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Scoping review of child development indicators and measures used for 2- to 11-year-olds

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Scoping review of child development indicators and measures used for 2–11-year-olds: final report

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Glossary

Adverse childhood experiences (ACEs) are traumatic events, particularly those in early childhood that have lasting effects on health, development and life outcomes.

Child development describes the sequence of physical, sensory, language, cognitive, emotional and behavioural changes that occur in a child from conception to adolescence.

Curriculum for Wales aims to support all learners to become:

- ambitious, capable learners, ready to learn throughout their lives
- enterprising, creative contributors, ready to play a full part in life and work
- ethical, informed citizens of Wales and the world
- healthy, confident individuals, ready to lead fulfilling lives as valued members of society

These are the **'four purposes'** of the curriculum. Learning is organised into six **Areas of Learning and Experience** (abbreviated to 'Areas'): Expressive Arts, Health and Well-being, Humanities, Languages, Literacy and Communication, Mathematics and Numeracy, and Science and Technology. Each Area brings together related subjects to help learners develop skills, knowledge, and values in a holistic and interconnected way that supports their growth as capable, creative, and ethical citizens.

Discriminative power describes a research tool or instrument's ability to differentiate meaningfully between children with different developmental levels.

Early Childhood Play Learning and Care (ECPLC) is about developing and delivering a consistent approach to nurturing, learning and development, through the provision of high quality play-based childcare and education opportunities, for all babies and young children aged 0-5 years old. ECPLC can be provided through childcare, playwork and nursery education settings prior to statutory school age.

Formative assessment describes ongoing evaluation to monitor children's progress and inform teaching. It helps practitioners identify strengths, areas for development, and next steps to support each child's learning and development.

Functioning describes how effectively a person can live independently, engage socially, work, learn, and take care of themselves.

Indicator represents the outcomes children are expected to achieve and a **measure** refers to ways to measure and monitor progress against these given indicators.

Interquartile range is a measure of the spread or variability in a set of data. It shows the range within which the middle 50% of the data lie. It is calculated by subtracting the lower quartile from the upper quartile.

Linear models of child development describe a sequential and predictable progression through a series of fixed stages or milestones, typically following a single, universal path.

This assumes that all children move through these stages in the same order and at roughly the same pace, and emphasises norms as indicators of progress – and the not meeting these as a cause for concern

Lower quartile is the value below which 25% of the data fall.

Neurodiversity describes how we all have individual differences in the way that our brains work. However, there are also groups of people that process information in a similar way to each other and are referred to as having the same **neurotype**. This means that there can be big differences between different neurotypes.

Neurotypical: This is the most common neurotype. As neurotypical people are in the majority they tend to thrive, as the environment is often constructed by other neurotypical people which means that their specific needs are met.

Neurodivergent: Minority neurotypes can include conditions such as autism, attention deficit hyperactivity disorder (ADHD), dyscalculia, dyslexia, Developmental Coordination Disorder and Developmental Language Disorder, and can also be described as neurodevelopmental conditions. Collectively, people with minority neurotypes are referred to as neurodivergent.

Normative models of child development: describe a linear (so sequential and predictable) progression through a series of fixed stages or milestones, typically following a single, universal path. This assumes that all children move through these stages in the same order and at roughly the same pace and emphasises norms as indicators of progress and the not meeting these as a cause for concern.

Pluralistic models of child development describe multiple, different pathways through which children grow, learn, and develop which are all considered equally valid. They can be contrasted with linear models of child development.

Psychometric quality describes the characteristics of a psychological assessment tool, such as its reliability and validity, which determine its quality and effectiveness.

Reliability describes the extent to which a test consistently measures what it is intended to measure.

Saturation is a concept used in qualitative research to describe a situation where no new ideas or themes are being identified, meaning that further data collection and/or analysis are unnecessary.

A **screener** is a standardised set of items, such as questions in a questionnaire and/or simple direct tasks, intended to be used to quickly identify children who may be at risk of developmental delay and who should be offered follow-up assessment or support

Screening focuses upon identifying specific issues, such as hearing loss or developmental delay, at a point in time, while **surveillance** focuses upon the ongoing monitoring of overall child development.

Summative assessment describes an evaluation of a child's learning and development at a particular point in time, often at the end of a period or stage.

Upper quartile is the value below which 75% of the data fall.

Validity describes the extent to which a test measures what it is intended to measure. In this context, **construct validity** describes whether a test measures the developmental construct it aims to measure, narrative validity describes whether the findings align with real world observations or narratives and **external validity** describes the extent to which findings can be applied to other contexts, settings, populations or periods of time.

