National Best Practice Framework for Early Childhood Intervention

Developing a suite of resources to support outcome measurement

A methods explainer

Introduction

This document is one of several that form the Outcome Measures Resources for the National Best Practice Framework for Early Childhood Intervention (the Framework). The resources include:

- Measurement overview: Choosing and using outcome measures
- Outcome measures for children
- Outcome measures for parents, carers and families
- Outcome measures for services and practitioners
- Developing a suite of resources to support outcome measurement: a methods explainer (this document)

The purpose of this document is to provide an overview of the methods used to develop the Outcome Measures Resources for the National Best Practice Framework for Early Childhood Intervention (the Framework). An evidence synthesis approach was taken to selecting outcome measures and providing information that describes each outcome measure and its related evidence. Evidence synthesis is critical to inform decision making in policy and practice. Due to the ever-increasing volume and complexity of published literature, traditional methods for conducting evidence reviews have become less feasible, particularly when trying to maintain both rigour and timeliness.

Our aim was to develop a suite of readily accessible evidence-based resources that early childhood intervention (ECI) services and practitioners can use to assess progress toward targeted outcomes of the Framework. The Framework describes targeted ECI outcomes for:

- children aged <9 years with developmental concerns, delay or disability
- parents, carers and families
- ECI services and practitioners
- communities

The current iteration of the Outcome Measures Resources focuses on measures for children; parents, carers and families; and ECI services and practitioners.

Our approach

Following the ECI desk top review and consultation processes, we identified more than 100 outcome measures with potential alignment with the outcome statements of the Framework. To address the challenge of conducting a rigorous review process efficiently, we combined traditional literature searching with augmented search tools to maximise the scope of our evidence synthesis while maintaining feasibility and rigour. Our replicable methods (see Methods Outline below) combined guidance from: the Cochrane Rapid Reviews Methods Group on rapid review methodology (1); early adopters of emergent generative-artificial intelligence (AI) technologies (2); and the Campbell Collaboration on evidence mapping (3, 4).

Evidence mapping offers a transparent, rigorous, and systematic approach to identifying, describing, and cataloguing evidence and evidence gaps in a broad topic area. Unlike systematic reviews that aim to synthesise data, mapping reviews describe, categorise, and catalogue findings across a wider scope.

The Framework provided us with an existing structure for a mapping review. For identified outcome measures that mapped directly to the Framework, we synthesised the available evidence and generated templated Framework practice resources. Our staged approach allowed for generation of immediate outputs, facilitating early interaction with the Framework in practice.

Importantly, the methods and resultant practice resources have been conceptualised as a living evidence synthesis that can be added to and refined over time. Future enhancements could include further assessment of the quality or potential bias of mapped evidence; rapid knowledge translation of new outcome measures as they emerge; inclusion of updated evidence by way of regular updates; development of visual supports such as an evidence gap map; and identification of Framework outcome areas where an absence of quality outcome measures, or where important limitations in measurement are present, indicates the need for measure development.

In conjunction with the Measurement Overview, and the Decision-Making Guide, the Framework's outcome measures practice resources support ECI practitioners to make decisions about measuring outcomes with families by providing readily accessible evidence-based information about outcome measures for core Framework outcomes.

Table 1 shows the approach taken to mapping the included outcome measures to the Framework's outcome statements. The mapping table is designed to show the relationship between individual outcome measures and Framework outcome statements and are provided for each of the groups for whom ECI outcomes are articulated.

Table 1. Example of approach to mapping outcome measures to the Framework's outcome statements

Outcome measure	Outcome statements					
	1	2	3	4	5	6
Name of outcome measure 1			●	◒		
Name of outcome measure 2	●				◒	◒

● Yes, measure addresses this outcome area; ◒ Partial, measure provides some information about this outcome

Box 1 displays the content that is provided for each outcome measure included in the Outcomes Measure resources.

Box 1. National Best Practice Framework for Early Childhood Intervention – Outcome Measures Practice Resources

- ECI Framework Outcome/s targeted
- Overview of the measure
- General description
- Domains/subscales
- Ages
- Special considerations
- Cultural adaptation
- Administration
- Training requirements
- How to access
- Evidence summary
- Overview
- Review papers
- Measurement properties
- Cultural adaptation papers
- Outcome studies in ECI practice settings
- Reference list

Methods

Search Strategy

The search strategy for this review combined an AI-augmented desktop review and traditional literature search to ensure methodological rigour. Search platforms used included: i) Perplexity: an AI-powered search engine for comprehensive web content analysis, ii) PubMed: a traditional academic database for peer-reviewed literature, iii) Consensus: an AI-powered evidence synthesis tool for developing consensus statements based on scientific literature and iv) Claude: an AI-powered assistant that uses large language models for synthesis of information. Further information is provided in Table 2. In line with the World Health Organisation's guidelines for the ethics and governance of AI for health (5), expert verification processes were integrated into the methodology at key stages to ensure information provided was correct. These verification processes are described below.

