RESTACKING THE ODDS

ENSURING THE EARLY CHILDHOOD WORKFORCE HAS TIMELY DATA

Key messages

- High-quality early years services are essential for all children—but many can't access or participate in them
- Enabling service providers to use data for decision making can help to close equity gaps
- Building workforce data capability must be a priority for both service leaders and policymakers
- Professional development should go beyond training—workplaces must also support motivation and opportunities to use data in practice.

When early childhood services have the information they need, they can make informed decisions and champion innovation to close equity gaps.

August 2025

murdoch children's research institute

SVA innovators for good

BAIN & COMPANY

Access to high-quality early childhood services is crucial for ensuring that children receive the best start in life. This is particularly important for children and families experiencing various forms of disadvantage (e.g. due to social, financial or health circumstances). Yet families experiencing disadvantage often have less access to, and lower rates of participation in, services that support optimal early childhood development.[1,2] To create a more equitable early childhood service system, providers and policymakers need timely and accurate data about service quality, quantity and participation (also known as lead indicators).[3,4] In addition, they need sufficient capability, opportunity and motivation to regularly use data for decision making.[5,6] Our research sought to identify effective workplace data-literacy interventions to enable and improve data-informed decision making.

Data literacy is the ability to read, understand and use data to make informed decisions.

Data literacy skills include knowing how to identify, collect, organise, analyse, and interpret data to inform and monitor action.[7]

Data literacy is important for improving early childhood services

Data-informed decision making involves a process of collecting, analysing and interpreting data, then using the insights to inform planning and practice. This largely behavioural process is underpinned by other aspects of data literacy such as data knowledge, skills, beliefs, attitudes, and intentions.[7]

Data literacy and data-informed decision making are crucial for improving child outcomes and addressing systemic inequities in service delivery and child development. It is essential that services are able to collect, analyse, report, and use lead indicator data (i.e. real-time data about service quality, quantity and participation).

Yet research shows service providers experience a wide range of barriers to data use. These include gaps in the skills needed to analyse and interpret relevant data, beliefs and attitudes that deprioritise or discourage data collection and use, and a lack of workplace systems and processes that support data-informed decision making.[5,6] Effective data-literacy interventions are needed to overcome such barriers so that service providers can engage in continuous improvement activities that ensure families receive high-quality services.

What was our aim?

A systematic review was conducted to inform the development of strategies to increase workforce data literacy in five early years services: antenatal care, sustained nurse home visiting, parenting programs, early childhood education and care, and the early years of school.

What did we do?

The systematic review aimed to identify effective data literacy interventions within the five early childhood service settings. We asked:

- Which interventions have demonstrated positive effects on workforce data literacy outcomes?
- How do the strategies featured in the identified interventions work to build workforce capability, opportunity and motivation to improve data literacy among early childhood services providers?

The review included a comprehensive search for relevant literature across multiple academic databases, research registers and key publications.

To create a more equitable early childhood service system, providers and policymakers need timely and accurate data about service quality, quantity and participation.

We looked for studies that compared groups who had received a data-literacy intervention with those that had not. Studies had to report whether the intervention had any effect on either (a) data knowledge, skills, beliefs, attitudes or intentions, or (b) data use, such as data collection, data analysis or reporting, or data-informed decision making. Though more than 5,000 records were checked for eligibility, only 12 publications met review inclusion criteria. Following the identification of effective interventions, the COM-B Model of behaviour change was used to classify whether strategies in each study related to capability (C), opportunity (O) or motivation (M).[8]

What did we find?

All interventions had been designed for use in primary schools, with most focused on improving teacher assessment literacy. Several interventions led to improved data knowledge, data skills, beliefs, attitudes, or data use. All interventions involved strategies to increase capability, and several included strategies to improve motivation to use data in decision making or strategies to ensure that staff had the opportunity to engage in data-informed decision making (Figure 1).

Capability

A range of strategies were used to increase capability. These included education (e.g. information or demonstrations about how to collect, interpret or apply data to decision making) and training (e.g. practice interpreting reports and graphs, or applying information to decision making).

