect these differences more clearly (Line 195-196):  <i>“Capacity Building clients are able to access services on an ad-hoc basis as determined by the client themselves, and have individually tailored rehabilitation or lifestyle goals that are achieved while living off-site.”</i></p>

<p>3. Page 6-8: Have all programs been available since start of your service (eg 1991)? Or have these developed over time? e.g., was the <i>Supported Independent Living</i> program previously available before the NDIS commenced in Australia, or is this a new program or service? Providing information on when these components have been available for clients to access will aid the reader in interpreting your service data and cohort statistics.</p>	<p>Not all programs have been available since 1991. To improve the clarity of the manuscript, program commencement years have been added to the manuscript (Cohorts, Setting and Programs) and Table 2.</p> <p>Please refer to the response to - Reviewer 1, Cohort Description, Point 1 for detail.</p>
<p>4. Are there specific timeframes for the 5 different services? If so, please add this information to the manuscript.</p>	<p>All programs except the HACC SS program described in the manuscript are still running today. The commencement dates of each program has been added to be manuscript (see comment 3 above) to improve the interpretability of the findings. The date in which the HACC program ceased to accept new admissions has been added to clarify, and it has been made explicit that the Capacity Building program replaced HACC (Lines 172-179).</p> <p><i>“This program began to be phased out in 2016 when the Capacity Building program began, with no new clients accepted into the program after June 2019<sup>29</sup>”</i></p> <p>The order of description of the programs in the Cohorts, Setting and Programs section has been re-ordered such that the programs are introduced in order of their commencement.</p>

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**Service description and access**

5. Do clients only access one of your 5 services, or can they access multiple or concurrent services? e.g. move from *TRP* program to *Capacity Building*, or transition from *TRP* to *SIL*? If they utilise >1 service, how is this data counted or reported regarding the cohort? e.g., is only the first service accessed counted? When I review Table 4, it appears only one service encounter is logged per individual.

Are people referred back to your service? If so, how is this accounted for in your data count /cohort?

Please clarify these factors within the manuscript.

To clarify this reviewer's question, additional explanation of the program structure is included in multiple places in the manuscript:

Cohort Design and Eligibility:

*"Each individual's entry date into the cohort represents the date of their index admission (first episode of care) to Brightwater's community-based brain injury services."* Line 89-91

Cohorts, Setting and Programs:

*"Clients are able to be re-referred to Brightwater programs, or transferred between programs, as their goals and abilities change, and therefore can have multiple episodes of care. However, clients can only be enrolled in a single program at any one time."* Line 118-121

For the current analysis, we considered only the **index admission** to Brightwater for each client. This has been clarified by the inclusion of the word "Index" prior to admission to services in the headings of Tables 5 & 6 and line 115

Also in Statistical Analysis:

*"Extraction and analysis of baseline data was completed in February 2021. Basic demographic and brain injury characteristics **at index admission** are presented in the current cohort profile. Subsequent research will examine the health status, service use, and outcomes of the cohort in detail."* Line 263-266

In subsequent papers, we will examine the trajectory of service use for the cohort (e.g. number of episodes of care, program transfers, re-admissions after discharge). Individuals with >1 episode of care can be included in analysis of outcome measures more than once, depending on the program they were admitted at the time of outcome measurement. This methodology will be explained in more detail in the specific outcome measures papers.