Table 2. Search platforms used in the outcome measure evidence synthesis

Tool / Link	Description
Perplexity https://www.perplexity.ai/	Perplexity AI is an AI-powered search engine that synthesises information from a wide range of sources including academic databases such as Semantic Scholar, news sites, research papers, and the broader web, to provide concise, citation-backed answers to user queries. It conducts real-time searches, interprets natural language questions, and includes direct citations to its sources for transparency and verification.
PubMed https://pubmed.ncbi.nlm.nih.gov/	PubMed is a publicly accessible academic database developed and maintained by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM), part of the National Institutes of Health (NIH). It provides access to citations and abstracts from biomedical and life sciences literature, including MEDLINE, PubMed Central (PMC), and the NCBI Bookshelf. PubMed supports advanced search features, such as Medical Subject Headings (MeSH), and offers links to full-text articles when available.
Consensus https://consensus.app/	Consensus is an AI-powered academic search engine that synthesises and summarises findings from scientific literature, primarily sourcing its data from Semantic Scholar. It allows users to ask natural language questions and provides evidence-based answers by aggregating and

Tool / Link	Description
	analysing results from multiple peer-reviewed studies. Consensus offers concise summaries of key findings, with clear source citations for transparency.
Claude https://claude.ai/	Claude is an AI-powered assistant developed by Anthropic, designed to generate natural, human-like responses to text and image-based prompts. It can perform a wide range of tasks, including summarisation, content generation, data extraction, translation, question answering, and document analysis.

Outcome Measure Identification

Outcome measures used to evaluate outcomes in ECI settings were identified from:

- consultations with ECI practitioners and the Framework's consortium leadership team
- a systematic review of ECI outcome measures conducted during development of the Framework
- a structured desktop scan, assisted by Claude AI (Table 2), using keywords from the Framework outcome statements

All identified outcome measures were collated in Microsoft Excel. Duplicate and/or irrelevant outcome measures were removed during our initial assessment. The outcome measures identified represent a starting point in an intentionally adaptive process. We deliberately built flexibility into our methodology to allow for the addition of new tools and removal of irrelevant ones, ensuring the final product remains 'live' and continuously refinable.

Outcome Measure Mapping

Each of the identified potential measures were mapped against the outcome statements of the Framework and categorised as 'Include', 'Exclude' or 'Unsure.' Mapping was checked and confirmed by three reviewers.

Tools were excluded if the tool was not relevant to the ECI setting and/or did not evaluate an outcome aligning with the Framework's outcome statements.

Outcome Measure Evidence Synthesis

A staged approach was taken to outcome measure evidence synthesis for each potential outcome measure aligning with the Framework.

Step 1

A structured desktop synthesis, augmented by Perplexity AI (Table 2), was conducted using pre-determined search prompts. Information was extracted about the measure's description, age range, domains/subscales assessed, administration information, training required, and how to access the measure.

Step 2

A traditional literature search was conducted in PubMed (Table 2) using a MeSH and keyword search string developed with an information specialist including:

- Tool-specific terms – tool name and acronym
- Terms related to psychometric properties – reliability, validity, responsiveness
- Terms related to cultural adaptations and applications
- Specific population terms relevant to diverse groups

Step 3

A structured desktop synthesis, augmented by Consensus AI (Table 2), was conducted using pre-determined search prompts to identify additional literature. These prompts included:

- Tool reliability, validity, and responsiveness in ECI practice settings
- Utility as an outcome measure
- Limitations and gaps in evidence
- Cultural adaptability and applications

Step 4

Additional literature identified in *Step 3* was verified and merged with the identified PubMed literature from *Step 2* within a PubMed collection.

All titles and abstracts of identified references were screened against the following pre-defined inclusion criteria:

- Review or meta-analysis directly relevant to the outcome measure
- Primary study of the measurement properties of the outcome measure
- Primary study related to the cultural adaptation of the outcome measures
- Primary study that used the outcome measure in an ECI practice setting

We excluded references where the full text was not available in English.

Included references were exported from the PubMed collection to Microsoft Excel. A second independent screen was conducted for each measure, coding references against the same four criteria, as well as identifying country of origin and study population. Results were collated using a pre-defined template.