Opportunity

Strategies to increase opportunities for engaging in data-informed decision making included the provision of: 'expert' software systems (that generated reports and made recommendations for action), onsite data systems coaches and online discussion boards (for trouble shooting technical difficulties). Opportunity strategies that aimed to improve the social environment or data culture within the organisation included: incorporating dedicated time for data utilisation (e.g. scheduled release days from usual duties, or embedding data-review activities in pre-existing meetings), and modelling of desired data attitudes and behaviours (e.g. by involving leadership in training, the use of video clips featuring peers, and collaborative learning activities conducted in-person or online).

INCREASING DATA USE REQUIRES A COMBINATION OF STRATEGIES THAT ADDRESS CAPABILITY, OPPORTUNITY AND MOTIVATION

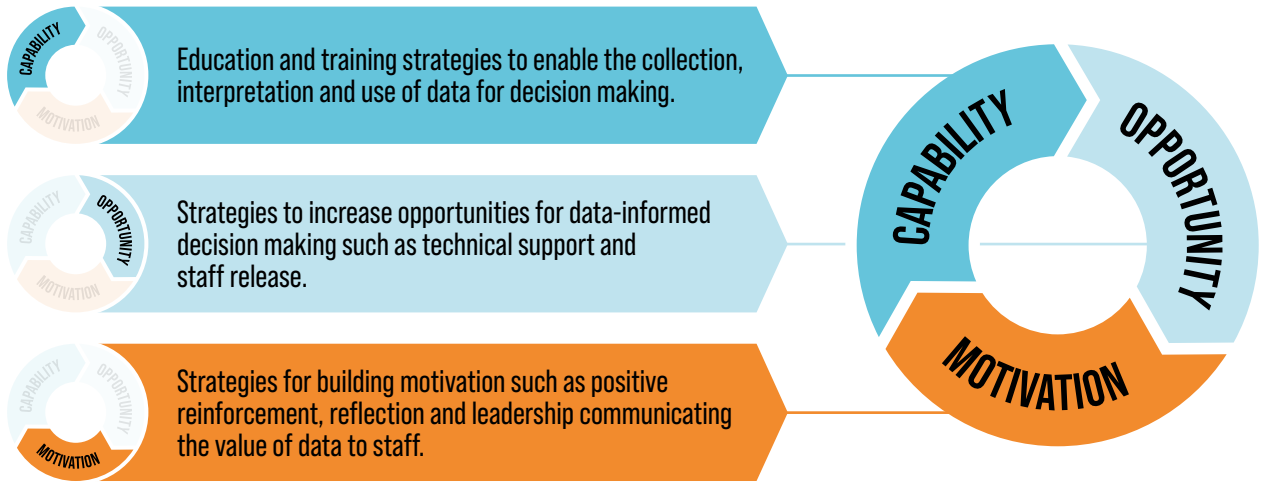

Figure 1: Strategies to increase data use

Motivation

Strategies to build motivation included use of positive reinforcement (e.g. praise, awarding certificates for completion of training), reflection activities (e.g. scheduling times to discuss alignment between data use beliefs and current practices, setting data use intentions or goals, and considering the potential benefits of using data to improve excellence and equity).

What does this mean?

The findings show that professional development interventions can improve data literacy and overcome barriers to data use among those working in primary schools. Positive effects ranged from changes in beliefs and attitudes through to data use, including for decision making. The results suggest data-literacy interventions in early childhood service settings should involve more than education or training to build workforce capability. The findings are likely to also apply to other early childhood service settings experiencing similar barriers.

Implications for policy, funders and practice

- Service (and service system) improvement initiatives could be strengthened by regular collection and analysis of data to track and evaluate service quality, quantity and participation.
- A data-informed approach helps ensure that the right interventions are being applied and adjusted as needed for continuous improvement.
- Improving data literacy and data-informed decision making requires more than education and training.
- There is a need for substantial investment in the development and rigorous evaluation of resources to improve data literacy and increase data-informed decision making in early childhood services other than schools.
- Governments and policymakers should consider the ways organisations are funded to deliver early childhood services, and opportunities to craft key performance metrics that encourage use of data (particularly lead indicator data).

