# A Novel 3-Part Approach to Tackle the Problem of Health Inequities in Early Childhood

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## Abstract

The first 5 years of a child's life are crucial in laying the foundation for their health and developmental trajectory into adulthood. These early years are especially influenced by the surrounding environments in which children live and grow. A large international body of evidence demonstrates that children who experience disadvantage tend to fall increasingly behind over time. At the societal level, these inequities can cause substantial social burdens and significant costs across health, education, and welfare budgets. A contributing factor is that children experiencing adversity are less likely to have access to the environmental conditions that support them to thrive. Many of these factors are modifiable at the community or place level. We argue for three key—though not exhaustive—ideas that collectively could achieve more equitable outcomes for children facing disadvantage and experiencing adversity:

1. Adopt a social determinants approach to conceptualizing disadvantage;
2. Stack existing, evidence-based government and nongovernment service interventions/programs that operate at the local or community level; and
3. Use data and evidence to focus improvements for more equitable and adaptive systems.

We conclude that if adopted, these 3 ideas could contribute to the ability of local communities and networks to identify and respond to factors that address early childhood inequalities.

**Keywords:** child inequities; early childhood; system change

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## What's New

We propose 3 ideas that collectively address early childhood inequities, by stacking interventions within the robust service "substrate" that already exists and utilizing equity based metrics to monitor and improve performance.

Equity exists when groups of people defined by social, economic, demographic, or geographic indicators are treated fairly and impartially and are not disadvantaged by any solvable differences.[1] The causes of inequities are complex and multifaceted[2,3]; however, the evidence is clear and consistent that it is the circumstance in which children live, learn, and develop, the social determinants,[4] that drive differential health and developmental outcomes: the more disadvantaged their circumstances, the poorer their health, and developmental outcomes.[5−10] The first 1000 days—the period from conception to the end of the second year—are particularly important.[11−13] This is the period when children are most developmentally plastic, thus experiences and exposures during this period have a disproportionate influence on later health and development.[10,14−16]

Gaps in both cognitive and noncognitive skills between children from advantaged and disadvantaged backgrounds begin in infancy, and widen progressively in the preschool years.[11,17] By school-age, children are already set on developmental trajectories that are difficult to shift. These disparities compromise future education, employment, and opportunities.[5,17−19]

Clearly, we should be seeking to reduce and prevent inequities.[4,20] To do so requires greater investments in prevention and early intervention initiatives in the early years.[21−24] The economic returns of investments in the early years are higher than those in later years: although it is possible to shape the development and wellbeing of children and young people when they are older, it becomes progressively harder and more costly to do so.[17,21,25,26] It is most cost effective to invest in early intervention that resolves issues as they emerge and are malleable, rather than responding to crisis, stress and trauma, which is both more challenging and more expensive to resolve later on.[21] Recent data show that


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Australian state and federal governments are spending $15.2 billion each year on high-intensity and crisis support services, and it is estimated that the cost of such late intervention (ie, difficulties that could have been reduced or prevented) equates to $607 for every Australian every year.[26] On the other hand, economic data show that population-based early interventions such as quality early childhood education and care provides a strong return of 2 to 4 times the costs.[27–29] Getting it right in the early years reduces downstream expenditure on remedial education, school failure, poor health, mental illness, welfare recipiency, substance misuse, and criminal justice.[21]

Research would suggest that the imperative and opportunity for addressing inequities should remain focused in the early years. That said, the challenge is how this should best be actioned. While addressing social determinants remains an important aspect of intervention, the reality is that for most economies it is a complex and complicated policy space for which many working in pediatrics may be ill-equipped to either influence or investigate in any substantial way. We would argue that the service "substrate" that already exists in most high-income countries is the perfect starting place for change. It may well be that expertise and effort should be focused on the considerable existing government and nongovernment service investment.

To that end, we put forward 3 ideas that if implemented concurrently could see cumulative benefits and therefore accelerate change. By utilizing a conceptual framework for disadvantage grounded in social determinants, we lay bare the broader ecological factors and specifically describe the system change possibilities for children and families. We then accompany this more complex approach to addressing disadvantage with the notion of "stacking" interventions, challenging the current program paradigm that seeks effectiveness in a single program but potentially misses the mutual benefit of multiple interventions (services and/or programs) over time. And finally, we propose a series of metrics that have been developed through research. These specifically target the service and community level systems and are designed to drive change in our existing systems with the potential to be translatable across countries.

