



# RESTACKING THE ODDS

## RESTACKING THE ODDS

### Communication Brief

Early years of school: An evidence based review of indicators to assess quality

V1.0 December 2020

CARLY MOLLOY  
RUTH BEATSON  
SHARON GOLDFELD  
NICHOLAS PERINI  
CHRISTOPHER HARROP

This work is copyright. No part may be reproduced by any process except in accordance with the provisions of the Copyright Act 1968.

Suggested citation: Molloy C., Beatson R., Cawley, S., Harrop C., Goldfeld S., Perini N. Restacking the Odds – Communication Summary: The Early Years of School: An evidence based review of indicators to assess quality. Melbourne, Australia, 2020.

*Acknowledgements: We would like to thank Dr John Ainley, Principal Research Fellow, Australian Council for Educational Research, who provided detailed feedback on the content of this report.*

## RESTACKING THE ODDS: PROJECT BACKGROUND

Inequities emerging in early childhood often continue into adulthood, contributing to unequal rates of educational attainment, mental and physical health and income. In some cases, this experience is part of a persistent cycle of intergenerational disadvantage. Inequities constitute a significant and ongoing social problem and – along with the substantial economic costs – have major implications for public policy.

To redress inequities, research tells us that efforts should be delivered during early childhood (pregnancy to eight years of age) to deliver the greatest benefits. Restacking the Odds focuses on five key evidence-based interventions/platforms in early childhood: antenatal care; sustained nurse home visiting; early childhood education and care; parenting programs; and the early years of school (*see Figure 1: Five Fundamental Strategies*).

These five strategies are only a subset of the possible interventions, but we have selected them carefully. They are notably *longitudinal* (across early childhood), *ecological* (targeting child and parent), *evidence-based*, *already available* in almost all communities and able to be *targeted* to benefit the ‘bottom 25 per cent’. Our premise is that by ‘stacking’ these fundamental interventions (i.e., ensuring they are all applied for a given individual) there will be a cumulative effect - amplifying the impact and sustaining the benefit.

Our intent is to use a combination of data-driven, evidence-based and expert informed approaches to develop measurable best practice lead indicators of quality, quantity and participation for each of the five strategies:

**Quality:** Are the strategies *delivered effectively*, relative to evidence-based performance standards? A strategy with “quality” is one for which there is robust evidence showing it delivers the desired outcomes. A large number of research studies have explored aspects of this question (i.e., “what works?”). Therefore, we pay particular attention to the quality dimension in this report.

**Quantity:** Are the strategies *available locally* in sufficient quantity for the target population? “Quantity” helps us determine the quantum of effort and infrastructure needed to deliver the strategy adequately for a given population.

**Participation:** Do the *appropriately targeted* children and families *participate* at the right dosage levels? “Participation” shows us what portion of the relevant groups are exposed to the strategy at the level required to generate the desired benefit. (For example, attending the required number of antenatal

visits during pregnancy). Participation levels can be calculated whether the strategy is universal (for everyone), or targeted (intended to benefit a certain part of the population).

These indicators will help identify gaps and priorities in Australian communities. We have tested preliminary indicators in six communities.