Step 5

An evidence summary was tabulated, augmented by Claude AI (Box 1). Content in the table was restricted to the outputs generated in *Step 1* and *Step 3*, i.e., the materials and references generated from the structured desktop search.

Outcome Measure Selection

Each evidence summary from the evidence synthesis was independently checked by reviewers and discussed in relation to the outcome statements of the Framework. Mapping was checked and agreed or re-categorised as 'Include', 'Exclude' or 'Unsure.'

Outcome measures were excluded if:

- They were not relevant to the ECI setting
- They did not evaluate an outcome aligning with the Framework's outcome statements
- Insufficient information and/or evidence was found

Tools marked as 'Unsure' were discussed within the review team. Consensus for inclusion was reached if it was clear that the tool could be used as an outcome measure in the Australian ECI setting and it measured an outcome that aligned with outcome statements in the Framework.

The review process was continued for relevant tools.

Development of ECI Practice Resources

Tool Overview table

A templated Tool Overview table was manually populated for each included tool using information collated in the evidence synthesis. Any content that was missing or inaccurate was flagged for independent review by a second reviewer. The second reviewer consulted original source(s) to manually verify, add to, or refine the information.

Evidence Summary table

An Evidence Summary table was manually populated using the information in the Excel data extraction template. Any missing information or misinformation was flagged for independent review by a second reviewer. A reference list was generated using a purpose-built script written in R and executed within the RStudio integrated development environment (6).

Each finalised Evidence Summary table and reference list was independently reviewed by at least one reviewer not involved in the prior steps to check for alignment with the Framework's outcome statements and to assess the accuracy and completeness of the included information. Original source(s) were accessed to verify and refine the included information.

Strengths and Limitations

Key strengths of the current review include the efficiency in identifying the most relevant literature, use of novel methodology that combined traditional and innovative search methods to maximise coverage, and transparent methodology that can be replicated and refined over time.

However, several limitations must be considered. Our non-generative AI search strategy was limited to one primary database (PubMed), which may not have captured all existing evidence, particularly unpublished studies. Further, the rapid nature and mapping review methodology means there is less depth in the information extracted than would be included in a systematic review if undertaken for each measure.

Summary

This document provides an overview of the methods used to create the Outcome Measures resources for the Framework. It is important to note that this has been designed to be a 'living resource' requiring continued input. Currently there are a number of potentially useful outcome measures that are still to have their evidence summaries completed for each of the three ECI groups included so far. In addition, the outcome measures evidence synthesis for Community outcomes is yet to commence. The related resources for this work can be found online, and include:

- Measurement overview: Choosing and using outcome measures
- Outcome measures for children
- Outcome measures for parents, carers and families
- Outcome measures for services and practitioners
- The Decision-Making Guide

References

1. Garritty C, Gartlehner G, Nussbaumer-Streit B, King VJ, Hamel C, Kamel C, et al. Cochrane Rapid Reviews Methods Group offers evidence-informed guidance to conduct rapid reviews. Journal of clinical epidemiology. 2021;130:13-22.
2. Fabiano N, Gupta A, Bhambra N, Luu B, Wong S, Maaz M, et al. How to optimize the systematic review process using AI tools. JCPP advances. 2024;4(2):e12234.
3. Campbell F, Tricco AC, Munn Z, Pollock D, Saran A, Sutton A, et al. Mapping reviews, scoping reviews, and evidence and gap maps (EGMs): the same but different—the "Big Picture" review family. Systematic reviews. 2023;12(1):45.
4. White H, Albers B, Gaarder M, Kornør H, Littell J, Marshall Z, et al. Guidance for producing a Campbell evidence and gap map. Campbell systematic reviews. 2020;16(4):e1125.
5. Guidance W. Ethics and governance of artificial intelligence for health. World Health Organization. 2021.
6. RStudio Team. RStudio: Integrated Development Environment for R. : Posit, PBC, Boston, MA; 2025 [Available from: https://posit.co/].

Recommended citation

Long, S., D'Aprano, A., Lami, F., Wilson, M., Knight, S., Yates, M. & Imms, C. *Developing a suite of resources to support outcome measurement: A methods explainer for the National Best Practice Framework for Early Childhood Intervention*. The University of Melbourne. Commissioned by the Commonwealth of Australia's Department of Social Services.

Along with the named authors of the report, the partners would like to acknowledge the full Leadership team including Bruce Bonyhady, Kirsten Deane, Tim Moore, Denise Luscombe, SNAICC authors, Karen Dimmock and Skye Kakoschke-Moore.

The partners would also like to thank the national and international expert advisors who generously gave their time and advice over the course of the project.