Taking both a social determinants lens to understanding disadvantage (through 4 lenses of sociodemographic, geographic environments, health conditions, and risk factors) and an ecological (child, family, community) approach offers a useful framework for policymakers to view and address the determinants of child health inequities.

Mutual and cumulative benefit of existing interventions (services and programs) that operate at the local or community level have the potential for sustained impact when delivered across early childhood and are ecological (targeting child, parent, and environment).

Service systems are supported to change when they have the right metrics and evidence for excellence, reach, and dose to drive equitable delivery processes.

## Idea 1: Adopt a Social Determinants Approach to Thinking About Disadvantage

Disadvantage is multifaceted. Philosophical perspectives emphasize disadvantage as limiting opportunity and the capacity for individuals to freely lead lives they have reason to value.[30] In the context of health equity, disadvantage refers to relative position in a social hierarchy determined by wealth, power, and prestige.[31] In contrast to concepts of poverty that focus on those who are the most deprived (eg, of money or material possession), socially excluded, and/or vulnerable,[32] disadvantage exists on a continuum.

In operationalizing the concept of disadvantage, conventional approaches typically measure children's experiences of disadvantage as socioeconomic status (eg, parental education, occupation, and income), but this fails to capture the complex and multifaceted ways in which disadvantage can manifest. For children, disadvantage manifests as the circumstances in which they live, learn, and develop that drive differential health and developmental outcomes (social determinants).[4] The bio-ecological perspective further suggests that children's biology interacts with the multiple nested levels of their surrounding social and physical environments to shape child development.[33] Sources of disadvantage may therefore arise at the individual (eg, poor nutrition), family (eg, low parent education), and community-level (eg, dangerous neighborhood).[2]

A framework of child disadvantage[5] (Figure), informed by a social determinants and bio-ecological approach[5,34] better encapsulates factors that matter for child health inequities. The *sociodemographic* lens captures characteristics (eg, families from an ethnic minority background facing structural and interpersonal racism) that define subpopulation groups at risk of poorer outcomes. The *geographic environments* lens captures the characteristics of the places where children live (eg, proximity to services). The *health conditions* lens captures conditions unevenly distributed across social groups (eg, caregiver depression). The *risk factors* lens captures attributes that are associated with an increased likelihood of poor child outcomes (eg, caregiver smoking). When conceptualized together, this framework ensures the adverse impact of disadvantage is not underestimated by considering only socioeconomic disadvantage or by underestimating the potential benefit by addressing different levers for disadvantage. Further research has shown that addressing disadvantage can decrease the combined rates of physical, cognitive, and social problems by up to 70%.[35]

## Idea 2: Stack Interventions to Make a Sustained Difference

The framework is also consistent with the idea of stacking interventions across the early years of a child's life and lends itself to creating measurable, meaningful indicators across relevant factors. Despite the range of available services for children, government and communities

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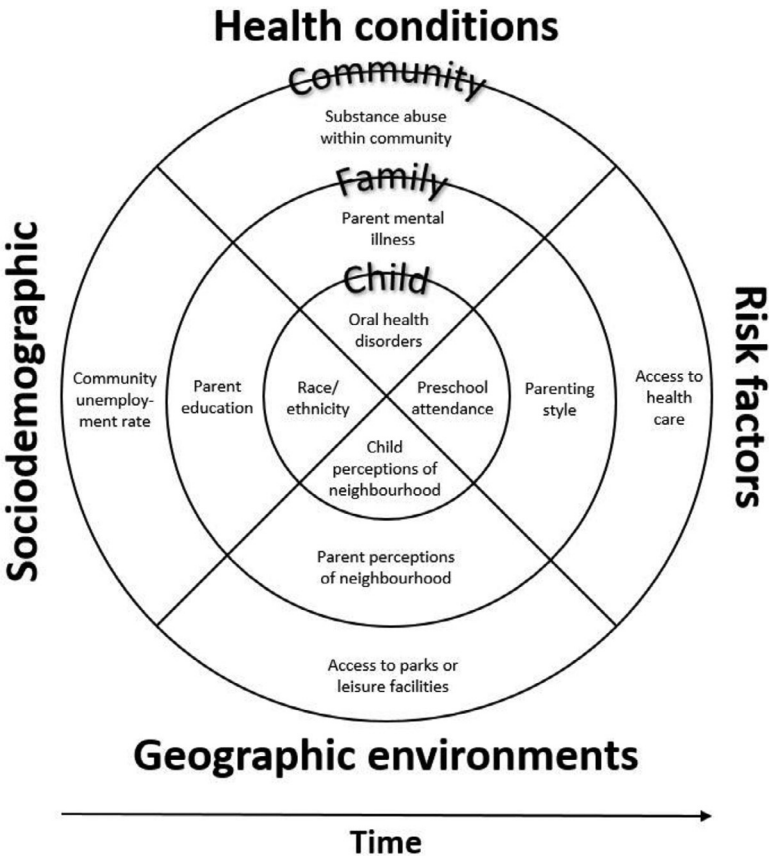