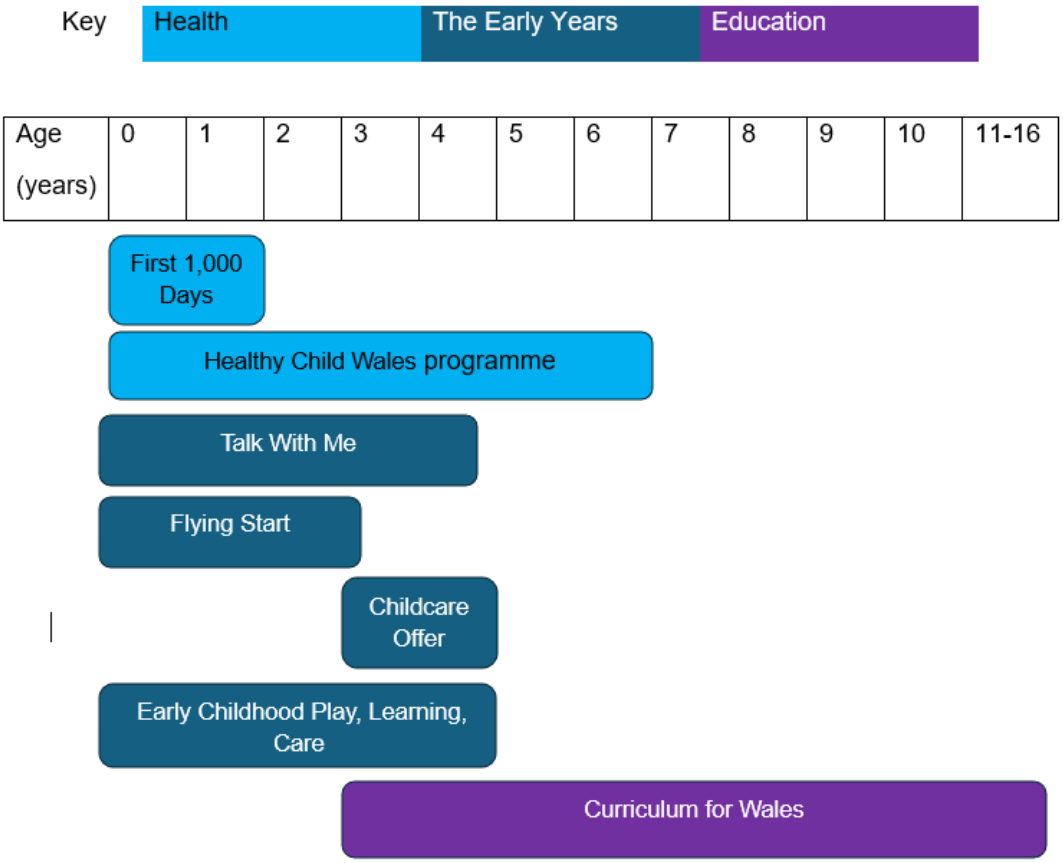
1. Introduction

1.1. Policy Context

The Well-being of Future Generations (Wales) Act aims to improve the social, economic and cultural well-being of Wales. The Act requires public bodies in Wales to take a more joined up approach, to think long-term, to prevent problems, and to work better with people and communities. The early years are seen as critical for children's physical, cognitive, language and socio-emotional development and therefore also critical to the social, economic and cultural well-being of Wales. In response, one of the core aims of the 2022 Children and Young People's Plan is that children and young people have 'the best start' in life and, as Figure 1.1 illustrates, a number of key policies in health, education and the early years [Footnote1] focus upon supporting child development. They focus upon groups of children defined by their age, and (in the case of geographically targeted programmes like Flying Start) where they live which, as outlined below, is used as a proxy for socio-economic disadvantage.

Figure 1.1: Key policies supporting child development

Figure 1.1: Key policies supporting child development



[1] In Building a Brighter Future: Early Years and Childcare Plan, published in 2013, the Welsh Government defined the 'early years' as the period of life from pre-birth to age 7. However, early years policies and programmes span the age range 0-5

Each of these policies is discussed further below.

1.2. Health policies

The First 1,000 Days is a health improvement programme led by Public Health Wales that aims to support parents to give their child the best start in life. It focuses upon the crucial time from conception to a child's second birthday, because the period of early development "provides the foundation for all future physical, social, emotional and cognitive development" (ibid.). As Figure 1.2 illustrates, the programme identifies that outcomes, such as child development, depend upon good health, feeling loved and secure, safety, play, learning and interactions and relationships.

Figure 1.2: The experiences and environments children need for the best start in life

Source: A Public Health Approach to Supporting Parents

The Healthy Child Wales Programme sets out how the Welsh Government will support the health and welfare of all children in the early years (that is to say, up to the age of 7). Like the First 1,000 Days, it is based upon evidence that investment in the early years of life has significant positive impact on a child's health, social and educational development and their long-term outcomes. It focuses upon supporting child development through screening, immunisation and surveillance [footnote 2].

