DISCUSSION

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Creating the conditions for robust early language development for all: Part two: Evidence informed public health framework for child language in the early years

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Abstract

Background: One of the most significant developmental accomplishments is the emergence of language in early childhood. Whilst this process is effortless for most children, others can face significant hurdles. Identifying, in the early years, which children will go on to have developmental language disorder is, however, fraught with several well-documented challenges. In the preceding paper we described and linked new research evidence about factors that influence language development in the early years, noting that exposure to some may be time sensitive and that these influences cluster together and can accumulate over time. We demonstrated that risk profiles were associated with and characterised low language trajectories, and we considered how this information could be integrated into a concept that moves beyond screening at single time points in the early years. We argue that this evidence might be used to build an improved early years framework for language thereby creating a more equitable surveillance system that does not leave children living in less advantageous circumstances behind. Underpinning this thinking was a bioecological framework that incorporates the social, environmental and family factors in the child's ecosystem known to influence language development in the early years.

Aims: To develop a proposal for the design and implementation of an early language public health framework based on current best evidence

Methods: We synthesised the findings from the companion paper (Reilly & McKean 2023) regarding early language trajectories, inequalities and clustering of risks with key public health concepts, relevant intervention evidence and implementation theories to develop a new framework for language surveillance and preventative interventions in the early years.

Main Contribution: An evidence informed early language public health framework is presented. Describing in turn (1) essential components;

(2) relevant interventions; (3) essential qualities for implementation ((i) probabilistic, (ii) proportionate, (iii) developmental and sustained and (iv) codesigned); (4) system-level structures and (5) processes required to adopt and embed an early language public health framework in an existing Local Government Area's child health surveillance and early prevention-intervention systems.

Conclusions: Children's language development influences their life chances across the life course and language difficulties are unfairly distributed across society. Current evidence points to the need for whole systems approaches to early child language and enables a blueprint for such a framework to be described.

KEYWORDS
language, public health, DLD, language disorder, prevention, early years, place-based

WHAT THIS PAPER ADDS

What is already known on the subject

- Early child language development sets the stage for a child's life chances and language difficulties can have profound long-term consequences. Such difficulties are unfairly distributed across society and the reach of preventative services is not universal or equitable.

What this study adds

- Several effective primary and secondary preventative interventions exist but their successful implementation is not straightforward. An early language public health framework of surveillance and intervention is described to provide equitable and effective early interventions to children from 0–4 years. We detail the essential components, interventions and qualities of that framework and describe system-level structures and processes required to adopt and embed an early language public health framework in a given locality.

What are the clinical implications of this work?

- A whole systems approach to early child language is required and should be co-designed through local collaboration with family, community and children's services stakeholders. A public health speech and language therapist role could catalyse the implementation of such approaches and support continuous improvement.

INTRODUCTION

The evidence presented in the accompanying paper, (Reilly & McKean, under review) clearly demonstrates that (developmental) language disorder ((D)LD) meets agreed criteria to be considered a public health problem: it places a large burden on society, is responsive to upstream preventative strategies and is unfairly distributed across society. There are many reasons why addressing inequalities such as these should be a priority, not least global principles

of children's rights (UNICEF UK, 1989). Supporting all children and young people to reach their potential in learning language affords more equitable opportunity for those individuals to participate in society economically and socially and brings consequent benefits for their well-being (Law et al., 2009; Schoon et al., 2009). However, it also brings benefits to wider society. Current economic theory suggests that tackling such inequalities is fundamental to societal productivity, prosperity and social cohesion (Shafik, 2021).

Developmental language disorder and inequalities in socioeconomic circumstances

Inequalities in children's health are influenced by the socioeconomic circumstances (SECs) in which children live. The pathways through which SECs influence child health outcomes are complex but 'in general are driven by differences in the distribution of power and resources that determine the economic, material and psychosocial conditions in which children grow up' (Pearce et al., 2019, p. 998). Inequalities in child language are no exception. Hence although (D)LD is not caused by the child's SECs, the gradient in language abilities associated with socioeconomic factors must not be ignored in the design of interventions.

(D)LD emerges through an interaction between the child's biological endowment for language learning and the environment in which they grow and learn. Children with less propensity to learn language need a richer language environment than those with a higher biological propensity if they are to reach their potential as language learners. This includes, for example, requiring more repetitions of words to learn them (Gray, 2003; Storkel et al., 2017), more responsive caregiver interactions to 'catch up' from early delays (Levickis et al., 2014; Levickis et al., 2018) and for this responsivity to be sustained and consistent (Levickis et al., 2023).

There are many barriers in place to providing a language enriching environment for families living with limiting or challenging SECs. Barriers include jobs which take parents away from the home at key opportunities in the day for interactions, overcrowded homes reducing opportunities for contingent responsive interactions, and long-term stress from insecure housing reducing a parent/caregiver's emotional resource to be able to be responsive and available for their child (Dean, 2007; Taylor & Edwards, 2012). And, as previously described 'risk factors hunt in packs' (Taylor et al., 2022, p. 233) and so disadvantaged families often are dealing with multiple cumulative and interacting factors which make it more difficult to provide optimal

environments for their child's health and development (Christensen et al., 2017; Eadie et al., 2022).

Inequalities in health should invoke a public health response but do not always do so. Even when public health interventions are implemented if poorly designed or delivered, they can inadvertently serve to widen rather than narrow inequalities. Not only do language abilities follow the social gradient but access to support and the ability to benefit from support is also influenced by SECs (Box 1).

Families living with social disadvantage are less likely to seek support than more advantaged families. Data from the specialist language cohorts ELVS (Early Language in Victoria Study (Reilly et al., 2018)) and SCALES (The Surrey Communication and Language in Education Study (Norbury et al., 2016)) show that only 50% of children up to 5 years of age with low language seek help from a health professional (Skeat et al., 2010) or receive help in school or referral to speech and language therapy (Norbury et al., 2016). Although worrying statistics in and of themselves, help seeking (Skeat et al., 2010) and receipt of support (Morgan et al., 2016) are even less likely in children living with social disadvantage.

Children's services in general and support systems for children with (D)LD are often complex and fragmented (Law et al., 2019; McKean et al., 2019). The necessary resources to support a child are often distributed across professionals and services and have complex rules and processes to gain access (Calder et al., 2019; McKean et al., 2019). This places a significant burden on families to 'join up' services and coordinate care for their child (Axford et al., 2015). Furthermore, access to additional resource, in schools through systems such as Education and Healthcare Plans, often requires significant advocacy by parents/caregivers, (Vibert, 2021). Families living with social disadvantage have less social capital and material and psychosocial resources with which to navigate such systems and to challenge the inherent power dynamics often at play. Families with sufficient material resource also can supplement state provision with private speech-language therapy (Law et al., 2019), a recourse that is clearly not available to many families.

Finally, many interventions to support children's language development place a substantial emphasis on supporting parents/caregivers to provide responsive contingent interaction (Law & Charlton, 2022; Levickis et al., 2022). However, it is much more difficult for a family living with multiple challenges to make this change. Hence universal interventions run the risk that children and families with the fewest needs benefit most and vice versa (Becker, 2011; Mol et al., 2008). These issues are further exacerbated for families from minority cultures and who speak languages other than English. In this

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> **Box 1: Barriers to access to support for socially disadvantaged children with and at risk of (D)LD**
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> It is more difficult for socially disadvantaged families of children with and risk of (D)LD to
> - seek and receive support (Morgan et al., 2016; Skeat et al., 2010)
> - navigate complex, fragmented services (Calder et al., 2019; Dockrell et al., 2019; Law et al., 2019; McKean et al., 2019)
> - pay for private services to supplement those on offer from the state (Law et al., 2019; McKean et al., 2019; Skeat et al., 2010)
> - advocate for their child's rights to education and health services (Vibert, 2021)
> - change behaviour in interventions due to the higher burden of material, psychosocial vulnerabilities (Levickis et al., 2022; Mol et al., 2008)
>
> And access is yet more difficult where social disadvantage intersects with non-western culture and minority home languages because
> - interventions may not be culturally aligned to the family's beliefs, values and practices (van Kleeck, 1994)
> - evidence-based non-English home language interventions are less readily available (Pert, 2022)

case interventions may not be culturally aligned to the family's beliefs, values and practices due to the research evidence being almost entirely built on evidence from white, western, monolingual and middle-class families (van Kleeck, 1994). Furthermore, whilst the number of evidence-based non-English home language interventions is growing numerous barriers remain to their delivery when in a minority language context (Pert, 2022).