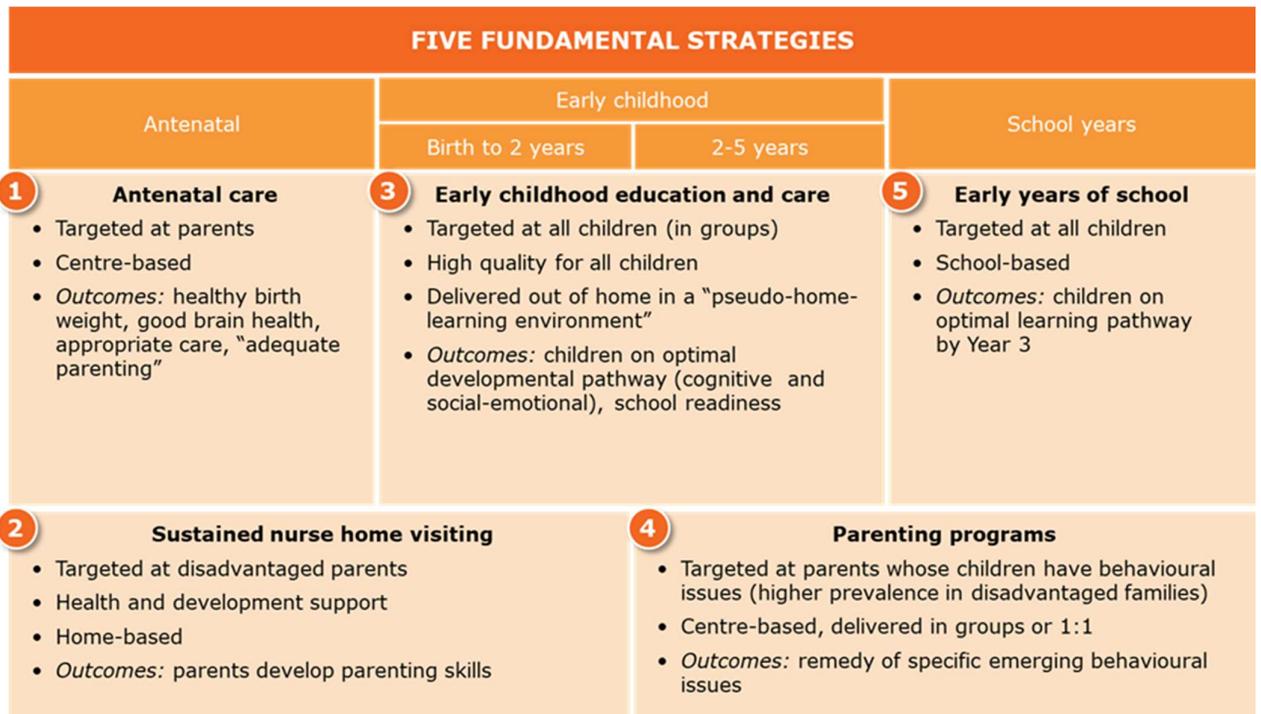


Figure 1: Five fundamental strategies

The findings summarised in this report provide essential inputs to guide our subsequent work. There is a similar report for each of the five strategies. Because school is compulsory in Australian states and territories this report only covers the quality dimension. Participation is expected to be in line with state and territory legislation.

### Fundamental Strategy: Early Years of School

Educational attainment is a social determinant of health and accumulates advantageously across the life course (Cohen & Synne, 2013; CSHD, 2008; Hahn & Truman, 2015). Academic achievement is associated with a variety of health outcomes and significantly influences access to employment and income and overall quality of life (French, Homer, Popovici, & Robins, 2015; Hahn & Truman, 2015; NSW CESE, 2016). Education also has societal impacts, directly shaping the capabilities and productivity of future labour forces, and has been linked to national economic performance (OECD, 2013) and government spending (Levin, Belfield, Muennig, & Rouse, 2007), social capital outcomes (e.g. level of

trust in others, political efficacy, community involvement) (Rhodes, Cordie, & Wooten, 2019), and level of participation in criminal activity (Levin et al., 2007; Lochner & Moretti, 2004).

Educational attainment often follows a social gradient. In both low and high-income economies, gaps in academic achievement show that children from disadvantaged backgrounds perform poorly relative to their socioeconomically advantaged peers (Carlisle & Murray, 2015; Chung, 2015; Sirin, 2005; von Stumm, 2017). In Australia, evidence demonstrates that students from low socioeconomic backgrounds are less likely to complete Year 12, and when they do, their average Australian Tertiary Admission Rank (ATAR) scores are much lower, affecting access to higher education (Lamb, Jackson, Walstab, & Huo, 2015). The socioeconomic profile of schools (in addition to the SES of individual students) is also associated with relative academic performance in Australia (Perry & McConney, 2010); this has stimulated policy efforts such as the Review of Funding for Schooling [The Gonski Report] (Gonski, Boston, Greiner, Lawrence, & Scales, 2011). The Gonski Report was commissioned to develop a new funding system for Australian schools that would be transparent, fair, financially sustainable and effective in promoting strong outcomes for all Australian students. The aim was to develop a funding model that ensures differences in educational outcomes were not the result of differences in wealth, income, power or possessions (Gonski et al., 2011).

Fortunately, the negative effects of low SES in childhood can be mitigated by increasing education quality (Barnett, 2011; Carlisle & Murray, 2015). Since the 1960s/70s, early intervention and education programs in the US targeted at children living in adversity, and tested via randomised controlled trial, have shown long-term benefits for both educational attainment and health outcomes (Muennig, Schweinhart, Montie, & Neidell, 2009; Ramey et al., 2000). Australian research shows that the academic quality<sup>1</sup> of schools interacts with student socioeconomic status (Lim, Gemici, & Karmel, 2014). Data from the Australian Longitudinal Studies of Australian Youth also found that a significant gap (in Program for International Student Assessment [PISA] scores) between students from low and high SES backgrounds occurs in low-quality secondary schools, but that this gap disappears at high-quality schools (Lim et al 2014). Data revealed that the impact of attending a high-quality school relative to low-quality school more than doubles the chance of completing year 12 among low performing low SES students.