[2] Screening focuses upon identifying specific issues such as hearing loss or developmental delay, at a point in time, while surveillance focuses upon the ongoing monitoring of overall child development.

1.3. Early Years Policies

1.3.1. The Early Childhood Play Learning and Care (ECPLC) Plan

The Early Childhood Play Learning and Care (ECPLC) Plan brings together all the policies and programmes relating to early childhood play, learning and care (including the Childcare offer and Flying Start) from across Welsh Government. It aims to give children the "best start in life" and as the ECPLC Plan outlines, it sets out how "childcare, playwork and nursery education settings" for children aged 0 to 5 "can support the development of babies and young children's social, emotional, cognitive and physical needs."1.3.2. 1.3.2. Developmental Pathways 0-3

The Early Childhood Play Learning and Care resources, include a quality framework, development pathways, reflective practice toolkit and assessment arrangements for children from birth to age 3. The ECPLC Pathways focus on what is important for children's development and how they can best be supported "to grow and develop in ways that suit their stage of development."

1.3.2. Flying Start

The Flying Start programme aims to improve outcomes for children under 4 years old in disadvantaged areas (with some outreach provision for families outside these areas) by mitigating the effects of poverty on early development and well-being. Its objectives are:

- ensuring that children get the best possible start in life
- tackling poverty and deprivation
- increasing the provision of high-quality childcare services and of Welsh medium childcare places and settings

The programme offers:

- funded, quality part-time childcare – 12.5 hours per week for 2-year-olds during term time
- enhanced health visiting, with smaller caseloads and more frequent visits than the universal service
- parenting support, with access to evidence-based programmes and informal guidance
- speech, language and communication support, based upon early identification and targeted interventions for communication needs

(Adapted from Flying Start Programme and Phased Expansion of Early Years Provision).

In September 2022 there was a phased expansion of the programme. The first phase focused upon all 4 elements of the programme, whereas a second phase, started in April 2023, focused upon expanding Flying Start childcare in Wales.

1.3.3. The Childcare Offer for Wales

The Childcare Offer for Wales aims to help working parents with the cost of childcare, supporting parental employment. It offers working parents (including those self-employed) and parents in education [footnote 3] across Wales, whose children are aged 3 and 4 years old, up to 30 hours per week of combined government funded nursery education and childcare[Footnote 4] , for up to 48 weeks per year. Although the main aim is to enable parents and carers to return to work and increase their disposable income, the programme as a whole aims to support a child's learning and development (Childcare offer for Wales: guidance for local authorities).

1.3.4. Talk With Me

Talk With Me is the Welsh Government's Speech, Language and Communication (SLC) strategy. It aims to improve SLC support for children aged 0 to 4 years 11 months and focuses upon raising awareness of SLC, timely identification and access to evidence based interventions, workforce development, and embedding SLC across policy.

1.4. Education Policies

Curriculum for Wales sets out a vision for 3- to 16-year-olds and aims to ensure that all children/learners become healthy, engaged, enterprising, and ethical citizens (described as the "four purposes"). It focuses on how learners develop, not just what they learn and embodies a vision of children's and young people's development in terms of cognitive, social, emotional, moral and physical growth. In support of this, learning is organised into six Areas of Learning and Experience (abbreviated to 'Areas'): Expressive Arts, Health and Well-being, Humanities, Languages, Literacy and Communication, Mathematics and Numeracy, and Science and Technology. Supporting learners' progression in each of these areas is at the heart of the framework. Statements of "what matters" focus upon the "big ideas" in each Area and "descriptions of learning" provide guidance on how learners should progress within each statement of "what matters." These are arranged in 5 progression steps which "provide reference points for the pace of children's progression." Curriculum for Wales is discussed further in Sections 3 and 4.

[3] Parents must live in Wales and must be employed (or self-employed) and earning at least, on average, the equivalent to 16 hours a week at National Minimum Wage or Living Wage; on Statutory Pay and Leave (Sick, Maternity, Paternity, Parental, Bereavement or Adoption Leave) or enrolled on a further or higher education course that is at least 10 weeks in length. Foster carers and kinship carers (a relative or friend who is not a child's parent) can also apply. Full details on the offer of childcare and eligibility are available on the webpage: Get up to 30 hours of childcare for 3 and 4 year olds

[4] All children are entitled to nursery education usually from the term after their third birthday. All local authorities provide a minimum of 10 hours per week of nursery education.

1.5. Welsh Language Policies

In support of the Welsh Government's goal of a million Welsh speakers by 2050, Cymraeg 2050: A million Welsh speakers sets out the actions taken to enable more people to learn and use Welsh. It includes a focus upon expanding Welsh-medium provision in the early years and ensuring that statutory education provision develops confident Welsh speakers.