The barriers to access described here have been further exacerbated by the effects of the COVID-19 pandemic and the current cost-of-living crisis. There has been a 'perfect storm' of increased prevalence of language difficulties due to children's more limited early life experiences, in particular for socially disadvantaged families (Erbay & Tarman, 2022), the departure of experienced practitioners from the speech and language therapy and early years professions (Early Years Alliance, 2021; RCSLT, 2022), and severe and sustained cuts in local government spending on early years services (Action for Children, 2021). These unprecedented pressures on families, early years services and speech and language therapists (SLTs) have exacerbated the inequalities in language skills between disadvantaged children and their more advantaged peers, (Tracey et al., 2022).

A public health framework of preventative interventions

Given that (D)LD meets agreed criteria to be considered a public health problem it therefore follows that we should tackle it using public health interventions (Law et al., 2013). Intervention in the context of public health goes beyond traditional clinical models of intervention and rather is *any* action taken which alters the course or outcome of a condition, that prevents harm or improves functioning (McKean et al., 2022a). In this, and the accompanying paper, we use the term public health and its framework to encompass the broad range of services and systems involved in promoting healthy development and well-being. Public health interventions therefore represent action which moves well beyond the boundaries of the health sector into the domains of agencies such as education, social services and local government and the coordination of this action across such boundaries. Within a public health framework this action for prevention can be enacted at three levels with differing populations, aims and mechanisms of action: primary, secondary and tertiary prevention (Figure 1).

Primary prevention acts at a whole population level and aims to reduce the incidence of a condition and to prevent its later development. Successful examples include taxation on cigarettes to reduce lung cancer, advertising to encourage us to 'slip, slop, slap' on a t-shirt, hat and sunscreen to reduce skin cancer, and national immunisation programs in response to the COVID pandemic.

Secondary prevention is targeted at subgroups of the population. It aims to prevent a given condition from emerging or to act early to slow down or reverse its course once it has begun. This targeting can be either selective or indicated. *Targeted-selective* approaches are delivered to groups most at risk of developing a condition, for example breast screening programs for women aged 47 years or older in the United Kingdom. *Targeted-indicated* approaches are used when early signs and/or risks of a condition are present in the individual, for example, the prescription of statins to those identified as having high blood-pressure to reduce the risk of cardiovascular disease.

Tertiary prevention refers to interventions for an individual with a persisting condition. Here the focus is on reducing negative consequences, improving quality of life, and reducing an individual's experience of disability.
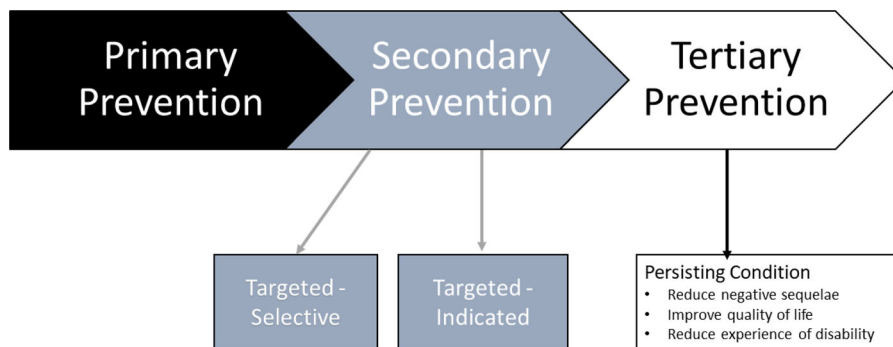
Public Health – preventative intervention

FIGURE 1 Public health framework of intervention adapted from Mrazek and Heggarty (1994); Law et al. (2013) and Axford et al. (2015). Reprinted with permission from McKean et al. (2022a) Language trajectories in childhood: the nature and drivers of individual differences and their implications for intervention. In: Law, J., Reilly, S. & Mckean, C. (eds.) Language Development: Individual Differences in a Social Context. Cambridge: Cambridge University Press. [Colour figure can be viewed at wileyonlinelibrary.com]

A PUBLIC HEALTH FRAMEWORK FOR THE PROMOTION OF ROBUST EARLY LANGUAGE DEVELOPMENT

With the recognition that individuals' life chances with respect to health, education, employment, and well-being are predicated on early childhood language development (Shonkoff, 2007) and that language development is substantially influenced by the clustering and accumulation of risk-exposures over the life course (Blane, 2006; Christensen et al., 2017; Taylor et al., 2019; Taylor et al., 2020) comes the imperative to act early. As Heckman noted when considering the economic benefits of early interventions, 'skill begets skill' and so earlier interventions, through the action of positive developmental cascades, bring greater overall benefits for individuals' development over the life course than later interventions (Heckman, 2006).

The issues described previously regarding inequity in reach and benefit from interventions, and instability in language status, create significant challenges for the design and delivery of interventions. How then can early interventions be designed such that all children benefit equally, the right children receive intervention and the opportunities to address upstream determinants of language disorder are not missed? In the following we describe a public health framework for early child language intervention, describing in turn (1) the components of such a framework, (2) the types of evidence-based preventative interventions which could be implemented within that framework and (3) the qualities which are essential to its implementation.

The components of a public health framework for child language

If all children aged 0–4 years across a given population are to receive the necessary support for optimal language outcomes, we propose that a mosaic of interventions is necessary across the levels of public health prevention. Each form of prevention *on its own* will not address children's language needs equitably or comprehensively. A mix of primary, secondary and tertiary intervention is essential. If used in isolation

- Universal interventions risk widening inequalities as those with most resources are more able to act upon messages regarding the provision of language enriching environments.
- Targeted selective interventions risk over- and underservicing as not all children living in socially disadvantaged circumstances will have language problems and conversely, some children living in socially advantaged families will have language difficulties.
- Targeted indicated interventions again risk both over- and underserving children with or at risk of low language due to the instability in early language development, with some children growing out of their language difficulties but also some growing into them.
- Tertiary preventive interventions, offered to those with a definitive diagnoses of (D)LD, given the limited and inequitable access to services described previously, risk substantially underserving children and, crucially, miss the opportunity to tackle upstream determinants of low language early in life.

A mosaic of preventative interventions and developmental surveillance

For equitable outcomes a public health framework must be viewed as a whole system approach not a menu of options. We therefore propose that *all* of the following components need to be in place for children aged 0–4 years

Primary prevention: Universal intervention should be provided for all children in the early years promoting the awareness of the importance of language development, the role of parents and the wider family in supporting children's development, ways to support language development as part of daily routines, and avenues and triggers for seeking support as necessary. To enable equitable and sustained reach this should be delivered through multiple universal systems such as print, broadcast and social media campaigns, midwifery and public health nurse contacts with families, and early years education and care providers. Language surveillance should be carried out (Gilroy et al., 2022). All children's language and communication development should be monitored at key points in their development and/or at educational transitions (e.g., 11–12 months; 2–2.5 years, 3 years, 4 years). Practitioners across health, social care and education should be able to view and link these data to enable them to monitor and understand children's early language trajectories. Furthermore, tracking the socio-emotional development of children with low language would enable those with the most vulnerable language and socio-emotional development trajectories to be identified (McKean et al., 2017).