Research suggests universal education platforms are well-positioned to address socioeconomic inequities through increased access to higher quality schools (Carlisle & Murray, 2015; Ladd & Loeb, 2013). In Australia, attendance at school is compulsory at age 5 or 6 dependent on individual state and

---

<sup>1</sup> School academic quality was defined by modelling the predicted TER scores and probability of an 'average' students attending university by 19 years of age using several characteristics of each school

territory mandated by law (ANZHES, n.d.; Krieg & Whitehead, 2015). The early years of school, defined as the Foundation<sup>2</sup> Year through to Year 3 (Hard & O'Gorman, 2007; Jay, Knaus, & Hesterman, 2014) is a critical time to develop children's language, cognition, social-emotional functioning, and generally prepare them for the acquisition of knowledge and skills required for a successful life (Bennett & Tayler, 2006). In the formal school setting there is an explicit emphasis on further developing children's language, literacy and numeracy skills (Harrison et al., 2010; Laevers, 2005). Indeed, evidence shows that early school-based intervention programs that target all students have great potential to reduce inequities in child development (Barnett, 2011; Dietrichson, Bøg, Filges, & Jørgensen, 2017; Piasta & Wagner, 2010; Sklad, Diekstra, De Ritter, Ben, & Gravesteyn, 2012).

Within this review, and consistent with others (Klassen et al., 2010) domains refer to broad overarching categories that describe a range of related strategies thought to improve the quality of schools. Within each group of general strategies there may be a variety of interventions that have a shared focus, and within the groups of interventions there may be specific programs characterised by very prescriptive guidelines for the structured delivery of predefined content. To give an example, promotion of social-emotional development is considered a domain, use of whole-of-school social-emotional learning programs is a strategy, and groups of mindfulness-based practices are interventions.

Australia has a National Quality Standard (NQS) for the early childhood education and care sector, but not nationally for schools. The NQS was developed and implemented across the ECEC sector as a way to improve its quality using an external reviewing process. Given the importance of the early years of school to children's health and quality of life, it is surprising that Australia does not have an accredited national quality framework to guide school quality and performance. Rather, each state and territory has its own framework for improving school quality. These frameworks describe a variety of approaches with differing improvement cycles that involve phases of evaluation, strategic goal setting, planning, implementation and monitoring. Each of the frameworks identifies a range of domains thought to reflect school quality, and within each of the domains there may be suggested improvement strategies (e.g. within the Teaching and Learning domain of FISO, strategies such as use of collaborative learning tasks, setting goals, and providing worked examples are encouraged). However, there are several concerns with the evaluation tools utilised in existing frameworks - including overly complex structures, reliance on subjective ratings from school leaders, and the ambiguity of quality indicators (compromising the extent to which they are measurable and modifiable). Although extant frameworks identify a range of indicators considered important to educational quality, in some cases, "what works"

---

<sup>2</sup> The Foundation Year is the first year of formal schooling, also referred to as the Preparatory year or Pre-Primary in some Australian states, Reception in the United Kingdom, and Kindergarten in the United States.

is not well known and in others, the strength of supporting evidence is unclear. This situation does not provide educators and school leaders with clear direction on how to evaluate the relative importance or impact of an indicator, or where they should focus their efforts.

If schools are to deliver high-quality education it is important to know which strategies have demonstrated positive effects on child academic/cognitive, social-emotional and health outcomes. An understanding of the strategies that significantly improve outcomes among children in the earliest grades is critically important to reduce long-term inequities observed in children who do not receive good quality education. The findings will inform the development of objective, measurable, process-based quality indicators.

## Aim

High quality education in *the Early Years of School* (EYS) is one of the five effective early intervention strategies identified by Restacking the Odds.

This review seeks to:

1. Identify effective school-based strategies to improve child outcomes (including academic achievement, social, emotional, and behavioural development), and
2. Evaluate the evidence base specific to children in the early years of school, so that:
  - a. School quality frameworks can be assessed against the evidence base,
  - b. Educational decision makers have the necessary information to improve child outcomes, and
  - c. We identify gaps in the literature, to guide the direction of future research.

## Method

We undertook a restricted systematic review, a research methodology that uses similar methods and principles to a comprehensive systematic review but is shorter and narrower. Rigorous methods for locating, appraising and synthesising the evidence related to a specific topic are utilised; however, the methodology places several limitations on the search criteria and on how evidence is assessed. As formal schooling is compulsory in all Australian States and Territories from approximately five years of age, the search for the key drivers was restricted to those concerning quality (not quantity or participation).

## Peer-reviewed literature

A detailed account of the methodology is described in a technical report (Molloy et al., 2020) and summarised briefly here. We sought to identify meta-analyses and systematic reviews of school-based interventions to improve student outcomes. Where we could not identify such publications, or those we identified yielded low levels of evidence (e.g. correlational syntheses), we extended our search to randomised controlled trials (RCTs). In cases where no experimental studies met our inclusion criteria, we also considered quasi-experimental studies. We did the search in two phases. In the first phase, we kept the search terms broad and used the form: (synthesis terms) AND (school terms) AND (early childhood terms). In the second phase, we specifically targeted thirteen quality domains identified as common to existing school quality frameworks<sup>3</sup>.