**Figure.** *Framework of child disadvantage, reproduced from Goldfeld, O'Connor, Chong, Gray, O'Connor, Woolfenden, Redmond, Williams, Mensah, Kvalsvig, Badland,[35] aligning a social determinants and bio-ecological perspective. Examples of relevant indicators within each lens (sociodemographic, geographic environments, health conditions, and risk factors) and level (child, family, and community) are shown. It is expected that disadvantage experienced through each of these lenses will overlap and interact to influence inequities in complex ways, and will unfold over time.*

alike often focus on importing or trialing new programs rather than improving the existing and already funded service system where a range of evidence-based interventions could be readily incorporated.[36,37] While there is a vast literature base reporting on the efficacy of individual interventions, there are few that explore the potential cumulative benefit of applying multiple services/interventions over time.[38] Further, while the services exist, they are not considered as a system. Within the policy environment they often cross sectors (eg, health, education) with few incentives to drive a coordinated stacked approach that considers the necessary metrics to maximize the mutual benefit required to address inequity. Heckman has suggested there are economic benefits that address both inequity and advance human capital by stacking services or interventions.[22] This builds on the evidence that supports effective individual interventions such as quality early childhood education[39–41] and sustained nurse home visiting programs[42–44] as promoting cognitive and noncognitive skill formation. Heckman suggested that applying multiple, complementary services continually across the early years will amplify the effect on a single strategy/service and indeed be more effective than traditional policy initiatives, such as tuition subsidies, job training tax rebates and downstream funding/treatment for preventable conditions.[45,46] There is a vast evidence-base demonstrating a dose-response relationship between a child's exposure to risk and poorer health, cognition, and life-course outcomes,[47,48] yet there is a dearth of evidence demonstrating the potential cumulative benefit of children receiving multiple evidence-based interventions.

To determine if there was an a priori case for supporting stacking of service interventions in the Australian context, recent research examined the association between exposure to a combination of evidence-based services (antenatal care, nurse-home visiting, early childhood education and care, parenting programs, and early years of school) between 0 and 5 years on a measure of academic reading at 8 to 9 years.[38] These services were selected because they are 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%. As hypothesized, reading scores were higher for children who accessed more services. This finding could have significant implications for sustainably reducing inequities in early childhood. However, there was no differential benefit for children experiencing disadvantage who potentially have more to gain from these interventions, which was counter to the hypothesis.[38] Issues associated with access and quality, not tested in this study, could explain this unexpected outcome.

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Importantly, for children who are unstably housed and/or experience food insecurity, Maslow's hierarchy of needs[49] would clearly suggest that these factors are critical to address as a priority. Programs such as the Supplemental Nutrition Assistance Program in the United States[50] and interventions designed to reduce intimate partner violence, one of the leading causes of housing instability,[36,51] should be considered fundamental to other critical early years services such as those discussed above. We would argue however that this is not an either/or scenario.

Approaches capitalizing on system-wide and place-based initiatives are avenues where stacking interventions could be experimentally trialed both from a developmental and cost effectiveness perspective. In order to properly assess the impact of stacking interventions, evidence-based, measurable indicators are required.

## IDEA 3: USING DATA-DRIVEN, EVIDENCE-BASED SYSTEM METRICS TO DRIVE EQUITABLE, AND ADAPTIVE SYSTEMS FOR CHILDREN

Utilizing data-driven, evidence-based system metrics means communities can access more precise data to assist them with decision-making and allocation of limited resource. By building on the first 2 ideas in this paper, we argue that a next logical step is to deliver metrics on measurable and modifiable factors that are known to drive disadvantage taking the social determinants and bio-ecological approach (Idea 1) and can drive stacked responses (Idea 2).