Secondary prevention—targeted selective: The subgroup of the population most at risk of poor language development and therefore candidates for targeted selective approach are children living with social disadvantage (McKean et al., 2022a; McKean et al., 2018; Reilly et al., 2014). Early years education, health, social care and voluntary sector organisations supporting families in more disadvantaged areas must have the promotion of children's language development as a priority outcome. Sustaining this focus is challenging. To withstand the pressures arising from high staff-turnover, volatility in funding and service delivery models and changes in local and national government policy priorities in this sector (Action For Children, 2021; Lewing et al., 2020), service delivery pathways, policies and curricula must all explicitly include language development as central to support offered to socially disadvantaged communities. The teams providing these services need ongoing continuing professional development to ensure they have the knowledge and skills to support families and early education and care providers to provide language enriching environments (Gascoigne, 2021). Commissioners and funders of services must also ensure they have the capacity to provide this support.

Early support to families and wider social policy must tackle the upstream determinants of low language which cluster in families, such as overcrowding, housing instability, parental stress and more limited parental resources in terms of time and money (Eadie et al., 2022; Taylor et al., 2020). As described in the companion paper (Reilly & McKean, 2023). Local data should be analysed with reference to knowledge of subgroups with clustering of risks to enable precise deployment of resource. For example, communities could receive additional resource where there are high levels of families having several of the risks identified in Eadie et al. (2022) and Taylor et al. (2020) (social disadvantage, large family size, maternal mental health needs, unemployment, low language at 2 years and so on). Furthermore, the universal collection and linkage of data regarding children's early language development should be used by local service providers to identify geographical areas and population subgroups where language development appears, at a group level, to be less robust than the wider population. Services should concentrate resource and effort to address those needs.

Secondary prevention—targeted indicated: Given the volatility in early language trajectories described in part one, targeting interventions based *solely* on children's language ability before 4 years, cannot be recommended. Even in studies using multiple language measures to create latent language variables, low stability in children under 5 years remains, and the translation of such group level, latent measures into valid clinical tools which estimate individual clinical risk has not been achieved (Bornstein et al., 2016; Bornstein et al., 2018). However, given that not all children with (D)LD are from socially disadvantaged families, some form of targeted indicated intervention as a component of this public health model is indicated. The recent evidence regarding the clustering and accumulating of risks and their ability to predict language outcomes suggests it may be possible to integrate child and environmental factors to create clinical 'risk models' with which to inform the targeting of clinical services.

As described in the preceding paper, (Reilly & McKean, under review) risk models have been developed which are predictive of 4-year language outcome at 11–12 months of age (McKean et al., 2016), identify the accumulation of risks over the first 4 years of life (Eadie et al., 2022) and characterise clusters of risks within families which are of particular concern (Taylor et al., 2020; Taylor et al., 2019). Also clinical tools with proven feasibility and acceptability have been developed at 2–2.5 years, which integrate child language abilities with other risks (Early Language Identification Measure and Interventions- the ELIM_I) (Law et al., 2020; Law et al., In press), and which measure the key

environmental risk of caregiver responsiveness and contingent talk (Parental Responsiveness Rating Scale- the PaRRIS) (Hudson et al., 2015; Levickis et al., 2019).

Tertiary prevention: The provision of primary and secondary interventions must never serve to slow down referrals for tertiary prevention where parental concern is high, difficulties are severe or where indicators of other disabilities are present. Clear referral criteria and pathways to specialist assessment and intervention services from SLTs, and other specialist teams must be in place and all members of the children's workforce must be aware of them and such teams must be adequately resourced to meet the level of need. Key secondary consequences to low language in the early years which should be considered for tertiary prevention are socio-emotional and behavioural difficulties, social relationships and pre-literacy skills such as phonological awareness. There is limited evidence regarding interventions addressing these outcomes in children with or at risk of (D)LD. However, parents should have ready access to advice regarding strategies to tackle frustration and reduce withdrawal and/or conduct difficulties where these occur (Hutchings et al., 2007; Landry et al., 2008). Furthermore, early childhood education and care settings must be equipped with the necessary skills and knowledge to promote peer relationships for children with or at risk of (D)LD (Fujiki & Brinton, 2017), modify learning environments to reduce stress, improve access to learning (Dockrell et al., 2012), and develop key pre-literacy skills such as phonological awareness (Gillon, 2000).

Evidence-based preventative interventions

Clearly if the public health model described is to be worthwhile then effective interventions at each level of prevention are required. In recent years the number of early language interventions which have been robustly evaluated has grown substantially. Here and in Table 1 we draw on a number of recent systematic and/or thematic reviews to provide a sense of the key approaches or subtypes of interventions which have proven efficacy (Greenwood et al., 2019; Heidlage, 2019; Justice & Cabell, 2022; Law & Charlton, 2022; Levickis et al., 2022; Markussen-Brown et al., 2017) and to highlight key issues with respect to equitable and effective implementation at scale in the 'real world'. This summary is not intended to be exhaustive but rather illustrative. We refer readers to those systematic and thematic reviews for more comprehensive and detailed summaries.

Effective primary and secondary preventative interventions can be broadly grouped into adult–child interaction (ACI), resource provision (RP), dialogic book reading (DBR) and direct instruction (DI) with the latter focusing on vocabulary learning, comprehension monitoring, sentence, narrative and discourse structure. They are variably delivered through parent/caregiver training, training of educators and delivery of specialist early years curricular.

The very earliest interventions (0–30 months) may include RP (such as gifts of toys or books) (e.g. Christakis et al., 2007). Those between 10 months and 3 years tend to focus on the promotion of responsive contingent interaction between adults and children through ACI or DBR approaches (e.g. Buschmann et al., 2009; McGillion et al., 2017; Mol et al., 2009; Wake et al., 2011). Core to these approaches are characteristics such as following the child's lead, and repeating, recasting and extending the child's communicative attempts. The context within which these occur may differ (free play, play with a specific toy, care routines, shared-book reading) as can the degree and nature of support offered and the adults targeted (parents/caregivers and early educators), but at their core they all are focussed on increasing the number and quality of responsive caregiver interactions. These interventions have been delivered at all three tiers of intervention in universal primary prevention, in targeted-selective and targeted-indicated secondary prevention and as components of tertiary prevention. Later between 3 and 5 years, the focus tends to move towards educators and includes ACI, DBR and or DI, with a number including combinations of these components (e.g. Fricke et al., 2017; Reeves et al., 2018). However, some include both educators and parents (Frizelle et al., 2021); indeed Justice and Cabell, in their recent thematic review of interventions based in preschool settings, see the involvement of parents as a crucial component for success (Justice & Cabell, 2022).

Few tertiary preventative interventions have been evaluated and the existing studies often represent lower levels of evidence (e.g., case series, matched group designs, expert opinion) and relate to children over 5 years and/or with additional diagnoses (autism spectrum disorder, learning disabilities). Examples include social communication outcomes (Fujiki & Brinton, 2017) and phonological awareness outcomes (Gillon, 2000). In the case of socio-emotional behavioural outcomes relevant evidence can be found in studies evaluating 'parenting' interventions where there is robust evidence of efficacy (Hutchings et al., 2007; Landry et al., 2008). Whilst these studies likely include children with low language it is difficult to extract the effects on this subgroup from available evidence. The lack of tertiary prevention evidence for children with low language abilities aged 0–4 years may simply represent the age at which children with (D)LD are identified but also points up the lack of empirical intervention research targeting 'functional', secondary consequences of language

T A B L E 1 Illustrative examples of primary and secondary preventative intervention studies—for children aged 0–5 years drawn from (Greenwood et al., 2019; Heidlage, 2019; Justice & Cabell, 2022; Law & Charlton, 2022; Levickis et al., 2022; Markussen-Brown et al., 2017) with approaches categorised as adult–child interaction, resource provision, dialogic book reading, direct instruction.