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<p>6. You report that some clients who access your service have had &gt;1 brain injury. Are these: new clients to your service (did not access following first ABI)?; a second referral or rereferral to your service?; or part of an ongoing / longterm admission? How are these counted with respect to the cohort numbers above and in Table 4?. Please clarify this within the manuscript.</p>	<p>This is correct. The proportion of clients with a prior brain injury reported refers to individuals who had a separate ABI prior to their primary ABI which led to admission to Brightwater services.</p> <p>Individuals with a prior brain injury did not access Brightwater services following that prior injury. This is further clarified in:</p> <p>Cohort Design and Eligibility:  <i>“Each individual’s AROC diagnosis represents their primary brain injury diagnosis at index admission to Brightwater, but not necessarily their index brain injury. It is possible for individuals to have had prior brain injuries for which they did not access Brightwater services.”</i> Line 103-106</p> <p>Only the primary brain injury diagnosis at entry to Brightwater services was counted in the counts for each brain injury type in the cohort description and Table 1.</p> <p>Each individual was counted only once in the numbers for each brain injury type regardless of how many prior brain injuries they had acquired.</p>
<p><b>Demographic information</b></p> <p>7. I note an age limit existed for you clients accessing <i>Oat St TRP</i>. Does this age limit extend to all your services? This was not specified for the other service groups. Please specify this for all 5 service groups within the manuscript. This impacts interpretation of your demographic data and supports your reporting of the cohort’s age as a limitation of your study</p>	<p>To improve the interpretability of the results, the age range of clients has been clarified. All services accept clients between the ages of 18-65, however this is on a case-by-case basis and is funding dependent. As such, some clients outside these age ranges have been accepted into services throughout the duration of these programs.</p> <p>This has been specified in the manuscript.  <i>“All programs accept clients between the ages of 18-65 years, however acceptance to each program is on a case-by-case basis. As such, some individuals outside of those age ranges have been admitted throughout the duration of the programs.”</i> Lines 122-124</p>

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**Findings to date**

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**Future directions**

1. In your 'future directions' section, you are reporting on the MH findings of a subsection of your data. Is this from a specific component of your cohort? e.g. those admitted to one particular arm of your service (e.g., TRP)?; or those admitted straight from hospital?; or 263 consecutive admissions? Please provide a brief statement / sentence on the MH cohort referenced is (if possible) to help the reader better interpret this important point.

We agree that this section would benefit from additional clarity around the subsample used in this prior research.

This has now been updated to specify; "Prior research *using a retrospective convenience sample* of 263 ABI-REStART members *admitted to the service from 2009 - 2018* found that mental health comorbidities were present in 55.8% of the sample ( $n=106$ ), representing the most common comorbidity<sup>26</sup>" (Lines 372-373)

**Strengths and limitations**

2. You state that the cohort allows for effects of policy and treatment changes to be examined over time, and can evaluate the efficacy of programs and post-acute rehabilitation. I agree, but in this paper, you have only reported on the demographic and injury information, not the impact of treatment or effects or outcomes of the program. Consider some of your tense / wording: eg the sentence "*The cohort was formed over 29 years, allowing the effects of policy and treatment changes over time to be examined.*" implies that this has been examined (either within this paper or via a separate publication). If it has, please note this here, if it is an ongoing / future direction consider rewording the sentence

Thank you for bringing this to our attention.

This sentence has been re-worded to clarify that while the data relating to client demographic features has been collected for 29 years, future planned research will be required to examine the effects of these policy and treatment changes across that 29 year period.

Lines 382-384

*"The demographic and outcomes data at Brightwater has been collected over 29 years, which will allow the effects of policy and treatment changes over time to be examined."*

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**Technical and editing comments**

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<p>1. Within the text, acronym use and provision of definitions is a little variable. .e.g, - p 11 – IRSP – please provide the word in full in the text, as well as a brief description of this in the text. This may also benefit from being referenced.</p>	<p>This acronym has now been expanded in text (Lines 285-286).</p>
<p>2. Check your REStArT acronym and capitalisation – this is different between the title and the Text</p>	<p>We have amended the title to match the capitalisation seen in text.</p>
<p>3. Table 2: please include a key and expand acronyms (e.g., SEIFA, ASGS), and reference these as required</p>	<p>This is now Table 5.  We have now included a note below the table expanding the acronyms within the table.</p>
<p>4. You state no grants supported this study, but then report funding in the acknowledgements– could you please clarify this inconsistency.</p>	<p>Thank you for bringing this to our attention.  No funding is to be declared. The Author Contribution statement has been modified to remove the reference to funding procurement.</p>

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Watter, Kerrin The University of Queensland
<b>REVIEW RETURNED</b>	02-Jul-2021
<b>GENERAL COMMENTS</b>	All identified areas from the first review have been addressed and I recommend publication of your manuscript. I look forward to future publications from this data set, including your clinical outcome data.