### COMMUNITY-LEVEL METRICS

The research into neighborhood or community effects on children, originally motivated by the observation that disadvantage is often geographically concentrated and intergenerational,[52] established the relationship between neighborhood socioeconomic status and children's developmental outcomes.[53,54] However, further research has shown this relationship goes beyond socioeconomic factors. For example, communities that have local amenities (eg, kindergartens and playgroups, green spaces) and services (eg, public transport), and safe places to play, also promote early childhood development.[55] Positive and stimulating environments early in a child's life are crucial to the development of foundational skills in learning and communication.[56,57] Likewise, neighborhoods with high levels of poverty and violence have the potential to negatively impact children's developmental trajectories.[58]

The Kids in Communities Study[59] investigated community-level factors associated with early childhood development in 5 community domains—physical, social, service, governance, and socioeconomic environments—in 25 communities in 5 Australian states and territories using a mix of quantitative and qualitative methods. This study identified a set of evidence-based foundational community factors (FCFs), those which lay the foundations of a good community for young children.[60] Some examples include public open space availability and quality, physical access to services (eg, walkability and public transport), and affordable housing.

The FCFs allow communities to move beyond anecdotal information to a discussion grounded in evidence about how they are tracking on community factors related to early childhood outcomes. The added richness and value of information to better understand the local context is crucial to tailoring place-based interventions most likely to be responsive and work in the community. Although there are existing collective impact approaches, such as the Asset-Based Community Development program[61] that are framed around place-based action for change using local action. This approach considers the existing services and resources available but does not conceptually drive a stacked approach to service delivery across sectors nor suggest the necessary service-level metrics that could be utilized to understand and then drive system change. While one could argue the lack of detail is purposeful to allow for local input and ingenuity, the difficulty is then generating sufficiently robust cumulative system benefit to actually address inequity. Given that these approaches are yet to deliver on outcomes it may be process and community-level metrics that could be the accelerators needed.

An extension of Kids in Communities Study is to take evidence on the built environment-specific FCFs to scale. Spatial built environment measures such as traffic exposure, public transport availability and access, park access and quality, early childhood education and care service availability, and housing, have recently been linked to the 2015 Australian Early Development Census in Australia's largest 21 urban and major regional cities and towns.[62] The Australian Early Development Census is a population measure of early childhood development completed by teachers on all children starting school every three years[63] and is widely used by policy makers, practitioners, and researchers to help measure and monitor child development outcomes in communities. The result will be early childhood development and built environment data at a small geographic scale (around the child's home) for over 235,000 children approximately 5 years of age across the country.[64] The aim is to develop evidence-informed built environment indicators for early childhood, which can help identify areas of inequity, monitor community progress, strengthen community engagement and development, assist with prioritizing effort, and help inform policy recommendations using the best local data.

### SERVICE-LEVEL METRICS

In order for systems/services to respond to gaps in performance and delivery, evidence-based metrics encompassing multiple domains (eg, quality, participation, access) with balance across structure (ie, accessible), process and outcome indicators are required to allow prioritization of limited time and resource.

Although there is a paucity of research examining the link between specific indicators and improved service performance, there are examples demonstrating the value of

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quality indicators in their utility to improve performance in health care. For example, the Australian Council on Healthcare Standards established the Care Evaluation Program of clinical performance measures in its accreditation program. Documented evidence showed improved management and examples of improved patient outcomes related to quality metrics.[65] Follow-up data showed a large number of indicator results actioned by a high proportion of health care organizations, which also increased over time.[65,66] The actions included review of data quality activities, policy and procedure changes, educational programs, new appointments, and equipment changes.[65] Similarly, the US National Database of Nursing Quality Indicators is designed to provide unit-level data to aid in decision-making related to improving the nursing work environment and patient outcomes.[67] Research has shown that process and provider metrics from the National Database of Nursing Quality Indicators demonstrate important associations with patient quality of care.[68,69]