Primary Prevention					
	Study & design	Age (months)	Approach	Intervention description	Findings
1	McGillion et al. (2017) RCT	11	ACI	Parents shown 10-min video of caregivers engaging in contingent talk. Parents asked to practice contingently responding to child 15 min per day (one home visit; one follow up call)	Children from low SES families had increased expressive language at 15 months and 18 months compared to control but no gains remained at 24 months. Higher SES families did not show an effect.
2	Christakis et al. (2007) RCT	18–30	RP/ACI	Distribution of building blocks after paediatrician review with newsletters suggesting play activities with the blocks on two occasions. Families also filled in a diary about the activities their child engaged in over a 24-h period.	Children from low- and middle-income families in the intervention group had increased (CDI) Communicative Development Inventories scores compared to a no intervention control after 6 months. Those from low-income families benefitted more.
3	Mol et al. (2008) Meta-analysis	24−60	ACI/DBR	Parent–child shared book-reading—16 studies focussed on increasing the use of dialogic book reading in families and with 'reading as usual' as the control were analysed.	Dialogic book reading benefited children's vocabulary for those aged 2–3 years (moderate effects for expressive vocabulary and small for receptive). Effects were smaller for older children and those at risk of language delay (SES & family history)
4	Mol et al. (2009) Meta-analysis	36–72	ACI/DBR	Educator~child shared book reading—31 studies focussed on the use of interactive/dialogic book reading in preschools and with usual daycare/kindergarten practice in the control arm.	Interactive book reading benefited children's oral language and expressive vocabulary but only if delivered by researchers, not educational staff. Effects were similar for at-risk and not at-risk groups.
5	Bleses et al. (2018) RCT effectiveness	36–72	DBR/DI	Enhanced story book reading, plus/minus educator professional development; plus/minus parent homework. Three interventions compared to "business as usual" control. Planned intervention 30 min enhanced storybook reading sessions 2× per week for 20 weeks in small groups.	Overall no difference between the three types of intervention and no significant effect on oral language abilities compared to control. However, significant gains for letter knowledge and phonological awareness. Oral language skills significantly improve if children receive at least 10 h of intervention

TABLE 1 (Continued)

Primary Prevention

	Study & design	Age (months)	Approach	Intervention description	Findings
6	LAARC et al. (2017) RCT	46–79	DI	A whole class language focussed curriculum was delivered in pre-kindergarten and kindergarten classrooms by trained teachers in four 30-min lessons per week over 25 weeks. The focus of 'Let's Know' is on vocabulary, comprehension monitoring, and understanding narrative and expository discourse and was compared to 'business as usual'.	Positive impacts found for vocabulary knowledge, comprehension monitoring and understanding of expository text.

Secondary prevention—targeted selective

	Study & Design	Age (months)	Approach	Intervention description	Findings
7	Burgoyne et al. (2018) RCT	31–42	ACI/DI	Parent-delivered program of daily activities over 30 weeks and supported by UK children's centre staff. Targeted at more socially disadvantaged families. This involved pre-training, provision of materials for each daily session, ongoing advice and support and celebration events. The control was a similar program targeting motor skills.	Sample was more disadvantaged than UK population as a whole but included a range of SES. Children receiving the language programme made significantly larger gains in language and narrative skills than the control and this was sustained 6 months after the intervention was completed.
8	Frizelle et al. (2021) QES	36–51	ACI/DI	Happy Talk—parallel program of training for parents and early educators to increase contingent responsiveness and complete particular language promoting activities. preschool staff complete four workshops. Parents attend a 12-week parent programme. Staff receive a 30-min coaching session.	Significant intervention effects for comprehension and total language scores with large and moderate effect sizes. No significant effect was shown for parental responsiveness. Preschool staff deemed the programme to be acceptable and rated the intervention positively
9	Gonzalez et al. (2010) RCT	48–61	DBR	Language and literacy curriculum for pre-schoolers at developmental risk. integrating science and social studies vocabulary nstruction into shared book reading with low-income preschool children (WORLD). Teachers implemented the intervention in small groups of five to six students, 5 days per week, 20 min per session, for 18 weeks.	Findings from multilevel models indicated significant effects of the WORLD intervention on standardized measures of receptive vocabulary and on researcher-developed measures of expressive and receptive vocabulary. The WORLD intervention had an overall main effect, regardless of entry-level vocabulary.

TABLE 1 (Continued)

Secondary prevention—targeted selective					
	Study & Design	**Age (months)**	**Approach**	**Intervention description**	**Findings**
11	Lonigan et al. (2011) RCT	36–72	DI and DBR	Literacy-focussed curriculum including 10 thematic units with large group/whole classroom activities, and small group activities involving dialogic book, phonological awareness and print knowledge. Professional development is provided to early educators for 2 days at the start of the academic year and 4× half days over the remainder of the school year. The curriculum runs for an academic year.	Preschool children were assessed on language and literacy outcomes. Results revealed significant effects of the literacy-focussed curriculum when compared to traditional curricula on expressive language, phonological awareness and print knowledge.
12	Wasik and Hindman (2020) RCT	44–76		Story Talk intervention provides whole-class instruction in vocabulary, drawing on book- and play-based activities. Story Talk classrooms are provided with materials, training (4 × 3 h), and progress monitoring of children, focused on a series of target words.	Children from high poverty schools in intervention classrooms performed significantly better than business as usual controls on measures of taught vocabulary, and on standardized measures of vocabulary.
Secondary prevention—targeted indicated					
	Study & design	**Age (months)**	**Approach**	**Intervention description**	**Findings**
13	Wake et al. (2011) RCT	12–18	ACI	At 18 months, children ≤20th centile on an expressive vocabulary checklist at a well child check were recruited to the trial. Parents received a modified Hanen 'You Make the Difference' programme over six weekly sessions which focusses on increasing parents' responsive contingent interaction.	The Modified 'You make the difference' programme was compared to 'usual care'. This community-based programme was feasible and acceptable, but little evidence was found that it improved language or behaviour either immediately or at age 3 years.
14	Buschmann et al. (2009) RCT	24	ACI/DBR	Children who are slow to talk/late talkers with no evidence of receptive received the Heidelberg Parent-based Language intervention 3 month program. The program focussed on Parent child interaction, increasing responsive interaction and based around shared book reading. Parents receive 8 × 2 h training sessions.	At the age of 3 years, 75% of the children in the intervention group showed normal expressive language abilities in contrast to 44% in a wait-list control group. Only 8% of the children in the intervention group versus 26% in the waiting group met the criteria for 'specific language impairment'.

(Continues)

TABLE 1 (Continued)

Secondary prevention—targeted indicated					
	Study & design	Age (months)	Approach	Intervention description	Findings
15	Reeves et al. (2018) RCT	36–48	DI	Staff in Nurseries serving socially disadvantaged communities are trained by SLTs. Children about whom staff are concerned about their language and communication development receive the intervention. 'Early Talk Boost' is a manualised approach which supports attention and listening, learning words, and building sentences. Groups 6–8 children 3× week for 9 weeks in 20 min sessions.	Wait list control. Medium—large effect sizes reported in raw scores for language production and comprehension. Some issues with reporting make interpretation difficult.
16 17	Fricke et al. (2017) West et al. (2021) RCT—efficacy & effectiveness	48–60	DI	Nuffield early language intervention (NELI) delivered by trained teaching assistants. Mix of small group and 1:1 sessions over 20 weeks delivered to children with lowest scores on language screen in a given class (lowest 10%). Manualised sessions focus on vocabulary, narrative, phonological awareness and print knowledge. TAs receive 2.5 days training plus remote support from SLTs.	NELI is effective in improving oral language ability when compared to 'business as usual' control. Effects are evident in both efficacy and effectiveness studies with reduced effect sizes in efficacy trial.