Meta-analyses and systematic reviews constitute the highest levels of evidence, based on the NHMRC evidence hierarchy as they combine the results from multiple studies to increase the power to detect effects and produce a more precise estimate of the effect of treatment by consolidating sometimes conflicting results across studies (Hoffman, 2015). RCTs on the other hand are considered the ‘gold standard’ way to assess a program’s effectiveness.

## Ranking the evidence

We applied a quality and bias check to each study that met our inclusion criteria. We used the quality and bias information to consider the conclusions of included studies, and the potential effectiveness of each strategy identified within each quality domain.

Considering the accumulated evidence, we reached a judgement about the strength of the evidence base for each quality domain (See Appendix A). The criteria were adapted from The California Evidence-based Clearinghouse for Child Welfare (CEBC, 2016). The judgement was made by two independent raters, and consensus reached in the event of any rating discrepancy.

- *Well Supported*. Clear and consistent evidence of benefit across multiple strategies.
- *Supported*. Clear evidence of benefit for at least one strategy.
- *Promising*. Evidence suggestive of benefit for multiple strategies but more evidence needed.

---

<sup>3</sup> The frameworks had particular relevance to Australia’s education policy context and included: the Victorian Framework for Improving School Outcomes (Department of Education and Training, 2019a), New South Wales School Excellence Framework (New South Wales Department of Education, 2017), National School Improvement Tool (ACER, 2016), National Quality Framework (Department of Education and Training, 2019b), and the UK-based Ofsted Education Inspection Framework (OFSTED, 2019). See Table S1 for a comparison of the frameworks.

- *Preliminary.* Evidence suggestive of benefit for at least one strategy but more evidence needed.
- *Mixed.* Conflicting findings for similar strategies.
- *Unknown.* Insufficient evidence to determine whether identified strategies are beneficial.
- *Not Supported.* Evidence consistently demonstrates identified strategies are ineffective or concerning.

### Expert Evaluation of Draft Indicators

The distilled list of indicators was vetted via consultation with Australian and international sector experts.

We asked these experts to independently comment on the developed list of supported EYS quality domains and related quality indicators.

### Comparison with other project reviews

Notably, the review we have completed for the Early Years of School differs from that completed for the other four strategies due to the more limited research and evidence base available specifically relevant to developing measurable process indicators and the application of evidence to the delivery of high quality schooling. As a result, the review findings do not provide the same level of detail as those generated for other strategies (e.g., we have not been able to identify quality indicators that are specifically targeted at vulnerable cohorts).

### Findings for the early years of school

The literature search and screening process resulted in the identification of eighty-three relevant publications, of which sixty-six were meta-analyses or reviews, providing the highest-levels of evidence. We evaluated the evidence base for each of the thirteen domains, and identified five Well Supported and four Supported quality domains. Within these domains, we identified twenty-one general strategies that have demonstrated effectiveness for children in the early years of school. These findings informed our development of evidence-based indicators to establish school quality. See Table 1 for a brief description of the 13 quality domains.

**Table 1: Overview of domains**

Domains	Primary Outcomes
---------	------------------

Part I: Effective Classroom Pedagogical Practices (academic interventions)	
1. Application of pedagogical content knowledge	Student academic achievement & academic engagement (e.g. on-task behaviour)
2. Effective differentiated teaching	
3. Peer tutoring and collaborative learning	
4. Physical activity for academic achievement	
5. Technology-assisted teaching and learning	
6. Physical environment design to optimise learning	
7. Class size and Teacher-Student ratios	
Part II: School Environment and Student Wellbeing	
8. Student empowerment and leadership	Student social-emotional or behavioural outcomes (including school engagement) & staff-student relationships
9. Social-emotional and behavioural (SEB) interventions to promote a positive school climate	
10. Teacher-student relationships	
Part III: Providers and Partnerships (teacher & principal professional development, family engagement, community collaboration)	
11. Staff and leadership development	Student academic, social-emotional /behavioural and health outcomes

### Quality indicators

In total, 37 quality indicators were developed. These indicators are tied to school processes (i.e. process indicators at the classroom, student level or lesson level that contribute to the achievement of high quality outcomes) and teaching staff competencies (i.e. provider indicators) that map to Well Supported and Supported quality domains. Note that formal training refers to participation in external professional development opportunities (such as workshops run by independent organisations).

There are 5 domains that were Well Supported by the evidence and 4 that were rated Supported. See Table 2 and 3 for a full list of quality indicators.