Implications for research

Research embedded within professional development and continuous improvement processes could help us to learn more about:

- the types of strategies early childhood services are using—or would consider acceptable and feasible—to increase data-informed decision making
- how well these strategies are implemented
- whether they produce the effects expected based on previous research.

Engaging in a continuous cycle of analysing data, planning and implementing actions informed by the data, then evaluating the impact should ensure that all children and families can access and participate in high-quality, evidence-informed early childhood services.

For further information

Beatson, R., Macmillan, C. M., Sherker, S., Hilton, O., Goldfeld, S., & Molloy, C. (2025). Improving Data-Based Decision-Making in Early Childhood Services: A Systematic Review Informed by the Capability Opportunity and Motivation Model of Behavior. *Child & Youth Services*, 1–28. **https://doi.org/10.1080/0145935X.2025.2468185**

Suggested citation

Restacking the Odds (2025). Ensuring the early childhood workforce has timely data. The Centre for Community Child Health at The Royal Children's Hospital and Murdoch Children's Research Institute Parkville, Australia. **https://doi.org/10.25374/MCRI.28545605**

References

1. Hurley, P., Matthews, H., & Pennicuik, S. (2022). Deserts and oases: How accessible is childcare? Mitchell Institute. **https://apo.org.au/node/317030**

2. Molloy, C., O'Connor, M., Guo, S., Lin, C., Harrop, C., Perini, N., & Goldfeld, S. (2019). Potential of 'stacking' early childhood interventions to reduce inequities in learning outcomes. J Epidemiol Community Health, 73(12), 1078-1086. **https://doi.org/10.1136/jech-2019-212282**

3. Molloy, C., Moore, T., O'Connor, M., Villanueva, K., West, S., & Goldfeld, S. (2021). A Novel 3-Part Approach to Tackle the Problem of Health Inequities in Early Childhood. Academic Pediatrics, 21(2), 236-243. **https://doi.org/10.1016/j.acap.2020.12.005**

4. Molloy, C., Perini, N., Harrop, C., & Goldfeld, S. (2025) Evidence-based Lead Indicators to Drive Equitable Early Years Services: Findings from the Restacking the OddsSstudy. *Child Indicators Research*, 1-35. **https://doi.org/10.1007/s12187-025-10215-z**

5. Villanueva, K., Beatson, R., Hilton, O., Lee, W.Y., Macmillan, C., Molloy, C., Sherker, S., & Goldfeld, S. (2024). Barriers and Enablers to Data-based Decision Making in Australian Place-based Community Initiatives: A Qualitative Study Informed by the COM-B Model and Theoretical Domains Framework. *Child Indicators Research*, 17(6), 2361-2387. **https://doi.org/10.1007/s12187-024-10170-1**

6. Sherker, S., Villanueva, K., Beatson, R., Macmillan, C.M., Lee, W.Y., Hilton, O., Molloy, C., & Goldfeld, S. (2025). Barriers and facilitators to data-based decision making in Australian early childhood education and care: A qualitative study. *Social Sciences & Humanities Open 11* 101285. **https://doi.org/10.1016/j.ssaho.2025.101285**

7. Mandinach, E. B., & Gummer, E. S. (2013). A Systemic View of Implementing Data Literacy in Educator Preparation. *Educational Researcher, 42*(1), 30-37. **https://doi.org/10.3102/0013189x12459803**

8. Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science, 6*(1), 1-12. **https://doi.org/10.1186/1748-5908-6-42**

RESTACKING THE ODDS

RSTO is a collaboration between the Centre for Community Child Health at the Murdoch Children's Research Institute, Bain & Company, and Social Ventures Australia.

For information about the study or RSTO

Email: **restackingtheodds@mcri.edu.au**
Visit: **www.rsto.org.au**

The Centre for Community Child Health

The Royal Children's Hospital Melbourne
50 Flemington Road
Parkville 3052 VIC, Australia

LinkedIn: **CCCH**
ccch.org.au

The Centre for Community Child Health is a department of The Royal Children's Hospital and a research group of the Murdoch Children's Research Institute.

We acknowledge the Traditional Owners of the land on which we work and pay our respect to Elders past, present and emerging.