Abbreviations: ACI, adult–child interaction; DBR, dialogic book reading; DI, direct instruction; RCT, randomised controlled trial; RP, resource provision; SES, socioeconomic status; SLT, speech and language therapist; TA, teaching assistant; WORLD, Words of Oral Reading and Language Development; CDI, Communicative Development Inventories.

disorders rather than 'impairment' outcomes (Roulstone et al., 2012).

Essential qualities of a public health framework for successful implementation

The summary of interventions in Table 1 and recent reviews demonstrate that robust evidence exists for effective interventions at primary and secondary preventative levels (Greenwood et al., 2019; Heidlage, 2019; Justice & Cabell, 2022; Law & Charlton, 2022; Levickis et al., 2022; Markussen-Brown et al., 2017) with emerging evidence at the tertiary level. However, detailed consideration of the findings also suggests that implementation in the real world is not straightforward and that lifting interventions 'off the peg' without detailed consideration of contextual factors and their implications for implementation is not possible or desirable (Greenwood et al., 2019). Such considerations include the fact that some early intervention effects may 'wash out', such that benefits to children's language are significant in the short term but do not last (McGillion et al., 2017). Also, some interventions, such as DBR may widen rather than narrow inequalities if delivered by parents (Mol et al., 2008) and may be difficult for educators to deliver in real world contexts (Mol et al., 2009), whereas others may be effective only if delivered to a minimum dosage (Bleses et al., 2017) or depend on the nature of support offered to educators for implementation (Markussen-Brown et al., 2017). Some may not be effective when delivered in community ascertained rather than clinical populations (Wake et al., 2011). Furthermore, effect sizes when delivered at scale, as effectiveness rather than efficacy studies, may be relatively small (Bleses et al., 2017; West et al., 2021).

We argue that such difficulties should not be characterised as early interventions having 'failed'. To some degree early language interventions may have suffered from policy narratives suggesting they are 'silver bullets' that can 'shift trajectories' and remove the need for any

later support (Allen, 2011). Given that both biological risks and socioeconomic disadvantage tend to be present across a lifetime, the need for continued support to mitigate those risks is logical. Early intervention brings larger benefits for smaller investment than later interventions but is not a panacea and does not remove the need for longer term support (Heckman, 2000; Heckman, 2006). Rather it is a necessary investment to enable the individual to benefit fully from later support and, through tackling language inequalities, providing the equality of opportunity which is fundamental to societal productivity, prosperity and social cohesion (Shafik, 2021).

We posit that these issues within the available evidence (e.g., 'washout', widening inequalities, dosage, scalability) point up a number of key characteristics for implementation which must be in place for a public health framework for early language to be successful and for these issues to be addressed. That is, implementation must be probabilistic, proportionate, developmental and sustained, and co-designed.

Probabilistic

The first quality we consider is the probabilistic rather than deterministic nature of the approach. Our goal is to gain population coverage through the implementation at all four levels and over time. The model described would not expect to reach every child at risk with every intervention, nor to successfully identify every child who will go on to have persisting (D)LD at every time point. Rather, the goal is that the approach *as a whole* and *over the first 4 years* of a child's life will benefit all children who need support.

As for other areas of public health, individual interventions will inevitably over- and underserve to a degree and this needs to be accepted and accommodated in the model. Whole systems approaches are needed that:

- link surveillance and intervention over time and across levels of prevention so that repeated contacts and primary preventative interventions act as 'safety nets' to ensure all children receive some level of support.
- track children over time, allowing those receiving too low a level of intervention to be identified and support stepped up as soon as possible.
- use available local data to target geographical areas and/or subgroups of the population where known risk factors cluster, or where language outcomes are below expected levels.
- ensure interventions do not cause harm to children who receive support but do not ultimately need it, in terms of increased anxiety or stigmatisation.

Where a condition is relatively highly prevalent, and the consequences are lifelong, significant and pervasive, as in the case of (D)LD, it can be argued that the benefits of overservicing for some children outweigh the risks of underservicing others (Trevethan, 2017). Whether or not this is true is an empirical question requiring further research and will ultimately depend on the makeup of the 'mosaic', the approaches to identification for targeting and the ability of the interventions to promote change without harm. There is an urgent need to design and evaluate whole systems approaches, paying particular attention to intervention design to ensure interventions do not raise anxiety unnecessarily in those whose difficulties will resolve and to economic evaluation to ensure the costs of overservicing are outweighed by the benefits of ensuring all children who require it, receive support.

Proportionate

Gascoigne (2021) argues eloquently that the goal of SLT services should not be equality in input but rather equity in outcomes. This approach chimes with the framework of 'proportionate universalism' advocated in the work of Professor Michael Marmot.

'Proportionate universalism refers to the universal provision of services, where the scale and intensity of service delivery is tailored to individual disadvantage and need' (Marmot et al., 2010). The goal being that the right amount and type of support is offered for all individuals to benefit equally. To some degree the provision of the four levels of prevention outlined here will ensure all those in need will receive support; however, to ensure they deliver equivalent benefit for families living with a range of differing challenges requires more detailed consideration.

As Law et al. (2018) noted, despite its appeal conceptually, the implementation of a proportionate approach is not without challenges. 'A variety of different intervention approaches have been suggested... Yet how proportionate universalism should be put into practice has not been well articulated' (p. 297). In addition to this lack of articulation, if mishandled, the provision of a different approach to specific families can stigmatise and so harm or not reach the groups it aims to help the most. Critics of the "30-million-word gap" campaigns suggest that this "deficit model" of the quality of learning environments in socially disadvantaged, and particularly minoritized communities could be stigmatising and judgemental and does not pay sufficient attention to cross-cultural language differences nor to the structural inequalities outside of families' control affecting their children's development (Golinkoff et al., 2019).

Recently McKean et al. (2022b) completed work aiming to design an acceptable, feasible and equitable early

language intervention synthesising current best evidence with stakeholder views to be delivered by Health Visiting Teams at the 2–2½-year review. McKean and colleagues found that for an intervention to be judged by parents and professionals as equitable, it must be *proportionate*, with higher 'intensity' for higher levels of disadvantage, and *tailored*, offering differing approaches considering the *specific* barriers and enablers, assets, and challenges in each family. They draw on a number of implementation and health sciences theories to articulate precisely how and when tailoring should occur (de Silva, 2012; May & Finch, 2009; Michie et al., 2014; Sekhon et al., 2017). Further work is needed to test empirically whether such tailoring does deliver equitable benefits.

For a proportionate approach to be effective, interventions must not lay all the responsibility to provide optimal early learning environments at the door of individual families. Where family-level interventions are delivered, they must be proportionate and tailored with due regard to families' assets and adversities to ensure equity of access and benefit. These must also be paired with social policy that tackles inequalities in order that all families have the necessary resource to provide an optimal home learning environment in the fundamental early years. We must challenge policy that places all the responsibility on individual families to make changes in the way that they parent without tackling broader inequalities (Molloy et al., 2021; Pearce et al., 2019).