Table 2. Quality indicators (Well Supported)

Application of pedagogical content knowledge	
Process	Provider
<b>QL 1</b> % of K-3 classroom teachers who utilise the school curriculum to plan pedagogical content delivery	<b>QL 5</b> % of K-3 classroom teachers who have formal training in evidence-based teaching methods
<b>QL 2</b> % of K-3 classrooms that balance the amount of time spent in reading and writing activities	<b>QL 6</b> % of K-3 classroom teachers who have formal training in evidence-based teaching methods who regularly coach other staff delivering K-3 literacy and numeracy
<b>QL 3</b> % of K-3 classrooms implementing daily literacy instruction that explicitly builds skills in phonics, phonemic awareness, spelling, morphology, reading fluency and comprehension strategies, and handwriting	
<b>QL 4</b> % of K-3 classrooms that incorporate regular use of manipulatives in numeracy instruction	
Effective differentiated teaching	
Process	Provider
<b>QL 7</b> % of K-3 students whose academic development in literacy and numeracy is systematically assessed and documented	<b>QL 11</b> % of K-3 classroom teachers with formal training in evidence-based differentiated teaching strategies
<b>QL 8</b> % of K-3 students whose literacy and numeracy instruction is tailored according to the results of systematic assessment of their academic development	<b>QL 12</b> % of staff with formal training or tertiary qualifications in special education for K-3 students needing additional support
<b>QL 9</b> % of K-3 students who regularly receive instruction in small groups	<b>QL 13</b> % of staff delivering additional support to K-3 students who have formal training in the provision of evidence based Tier 2 and Tier 3 learning interventions
<b>QL 10</b> % of K-3 students for whom assessment data indicates the need for individualised instruction in literacy or numeracy who receive an evidence based Tier 3 intervention	
Technology assisted teaching and learning	
Process	Provider
<b>QL 14</b> % of K-3 lessons utilising digital technology for instruction in interactive rather than static conditions	<b>QL 16</b> % of classroom teachers who have received formal training in the use of interactive digital instruction materials and incorporate these in their classes
<b>QL 15</b> % of K-3 classrooms utilising interactive digital technology platforms to supplement literacy and numeracy instruction	
SEM & behavioural strategies to promote a positive school climate	
Process	Provider
<b>QL 17</b> An evidence-based social-emotional development program is implemented across the school and activities to maintain the skills developed in the program are delivered on a regular basis (i.e. every term)	<b>QL 20</b> % of K-3 classroom teachers who have completed formal training in evidence-based social-emotional development programs (such as teaching mindfulness strategies)
<b>QL 18</b> % of families (with a child in grade K-3) indicating that their child feels safe at school on annual parent surveys	
<b>QL 19</b> % of families (with a child in grade K-3) who agree on parent opinion surveys that teachers at the school treat students fairly and/or student behaviour is well managed	
Staff Development & Leadership	
Process	Provider
<b>QL 21</b> % of staff professional development opportunities approved by the school principal that are characterised by both (a) active teacher learning experiences and (b) use of modelling/simulations	<b>QL 23</b> % of K-3 classroom teachers with formal training in an evidence-based classroom management strategy
<b>QL 22</b> % of approved professional development opportunities that are informed by student needs (i.e. based on data)	<b>QL 24</b> % of professional learning courses undertaken by K-3 classroom teachers that are evidence-based
	<b>QL 25</b> % of teachers receiving in-service teacher coaching that is considered best practice

Table 3. Quality indicators (Supported)

Peer tutoring and collaborative learning	
Process	Provider
<b>QL 26</b> % of K-3 classrooms that implement evidence-based peer tutoring activities in the weekly literacy/numeracy blocks	<b>QL 27</b> % of K-3 classroom teachers with formal training in evidence-based peer teaching methods

Physical activity for academic achievement	
Process	Provider
<b>QL 28</b> % of K-3 classrooms where physical activity is incorporated in academic instruction on a daily basis (whether by in class activity breaks, exercise prior to lessons, or use of movement to facilitate instruction)	<b>QL 29</b> % of K-3 classroom teachers who have received at least some informal training in strategies to incorporate movement in academic instruction

Class size and teacher-student ratios	
Process	Provider
<b>QL 30</b> % of K-3 classes that comprise 22 students or fewer	

Partnerships with Families	
Process	Provider
<b>QL 31</b> % of K-3 teachers who are aware of the school's family partnership policy and implement it into their usual practice with families	<b>QL 34</b> % of K-3 classroom teachers indicating that they have provided parents with strategies to use when reading with children at home
<b>QL 32</b> % of families (with a child in grades K-3) indicating that the school actively encourages and emphasises the importance of regular parent-child reading at home	<b>QL 35</b> % of K-3 classroom teachers indicating that they monitor parent home reading on a regular basis (i.e. weekly)
<b>QL 33</b> % of families (with a child in grades K-3) indicating that the school has provided information about specific strategies for parents to use when reading with their children	<b>QL 36</b> % of K-3 classroom teachers indicating that they provide additional support to parents who have indicated difficulties with home reading practice
	<b>QL 37</b> % of K-3 classroom teachers indicating that the materials they provide parents (to encourage and support reading at home) are evidence-based

## Conclusion

Overall, the review indicates that there is a reasonably strong evidence base supporting several of the domains identified in existing school quality frameworks (nine of thirteen identified domains were rated Supported or Well Supported). The review also shows many of the strategies underpinning these domains have demonstrated effectiveness for children in the early years of school. The identification of these strategies together with the strength of evidence assessment for each provides a useful resource for guiding school selection of quality improvement initiatives.