Process and outcome indicators have different strengths and limitations. On the one hand, outcome indicators are often a measure of something that is important in its own right (eg, literacy rate). However, they are not a direct measure of quality[70] and are difficult to link to practice/service performance.[71] In contrast, process indicators are direct measures of quality and are easier to interpret.[70] Service systems in developed countries tend to focus on mostly outcome indicators such as national tests of reading and numeracy standards or proficiency levels at school (eg, the National Assessment Program—Literacy and Numeracy in Australia, the National Assessment of Educational Progress in the United States, and National curriculum assessment in the United Kingdom). Other outcome indicators include antenatal care visit in the first trimester (eg, Australia, the United Kingdom, New Zealand, the United States), employer/client satisfaction,[72–74] and proportion of infants who were breastfed (eg, World Health Organization, Australia—maternal and child health).[75] While these indicators provide important insights, they are difficult to shift in the short term since they are not as sensitive to differences in quality of service provision.

In line with ideas 1 and 2 above, and considering the impact that accurate measuring and monitoring of process metrics could have on service systems, we suggest that there are 3 key drivers—quality, participation, and quantity. If delivered effectively, these 3 drivers could have significant and positive effects on children experiencing adversity and begin to reduce the inequity gaps prominent in Australia and other developed countries.

*Quality*: Early years services need to be delivered at high quality to see benefits for children, especially for children from disadvantaged backgrounds who are most likely to miss out.[38,76] Services/interventions with quality are those for which there is robust evidence showing it delivers the desired outcomes. Examples include early childhood education and sustained home visiting programs. However, research assessing the quality and key elements of such programs also illustrate that the how and by whom is also critical to realize the benefits. International research has shown that early education programs that emphasize learning in literacy, maths, science, environment and using a diversity of cultural and theoretical approaches result in better academic and social-behavioral outcomes than ones that do not have such a focus.[77] Children also make more progress in preschools where staff have higher qualifications.[78] Several systematic reviews and meta-analyses indicate the importance of specific quality components of sustained home visiting programs,[43,79,80] as well demonstrating the importance of staff skill and training.[43]

*Participation*: For interventions to be effective, the right children and families need to be targeted to attend at the right dosage levels. The optimal attendance levels may vary as a function of disadvantage status and can be calculated whether the intervention/strategy is for everyone (universal provision) or targeted (intended to benefit a certain population). Indeed, national data on enrollment rates in early education fail to demonstrate the variability in actual attendance (dose), particularly among high-risk and vulnerable groups, who arguably would benefit from higher doses than the general population.[81–83]

*Quantity*: Availability of services locally in sufficient quantity for the target population is crucial to ensure all children have physical access to evidence-based services in the first place. Understanding quantity metrics helps us determine the quantum of effort and infrastructure needed to deliver the intervention for a given population at the right quality and dose.

While there is obvious utility in individual indicators, adapting a systems approach across the key drivers of quality, quantity, and participation would enable local communities to make better and immediate decisions on where to direct limited resources.

We are currently undertaking a project, *Restacking the Odds*, that will test process metrics across 5 evidence-based interventions, primarily delivered as services (antenatal care, sustained nurse home visiting, early childhood education and care, parenting programs, and the early years of school), across the key drivers of quality, quantity, and participation, across several communities in Australia. The aim is to establish an actionable, evidence-based framework that can be used by participants across the social system to sharpen the targeting of their work, and to improve the effectiveness of their actions. In using this approach, we hypothesize that embedding process metrics into health and education services/platforms will create real and sustainable change.

## CONCLUSION

Robust research supports the adverse impact of disadvantage on children's health, development, and subsequent adult outcomes. The ability of policymakers, service providers, and communities to respond as a system rather than single programs or strategies remains a challenge. To move beyond good intentions and address the issues of inequity, we have suggested 3 ideas for

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addressing childhood inequities that have applicability across international service ecosystems.

If we 1) adopt a social determinants approach to disadvantage by assessing and responding to the underlying community conditions impacting children's well-being; 2) stack service interventions simultaneously (aimed at the child and parent) and continuously (antenatal to age 8 years); and 3) measure system functioning and use the data to make improvements (using quality, quantity, and participation), then we may be able to address early childhood inequities more effectively. Although there are essential government policy levers to consider, many of the change factors are modifiable at the local level. The necessary aligned effort required across organizations may be best advanced through the emerging place-based initiatives growing in disadvantaged locations across places like the United States, United Kingdom, and Australia. Using system metrics to support local communities and place-based networks to understand and respond to factors contributing to inequitable outcomes across early childhood is doable now and makes good sense.

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