Developmental and sustained

If a public health approach to the promotion of robust language in children between 0 and 4 years is to be effective, it must be both developmental and sustained. Surveillance must be *developmental*, not only in terms of the behaviours assessed, but also in terms of the certainty with which a 'low' score is interpreted. As children develop, we become more certain that a low score is likely to represent a persisting difficulty and so the response should differ accordingly. For example, a low score at 11–12 months, unless accompanied by other developmental concerns, might elicit signposting to universal resources regarding parent-child interaction and access to a parent-toddler support group; a low score at 2–2½ years might elicit 2 or 3 visits from the Health Visiting or Family Nurse team to support a family to increase their use of responsive contingent interaction; a low score at 3 years might elicit inclusion in a language enrichment group in nursery and advice and monitoring of progress by the SLT; and a low score at 4 years might elicit a referral to SLT to begin a diagnostic pathway and to receive an individualised treatment program. Our certainty that a child has a persisting diffi-

culty and would benefit from earlier SLT referral can be increased at younger ages by the consideration of risks such as those highlighted in the companion paper and work by Bishop et al., 2017; Eadie et al., 2022; and Taylor et al., 2022. Furthermore, a dynamic assessment approach should be adopted after each intervention to determine whether expected progress is made or not. Additional risks, lack of progress over time and/or significant parental concern should trigger earlier access to specialist support than a low language score alone.

Surveillance must be *sustained* to address the volatility in early language development previously described and ensure all children with needs are identified and so that earlier language scores can inform judgements regarding the accumulation of risks and hence the child's likely prognosis (Eadie et al., 2022). Interventions must be developmental with respect to the behaviours targeted in terms of the child's language and communication but also with regard to the nature of communicative partners' interaction (Rowe & Snow, 2020).

Intervention efforts also must be *sustained*. There is limited evidence testing the benefits of sequential interventions over the early years. As summarised previously, there is clear evidence that early interventions can work but not, as some have suggested, that they 'shift children's trajectories' (Bornstein et al., 2018). That is, gains are made but they do not appear to then accelerate future progress and gains from a single intervention may 'wash out' if support is not sustained (McGillion et al., 2017). Molloy et al. (2021) suggest that 'stacking' of interventions is required both over time and across services and that such an approach could serve to amplify the effect of individual interventions (Heckman, 2000; Heckman, 2006). Further research is required to test whether stacking interventions sequentially and/or simultaneously (e.g., simultaneous primary and targeted indicated approaches) do indeed accumulate or at least sustain intervention effects. Theoretically such stacking could offer cumulative benefits from interventions with relatively small effect perhaps adding up to larger ones over the early years. Law and Charlton (2022) suggest that effect sizes should be considered with respect to the age of the child. If conceptualised as months gained (e.g., 3 months in advance of the control group) then a relatively small effect size can represent a large proportion of a young child's life. The potential impact of small effects in this developmental window should therefore not be underestimated.

Co-designed

The final quality relates to the need for interventions and their implementation to be adapted to fit local

families' specific assets and challenges, the constraints and configuration of local services and the skills and capacity of the children's workforce. The need for adaptation is motivated by detailed review of intervention evidence. For example, Mol et al. (2008) found that promoting parent–child DBR is effective in socially advantaged but not in socially disadvantaged families. This demonstrated that the underlying intervention active ingredients of responsive contingent interactions are effective but that barriers such as time, confidence and physical resources in socially disadvantaged families make this specific approach unfeasible or unacceptable. It is only through co-design that the detail of these barriers can be understood. In a recent intervention co-design study McKean et al. (2022b) found a number of parents found book-reading interventions patronising, whilst others felt they failed to engage their children's attention leading to experiences of failure and disruption in parent–child relationships. In both such scenarios the barrier to engagement was not a lack of knowledge or motivation but the need to find more individualised contexts within which to promote responsive interaction which work for those specific families. To ensure interventions achieve equitable outcomes work is needed to understand and address such implementation barriers (Greenwood et al., 2019).

'Scaling up' interventions found to be effective in research studies for delivery by educators in the 'real world' is challenging (Snowling et al., 2022). It is clear from the intervention evidence reviewed above that ensuring educators have the time, skills, knowledge and support to deliver interventions to appropriate levels of fidelity and dosage is a real challenge. (Bleses et al., 2018; Mol et al., 2009). Barriers include competing priorities, staff turnover and large class-sizes. Addressing such barriers requires collaborative work with stakeholders and drawing on implementation science theory to adapt current best evidence to ensure interventions can be delivered sustainably, and through accessible and acceptable methods across families and contexts to evoke equitable change (de Silva, 2012; May & Finch, 2009; Michie et al., 2014; Sekhon et al., 2017).

SYSTEM-LEVEL STRUCTURES TO ENABLE DELIVERY OF AN EARLY LANGUAGE PUBLIC HEALTH FRAMEWORK

A place-based approach

The implementation of the whole system public health model for the promotion of robust early language described here is clearly highly complex. Furthermore,

its precise nature will differ across local areas in response to differences of local geography, the range of needs, challenges and assets of the populations served, and the distribution of the necessary knowledge, skills and capacity across the professionals and agencies active in the early years space.

We therefore advocate for place-based approaches to implementation which can be defined as:

> "A community of people bound together because of where they live, work or spend a considerable proportion of their time, come together to make changes to that place which they believe will improve the physical, social or economic environment and in doing so tackle issues of inequality." (p. 7 Bynner, 2016)

The implementation of the public health model to child language described here must align with and capitalise on the resources, systems and relationships of early years preventative services which are already in place. However, this is not a simple task. Within the United Kingdom, locality focussed, cross-sector approaches which aim to promote children's health and development in the early years have been a policy priority for many years (Bouchal & Norris, 2014; Lewing et al., 2020). However, such services are buffeted by ongoing changes in policy with respect to funding, models of provision and health and well-being priority areas. Early years provision has experienced significant disruption, with a 62% cut in council's early years services spending since 2010 (Action for Children, 2021). Many UK SLT services collaborate with the wider early years workforce across health, education, social care and the voluntary sector to provide early intervention through awareness raising, training, enablement and capacity building in the wider workforce (PHE, 2019). However, this has become more difficult in recent years due to the volatile climate in early years services, and the wide disparities across the United Kingdom in available SLT resource: local annual SLT spend per child varying from 32p to £45 (Longfield, 2019). Whilst directly comparable Australian data are not available, there is growing evidence of lengthy waitlists, particularly, but not exclusively, in rural and regional areas. Private therapy is an option for some but with rising rates private therapy is out of reach for many and particularly for these living in less advantaged circumstances creating further inequalities (McGill et al., 2020). Recent descriptive vignettes of practice and policy for the management of children with (D)LD across 35 countries, in Europe and beyond, demonstrate huge variety in early surveillance and prevention (Law et al., 2019). Some countries concentrate resource in traditional medical models of diagnosis and individualised treatment (e.g., Italy, Spain)

others implement universal early surveillance and prevention pathways (e.g., Denmark, Finland), with most having a mixed and variable approach depending on factors such as availability of specialist support, configuration of health and education collaborative practice and funding models.

Public health speech and language therapists

Maintaining a focus on equitable child language outcomes and locally adapted evidence-based interventions within such volatile systems requires sustained focus, advocacy and highly specialist knowledge and skills. We therefore recommend the creation of a designated child language public health speech and language therapy post in each locality area with a strategic, whole systems remit. This 'designated officer' would be responsible for advocating for child language as a local priority, for driving and evaluating progress and bringing coherence and direction to a whole systems approach. The post-holder would utilise local data, intelligence regarding local systems and provision, knowledge of the evidence-base for identification and intervention, and skills in co-production to steer the delivery of the public health model. Box 3 lists key responsibilities and objectives of the Child Language Public Health SLT.