Although not in scope for this review we acknowledge the importance that cost plays in decision-making and thus is a limitation of the current study findings. A detailed cost analysis would provide better context for decision makers in schools, councils, state education departments, and intermediary organisations to help inform their decisions about program choices, budgets, and strategies. Further,

there is a significant bridge to cross in relation to the specific strategies and interventions shown to be effective and how these can be successfully implemented. We have attempted to bridge some of that gap by focusing on process metrics, however these will need to be trialled and iterated on based on which are pragmatic to collect, resonate with communities, and provide robust measures to stimulate community and government action.

### Application

The developed indicators will help identify gaps and priorities for Australian schools. We will test them in several Australian communities to determine which are pragmatic to collect, resonate with school communities, and provide robust measures to stimulate school, community and government action. We have followed a similar path for the other four fundamental strategies that Restacking the Odds is focusing on – antenatal care, sustained nurse home visiting, parenting programs, and early childhood education and care.

## References

- ACER. (2016). *National School Improvement Tool*. Retrieved from <https://www.acer.org/au/school-improvement>
- ANZHEs. (n.d.). *Dictionary of Educational History in Australia and New Zealand* (C. Campbell, D. Kass, & J. Collins Eds.): Australian and New Zealand History of Education Society.
- Barnett, S. W. (2011). Effectiveness of early educational intervention. *Science*, 33(6045), 975-978.
- Bennett, J., & Tayler, C. P. (2006). *Starting strong II: Early childhood education and care*. Retrieved from Paris, France:
- Carlisle, B. L., & Murray, C. B. (2015). Academic performance, effects of socio-economic status on. *International Encyclopedia of the Social & Behavioral Sciences 2nd Edition*, 1, 43-48.
- CEBC. (2016). The California Evidence-based Clearinghouse for Child Welfare Scientific Rating Scale. from California Department of Social Services <http://www.cebc4cw.org/ratings/scientific-rating-scale/>
- Chung, K. K. H. (2015). Socioeconomic status and academic achievement. *International Encyclopedia of the Social & Behavioral Sciences 2nd Edition*, 22, 924-930.
- Cohen, A. K., & Synne, S. L. (2013). Education: A missed opportunity for public health intervention. *American Journal of Public Health* e1-e5.
- CSHD. (2008). *Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health*. Retrieved from [https://apps.who.int/iris/bitstream/handle/10665/43943/9789241563703\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/43943/9789241563703_eng.pdf)
- Department of Education and Training. (2019a). *Framework for Improving Student Outcomes (FISO)*. Retrieved from <https://www.education.vic.gov.au/school/teachers/management/improvement/Pages/FISO.aspx>
- Department of Education and Training. (2019b). *National Quality Framework*. Retrieved from <https://www.education.vic.gov.au/childhood/providers/regulation/Pages/nqf.aspx>
- Dietrichson, J., Bøg, M., Filges, T., & Jørgensen, A. K. (2017). Academic interventions for elementary and middle school students with low socioeconomic status: A systematic review and meta-analysis. *Review of Educational Research*, 87(2), 243-282. doi:10.3102/0034654316687036
- French, M. T., Homer, J. F., Popovici, I., & Robins, P. K. (2015). What you do in high school matters: High school GPA, educational attainment, and labor market earnings as a young adult. *Eastern Economic Journal*, 41, 370-386.
- Gonski, D., Boston, K., Greiner, K., Lawrence, C., & Scales, B. (2011). *Review of funding for schooling-Final Report* Canberra: Australian Government Department of Education, Employment and Workplace Relations.
- Hahn, R. A., & Truman, B. I. (2015). Education improves public health and promotes health. *International journal of health services*, 45(4), 657-678.
- Hard, L., & O'Gorman, L. (2007). 'Push-me' or 'pull-you'? An opportunity for early childhood leadership in the implementation of Queensland's Early Years Curriculum. *Contemporary Issues in Early Childhood*, 8(1), 50-60.
- Harrison, L. J., Ungerer, J., Smith, G. J., Zubrick, S. R., Wise, S., Press, F., & Waniganayake, M. (2010). *Child care and early education in Australia - The Longitudinal Study of Australian Children*. Retrieved from Canberra, Australia:
- Hoffman, J. I. E. (2015). *Meta-analysis Biostatistics for Medical and Biomedical Practitioners*: Academic Press.
- Jay, J., Knaus, M., & Hesterman, S. (2014). High-quality early childhood education in the early years of school. *Every Child*, 20(3), 22.
- Klassen, A., Miller, A., Anderson, N., Shen, J., Schiariti, V., & O'Donnell, M. (2010). Performance measurement and improvement frameworks in health, education and social services systems: a systematic review. *Int J Qual Health Care*, 22(1), 44-69. doi:10.1093/intqhc/mzp057

- Krieg, S., & Whitehead, K. (2015). Where are the early years of school in contemporary early childhood education reforms? An historical perspective. *Australian Educational Researcher*, 42, 319-333.
- Ladd, H., & Loeb, S. (2013). The Challenges of Measuring School Quality: Implications for Educational Equity. In D. Allen & R. Reich (Eds.), *Education, Justice, and Democracy* (pp. 22-55). Chicago, IL: University of Chicago Press.
- Laevers, F. (2005). The curriculum as means to raise the quality of early childhood education: Implications for policy. *European Early Childhood Education Research Journal*, 13(1), 17-29.
- Lamb, S., Jackson, J., Walstab, A., & Huo, S. (2015). *Educational opportunity in Australia 2015: Who succeeds and who misses out*. Retrieved from [www.mitchellinstitute.org.au](http://www.mitchellinstitute.org.au)
- Levin, H., Belfield, C., Muennig, P., & Rouse, C. (2007). *The costs and benefits of an excellent education for all of America's children*. Retrieved from <https://pdfs.semanticscholar.org/af57/1f8380a94ed03875dc7adc5b907e8b47707c.pdf>
- Lim, P., Gemici, S., & Karmel, T. (2014). The impact of school academic quality on low socioeconomic status students. *The Australian Economic Review*, 47(1), 100-106.
- Lochner, L., & Moretti, E. (2004). The effect of education on crime: Evidence from prison inmates, arrests, and self-reports. *American Economic Association*, 94(1), 155-189.
- Molloy, C., Beatson, R., Cawley, S., Harrop, C., Goldfeld, S., & Perini, N. (2020). *Restacking the Odds Technical Report: The Early Years of School: An evidence-based restricted systematic review of school quality domains and intervention strategies*. Melbourne: Murdoch Children's Research Institute.
- Muennig, P., Schweinhart, L., Montie, J., & Neidell, M. (2009). Effects of a prekindergarten educational intervention on adult health: 37-year follow-up results of a randomized controlled trial. *Research and Practice*, 99(8), 1431-1437.
- New South Wales Department of Education. (2017). School Excellence Framework. Retrieved from [https://education.nsw.gov.au/teaching-and-learning/school-excellence-and-accountability/sef-evidence-guide/media/documents/about-the-sef/SEF\\_Document\\_Version\\_2\\_2017\\_AA.pdf](https://education.nsw.gov.au/teaching-and-learning/school-excellence-and-accountability/sef-evidence-guide/media/documents/about-the-sef/SEF_Document_Version_2_2017_AA.pdf)
- NSW CESE. (2016). *How schools can improve literacy and numeracy and why it (still) matters*. Retrieved from [https://www.cese.nsw.gov.au//images/stories/PDF/Literacy\\_and\\_Numeracy\\_Paper\\_FA\\_AA.pdf](https://www.cese.nsw.gov.au//images/stories/PDF/Literacy_and_Numeracy_Paper_FA_AA.pdf)
- OECD. (2013). *PISA 2012 results in focus: What 15-year-olds know and what they can do with what they know*. Retrieved from <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-overview.pdf>
- OFSTED. (2019). *Education inspection framework*. Retrieved from <https://www.gov.uk/government/collections/education-inspection-framework>
- Perry, L., & McConney, A. (2010). School socio-economic composition and student outcomes in Australia: Implications for educational policy. *American Journal of Education*, 54(1), 72-85.
- Piasta, S. B., & Wagner, R. K. (2010). Developing early literacy skills: A meta-analysis of alphabet learning and instruction. *Reading Research Quarterly*, 45(1), 8-38. doi:10.1598/RRQ.45.1.2.
- Ramey, C., Campbell, F., Burchinal, M., Skinner, M., Gardner, D., & Ramey, S. (2000). Persistent effects of early childhood education on high-risk children and their mothers. *Applied Developmental Science*, 4(1), 2-14.
- Rhodes, C. M., Cordie, L., & Wooten, M. (2019). An examination of social capital among US Adults: Patterns that facilitate social well-being as measured by PIAAC. *International Journal of Learning, Teaching and Educational Research*, 18(2), 1-12.
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3), 417-453.
- Sklad, M., Diekstra, R., De Ritter, M., Ben, J., & Gravesteyn, C. (2012). Effectiveness of school-based universal social, emotional, and behavioral programs: Do they enhance students'

development in the area of skill, behavior, and adjustment? *Psychology in the Schools*, 49(9), 892-909. doi:10.1002/pits.21641

von Stumm, S. (2017). Socioeconomic status amplified the achievement gap throughout compulsory education independent of intelligence. *Intelligence*, 60, 57-62.