PROCESSES REQUIRED TO ADOPT AND EMBED AN EARLY LANGUAGE PUBLIC HEALTH FRAMEWORK

In concluding this paper, we outline an example of how a public health framework informed by a bioecological framework, might be adopted and embedded into local communities and areas. In doing so we acknowledge the excellent examples of local reform that have adopted a place-, local area- or community-based approach and recommend building on these (see Box 4). Because place-based approaches are recognised as being unique to the place, community or area as outlined in various frameworks, we are deliberately not prescriptive (Victoria State Government, 2020). We recognise there will be different levels of readiness, infrastructure and stakeholders, tools and resourcing, and governance models including ways of influencing decision making. Further these factors will influence the implementation, and how much change might be required which in turn might have an impact on the tools used in evaluation.

Critical to this new approach is the concept of a public health SLT and we recommend that person leads the series of steps outlined in Figure 2. A key assumption underpinning these steps is that current SLT services and early years

> **Box 2: Strategic enablers required for successful implementation of a place-based early language public health framework**
>
> To implement a place-based public health model to promote robust language development, local early years strategy must enable:
> - Shared vision regarding the importance of child language with a focus on equity and life course perspectives for the promotion of health and well-being.
> - Collaborative relationships and practices across health, education, social care and voluntary sector professionals and organisations.
> - Access to and use of routinely collected data to identify geographical areas and subgroups of the local population where children's language development is of concern and/or where risk clusters are concentrated.
> - Systems to map and monitor
>   - the reach of services to promote language development
>   - the equity of children's responses to interventions and
>   - untapped opportunities within the children's workforce and local communities which could be leveraged to support child language development
> - Skills in participatory methods and knowledge of the best evidence to adapt and implement evidence-based interventions to increase and/or maintain reach, equity and effectiveness.
> - Services and professionals with sufficient autonomy, capacity and flexibility to be responsive to identified needs and co-design and adopt novel approaches.
> - Long-term commitment to continuous, data-driven improvement in equitable reach and outcomes for child language.

services aiming to promote child language development will not be reaching many who need them—a finding now supported by multiple reports, (Action for Children, 2021; Morgan et al., 2016; Norbury et al., 2016; Skeat et al., 2014) including the recent update to the Bercow review (Bercow, 2018), demonstrating high levels of inequity for children. Our proposal builds on existing excellent initiatives such as those identified in Box 4. We aim to enable such models to be developed in other localities in an evidence-informed, deliberate and systematic manner and support existing

Box 3: The key objectives of the Child Language Public Health SLT

- Coalesce debate, effort and resources across sectors and advocate for the importance of child language as a key early health and well-being priority, and an equity focus in service development and delivery.
- Identify available data and gaps in that data which would allow the monitoring of children's early language development and the identification of subgroups at risk.
- Develop methods to enable data sharing and/or collect additional routine data to enable data-driven targeting of interventions.
- Work with local data analysts to scope and monitor:
  - Potential numbers and clusters of children at risk of (D)LD
  - Location and characteristics of populations with particularly high environmental risks
  - Reach and gaps in current service provision and their co-location and accessibility to those in greatest need
  - Progress over time and changes in children's trajectories in response to service delivery changes
- Develop and maintain knowledge of relevant evidence regarding effective identification and intervention methods and create and identify opportunities for cross-sector child language CPD.
- Represent child language on relevant strategic committees to steer strategy, break down silos/barriers between sectors and identify opportunities to leverage underutilised capacity within the early years workforce and local communities.
- Identify when and where additional resource is required and lobby relevant commissioners and policy makers.
- Work with local stakeholders (families, professionals, community members) to co-design methods for intervention implementation which overcome implementation barriers and enable equitable reach and benefit.
- Design methods to embed evaluation into services, including cost-benefit analyses, reach of services and child and family outcomes.
- Feed evaluation forward to enable continuous improvement.

Box 4. Examples of local area or community-based approaches to child language

- Stoke Speaks Out—https://www.stokespeaks.org
- Get Hackney Talking—https://gethackneytalking.co.uk/
- Speak up Salford—https://www.speakupsalford.nhs.uk/
- Language for Life—https://www.nottinghamshirehealthcare.nhs.uk/language-for-life
- Talk with Me—https://www.gov.wales/talk-with-me

models to reflect and audit the reach, equity and efficacy of their services against the proposed framework.

Step 1

The first steps focus on understanding the early years population and their demographic characteristics. These data are readily available in many countries such as the Public Health England Fingertips tool in the United Kingdom, which provides areas with data on the estimated incidence of children with Speech Language and Communication Needs, child and maternal health indicators and inequality tools and annual reporting of Early Years Foundation Stage Profile results in England. In Australia, the Australian Early Development Census collects nationwide data every three years of early childhood development when children commence their first year of full-time school and includes information on, language and cognitive skills and communication skills and general knowledge (Australian Government, 2022).

Step 2

When the early years population is understood and likely estimates of language vulnerability in the community are available, the next step is to map the *reach* of existing service provision across the community. As discussed earlier, *reach* is critical because language ability follows the social gradient (see Reilly & McKean, 2023; Box 1) but access to support and the ability to benefit from support is influenced by a range of factors including SECs. At this stage you might reasonably ask shouldn't we increase resources to broaden reach? This may be necessary but is not sufficient, as increases in spending per child on speech and
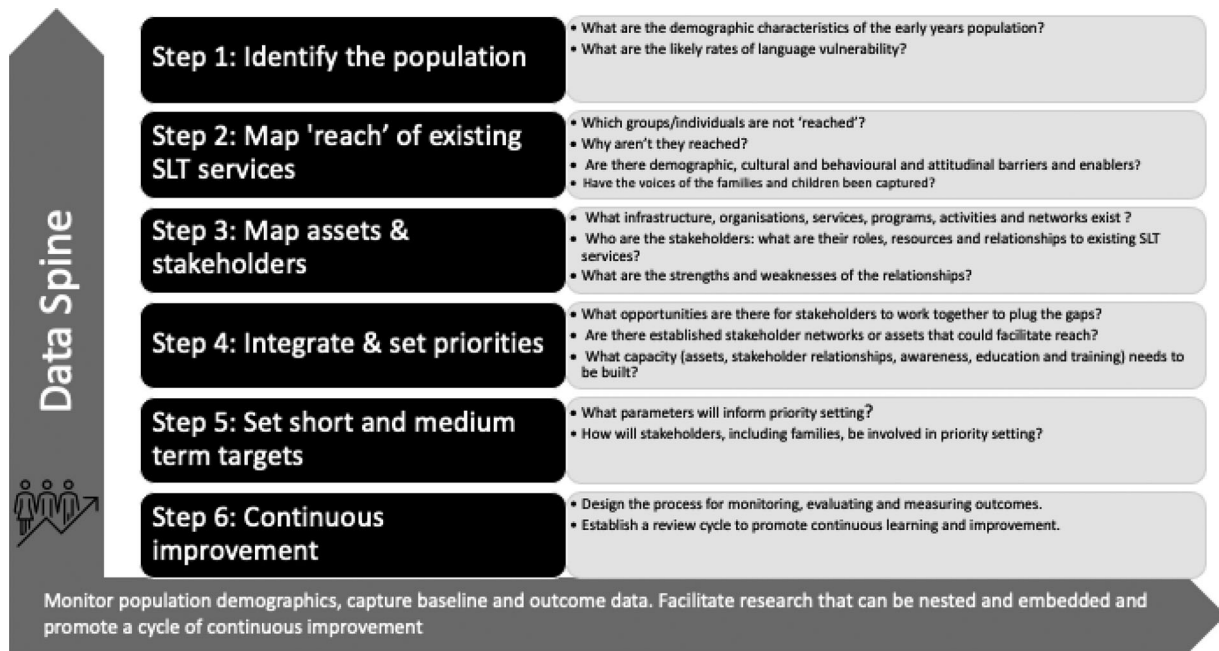
FIGURE 2 Key steps to commence planning the public health framework to underpin the delivery of language services to the early year's population in local areas. Adapted from Reilly, S., Law, J., Conway, M., Krake, M. 2022 Equity and access to services for children with language difficulties. In: Law, J., Reilly, J., and McKean C. Language Development: Individual Differences in a Social Context. Cambridge University Press. Abbreviation: SLT, speech and language therapist.

language has not necessarily resulted in resources being equitably distributed (see Longfield, 2019).