## Appendix A

OVERALL RANKING OF THE EVIDENCE-STUDY LEVEL	
	Definition
Well Supported	Clear, consistent evidence of benefit. No evidence of harm or risk to participants. A well conducted <sup>4</sup> systematic review or meta-analysis found the intervention to be more effective than a control group on at least one child valid outcome measure (i.e. cognition, language, academic achievement, social-emotional functioning). Populations examined are similar to, and results are sensible to apply to, the Australian primary <sup>5</sup> school context.
Supported	Evidence suggestive of benefit but more evidence needed. No evidence of harm or risk to participants. A systematic review or meta-analysis of moderate quality <sup>6</sup> found the intervention to be more effective than a control group on at least one child valid outcome measure (i.e. cognition, language, academic achievement, social-emotional functioning). The results of the review are sensible to apply to primary school age students. Populations examined may be somewhat different to the Australian population; affecting generalisability to the Australian context.
Promising	No evidence of harm or risk to participants. At least one RCT with low to moderate risk of bias found the intervention to be more effective than a control group on at least one valid child outcome measure (i.e. cognition, language, academic achievement, social-emotional functioning). The results of the study are sensible to apply to primary school age children <sup>7</sup> , though populations may be somewhat different to the Australian population.
Preliminary	No evidence of harm or risk to participants. At least one QES with low risk of bias found the intervention to be more effective than a control group on at least one valid child outcome measure (i.e. cognition, language, academic achievement, social-emotional functioning). The results of the study are sensible to apply to primary school age children <sup>8</sup> , though populations may be somewhat different to the Australian population.

<sup>4</sup> To be considered well-conducted, meta-analyses and systematic reviews had to receive a PRISMA rating indicating low risk of bias (++) and at least 50% of included studies had to be RCTs, QESs, or matched comparison designs.

<sup>5</sup> For meta-analyses and systematic reviews to be considered relevant to the early years of school, at least 50% of included studies had to involve elementary school students or results reported separately for elementary students.

<sup>6</sup> Moderate quality means the meta-analysis or review received a PRISMA rating indicating moderate risk of bias (+) and included at least 50% RCT, QES, or matched-comparison designs.

<sup>7</sup> At least 50% of participants, or the average age of participants, must be within the primary school range (i.e. 4 years to 12 years).

<sup>8</sup> At least 50% of participants, or the average age of participants, must be within the primary school range (i.e. 4 years to 12 years).

<b>OVERALL RANKING OF THE EVIDENCE-STUDY LEVEL</b>	
Not Supported	A well conducted systematic review or meta-analysis or at least one RCT found the intervention to be ineffective across several primary outcomes compared with a control group. The overall weight of the evidence does not support the benefit of the practice.
Concerning Practice	A well conducted systematic review or meta-analysis reported that the direction of effects was undesirable across several outcomes. At least 1 RCT with low risk of bias showed the practice to have a negative effect.
Unknown	The intervention has not been adequately assessed. Available meta-analyses, reviews, or RCTs are limited either in terms of quality (low PRISMA/NICE rating) or relevance (to primary school age population).

<b>OVERALL RANKING OF THE EVIDENCE-DOMAIN LEVEL</b>	
	Definition
Well Supported	At least two meta-analyses/systematic reviews identified different strategies rated Well Supported
Supported	At least one meta-analysis/systematic review identified a strategy rated Supported or Well Supported
Promising	At least two high quality RCTs identified different types of strategies with demonstrated effectiveness
Preliminary	At least one high quality quasi-experimental study or moderate quality RCT identified an effective strategy in this domain
Mixed	There are conflicting findings for similar strategies identified in equal quality studies (e.g. one high-quality meta-analysis suggests the strategy is not effective, while another high-quality meta-analysis suggests it is supported)
Not Supported	The strategies identified in this domain were consistently rated Not Supported or Concerning practices
Unknown	No relevant meta-analyses, systematic reviews, RCTs, or quasi-experimental studies were identified in this domain OR the evidence for strategies identified in the domain were rated Unknown due to poor methodological quality or low relevance to primary school age children

## THE TEAM

Restacking the Odds is a collaboration between three organisations, each with relevant and distinctive skills and resources:

- ***Murdoch Children’s Research Institute (MCRI)*** brings deep knowledge and credibility in the area of health and educational research, along with a network of relevant relationships
  - **Prof Sharon Goldfeld** –Director Centre for Community Child Health and Theme Director Population Health, Royal Children’s Hospital and Murdoch Children’s Research Institute
  - **Dr Carly Molloy** – Senior Researcher and Project Lead of Restacking the Odds, Murdoch Children’s Research Institute
- ***Bain & Company*** brings expertise in the development of effective strategies that deliver real results
  - **Chris Harrop** – a senior partner, and a member of Bain’s worldwide Board of Directors
- ***Social Ventures Australia (SVA)*** brings expertise in providing funding, investment and advice to support partners across sectors to increase their social impact
  - **Nick Perini** – Director, SVA Consulting.