Step 3

Mapping the community assets provides insight into available resources, their accessibility and distribution within the community. A broad definition of assets includes anything that can be drawn on to improve children's language development in the early years. Similarly, mapping stakeholders involves gathering information to fully understand the local context, ascertain the strength of the existing relationships, identify where relationships might need to be built to identify change efforts and engage stakeholders where necessary with co-design strategies. Further, improving reach, relevance and accessibility will also require careful co-design.

Step 4

The integration of the information collected to date, the identification of gaps and finally, the determination of priorities is Step 4. Key questions that could inform this process are outlined in Figure 2.

Steps 5 and 6

The two final steps concern the setting of short- and medium-term targets over a specified period. Step 5 details

the strategies and Step 6 concerns the process for monitoring, evaluating and measuring outcomes. Running through any initiative will be a data spine, a way of accessing existing data sets and capturing baseline and outcome data. This is essential to enable evaluation and promote a cycle of continuous improvement. There are some excellent examples of how data can be used to create change and deliver impact in communities (for example, see the Relational Insights Data Lab (RIDL, 2023)). The data spine has the potential to facilitate nested and embedded research projects, including stepped designs as well as evaluating the effects of stacking interventions and we highlight a number of these in the future research priorities next. We acknowledge data may be drawn from different sources to inform this work, for example in the UK population demographics monitored via the Public Health England Fingertips tool.

Indicators of successful implementation of a place-based child language public health model

Whilst an overall success indicator might be common across places, for example, increase the number of children on track with their language by school entry, both short and medium success indicators may vary from community to community and be dependent on:

- population demographics,

- existing '*reach*',
- community assets, stakeholder, and community readiness
- shared decision making and governance models

Emphasis should therefore be the measurement of impact appropriate for the community and over the lifetime of the initiative (Victoria State Government, 2020). However, given the social gradient and the size of the gap identified the first short-term success indicator should concern 'reach', including a definition of what the improvement target will be, over what period and how this will be incrementally improved. The nature of the 'reach' (primary, secondary and tertiary prevention) should be specified and informed by the information now available about developmental language pathways, risk clusters and risk accumulation. There will of course be many other measures of impact including the number of stakeholders upskilling via the training provided, the number of parents or caregivers reached, the number of stakeholders engaged as well as aspects of the change process itself. The medium- and longer-term indicators focus on improving child language outcomes. Initiatives such as Stoke Speaks Out and Warwickshire Time to talk have already demonstrated a reduction in the number of children with severely delayed language skills, with more children on track with language by the time they commence reception class.

FUTURE RESEARCH

There is no doubt that the broader evaluation of a place-based or community led model will be complex. Recently, there have been calls for interventions to be taken to scale in childcare and early intervention programs along with a suggested move away from the traditional evaluation methods such as randomised controlled trials (e.g., Walker et al., 2020). Walker and colleagues, in their review identified several compelling reasons pertinent to this paper for this broader approach to evaluation. First, few intervention studies have commenced prior to 3 years despite the risks known to influence language learning; second, only around one-third of the studies in their review included some children who were living in disadvantaged circumstances; and, third, attrition rates were highest amongst those children and families living in disadvantaged families. It is fair to assume that many research samples in randomised controlled trials are not representative of the population of children and families in terms of level of education, socioeconomic status and cultural and linguistic backgrounds. Therefore, we endorse a broader approach, providing the evaluation is conducted within a rigorous framework and suggest a place-based approach offers dis-

tinct advantages that could result in greater capture and broader evaluation of the early years. Next we outline priorities for future research to enable the development and implementation of the model described here and to support advocacy to fund such approaches and secure their place in children's services policy (see Box 4).

SUMMARY AND CONCLUSION

Our focus in this article has been the early years because it is within this short window that the critical foundations are built to support child language development and provide a platform for children's future life chances. In the preceding paper we began by exploring key public health concepts and summarised an important and recent body of research regarding key influences in the early years, noting that exposure to some may be time sensitive, influences cluster together and can accumulate over time. We demonstrated that risk profiles were associated with and characterised low language trajectories, and we considered how this information could be integrated into a concept that moves beyond screening at single time points in the early years (Reilly & McKean 2023). In this paper, we synthesise that evidence with intervention research and implementation frameworks to propose an early language public health framework of surveillance and intervention. We detail the essential components, interventions and qualities of that framework and describe system-level structures and processes required to adopt and embed an early language public health framework in a given locality.

Our goals for these companion papers are to (1) enable such models to be developed where they do not exist and to support existing models to reflect and audit their reach, equity, and efficacy; (2) support the necessary lobbying and awareness raising across policymakers and service providers which will be required to make child language a priority outcome across early children's services, coordinate effort and agree funding allocation; and (3) set a research agenda to enable the rigorous evaluation of such approaches.

We advocate for the creation of designated child language public health speech and language therapy posts in each locality area with a strategic, whole systems remit (Box 4). Through advocacy and a focus on the facilitation and evaluation of data-driven, cross-sector, co-designed, early prevention such a role would enable the implementation of the whole systems, place-based approach we describe. In this way equitable, sustained, proactive, preventative interventions can be provided for those who need it at point in their development when they can benefit most.

Box 5: Future research principles, methods and directions

Principles and methods

Generate evidence that

- Puts inequalities at the heart of design, implementation and evaluation (Pearce et al., 2019)
- Involves representatives/participants to improve uptake and effectiveness (Victoria State Government, 2020)
- Captures the voices of children and parents (Roulstone & Lyons, 2022)
- Harnesses the power of service data to inform approaches including methods for data sharing across sectors, and across countries to understand how children and families interact with services over time and the range of outcomes they engender
- Advocates for equitable resource allocation and distribution

Engender an equity focus in practice and training that is mindful of

- The unequal distribution of health
- The barriers to change (e.g., material, psychosocial) and seek alternatives/solutions

Apply implementation science frameworks to develop models of intervention design and delivery which are

- Equitable (Michie et al., 2014; de Silva, 2012)
- Feasible and acceptable (Sekhon et al., 2017)
- Sustainable (May & Finch, 2009)

Priority research directions

- Development and testing of clinical risk models
- Test whether stacking interventions delivers additive benefits
- Test whether whole systems approaches, across all levels of prevention over the first 4 years of life, reach all those who need it and deliver equitable benefit across families
- Examine the economic costs and benefits of whole system public health approaches to early preventative intervention
- Create methods to work with local stakeholders to address implementation barriers and adapt effective interventions for delivery within local service constraints and population needs and assets
- Test whether locally adapted methods are effective

Box 5: (Continued)

- Examine population level benefits of whole systems approaches across localities with differing geographical, population and service assets and constraints
- Develop and evaluate methods to use routine data to target resource and intervention efforts to enable equitable outcomes
- Develop and evaluate the impact of Public Health Speech and Language Therapist roles embedded in local health, education and social care integrated systems

Children's language development influences their life-chances across the life-course and language difficulties are unfairly distributed across society. The pandemic recovery and cost of living crisis have created an even stronger imperative to address such inequalities. We believe that current evidence points clearly to the need for whole systems approaches to early child language if we are to create a sturdy foundation and equitable life chances for all children.

CONFLICT OF INTEREST STATEMENT

The authors have no competing interests.

DATA AVAILABILITY STATEMENT

No new data were collected in writing this discussion paper.

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