1.6. Child development and this review's aim and objectives

Each of these programmes and policies aims to support child development, which has been defined as the "sequence of physical, sensory, language, cognitive, emotional and behavioural changes that occur in a child" from conception to adulthood (NEST framework: full report, pages 28 to 29). However, despite recognising its importance, currently the Welsh Government does not use one single definition of child development across its different policy areas, nor an agreed centralised set of measures for children in the early years. Engagement work by the Welsh Government indicated a particular gap in child development indicators and measures for children aged 2 to 11. Specifically, there is population-level collection of data by health visitors at 18 months and through the School Health Research Network (SHRN) and Health and Attainment of Pupils involved in the Primary Education Network (HAPPEN), and later General Certificates of Secondary Education (GCSEs) in secondary school. However, no other standardised, population-level data is collected. Therefore, as outlined in the specification for this study, the aims of this review are:

1. To generate evidence on the importance of, and the effective use of, child development indicators and measures used by the Welsh Government and external partners
2. To identify and document indicators and measures of child development used for 2- to 11-year-olds nationally and internationally
3. To critically assess the characteristics of indicators and measures of child development used for 2- to 11-year-olds nationally and internationally
4. To summarise evidence to provide a better understanding of what defines child development and its components in different contexts

The objectives of this review are:

- to undertake interviews with Welsh Government officials and external partners on the use of child development data and its role in evaluating policies across government
- to undertake a literature review considering indicators and measures used nationally and internationally to assess child development for 2- to 11-year-olds; this includes indicators and measures used in research literature, public services and public policy
- to identify and document a list of definitions of child development used nationally and internationally and the components that make up child development
- to document a list of instruments used to assess child development of 2- to 11-year-olds

- to critically assess the measures used to assess child development of 2- to 11-year-olds, including the validity and reliability of measures, costs and challenges involved in collecting data, potential biases, risks and constraints, and how the data is used in policy making, including unintended consequences

1.7. Structure of this report

Following this introductory Section:

- section 2 discusses the review approach and methodology
- section 3 discusses the review's findings in relation to the importance of, and the effective use of, child development indicators and measures
- section 4 critically assesses the characteristics of indicators and measures in light of the review's findings
- section 5 outlines the review's conclusions

A full list of child development indicators and measures identified by the review is included in the appendices and illustrative examples are included in Sections 3 and 4 of the report.

2. Methodology

2.1. Introduction

The scoping review was informed by a systematic desk-based analysis of relevant studies, which was complemented by interviews with stakeholders and a desk-based review of background documents, to provide a contextual insight specific to Wales. In order to assess the validity of the findings, a stakeholder workshop was subsequently convened to critically examine the preliminary results of the review. This provided an important opportunity to refine and further develop the findings.

2.2. Interviews and initial desk-based review

Twelve stakeholders were interviewed online (via MS Teams). Stakeholders were identified and agreed through discussion with the Welsh Government and comprised 11 staff members from the Welsh Government and 1 from Public Health Wales. Interviewees represented: Health; Flying Start; Education Research; ECPLC; Speech, Language and Communication; Curriculum for Wales; School Standards and Information; and Equity in Education. A copy of the interview schedule is included in Annex B.

The Welsh Government shared policy and research documents they had identified as part of scoping work to inform the commissioning of this review. Stakeholders who were interviewed were also invited to identify policy and research documents they felt were relevant. These were reviewed to provide contextual insight specific to Wales for the scoping review.

2.3. Systematic desk-based review

In order to identify and document indicators and measures of child development used for 2- to 11-year-olds nationally and internationally in the research literature, public services and public policy, a systematic search of the literature was undertaken. The search terms used were: childhood development OR child development AND measures OR indicators AND review. The search terms were used to search Google.co.uk, Google Scholar, JSTOR, Oxford Academic, PubMed - the National Library of Medicine and Sage Journals. Two formatting variations on the above were used when searching Google.co.uk and PubMed - the National Library of Medicine, as they were found to be more effective[footnote 5]. The results of the searches are presented in Figure 2.1. Once it was judged that saturation[footnote 6] was reached, with further searches failing to produce new or relevant information, the process was stopped.

The initial search only identified one study focused upon measuring child development in a bilingual context. Therefore, following the initial searches, a further additional search was

[5] This included (child development OR childhood development AND measures) OR (indicators) AND (review) AND (child development OR childhood development) (measures OR indicators) review.
[6] Saturation is a concept used in qualitative research to describe a situation where no new ideas or themes are being identified, meaning that further data collection and/or analysis are unnecessary.

made to identify studies which focused on bilingual nations for comparison with Wales. This included Google searches with the term: (child development OR childhood development) (measures OR indicators) (bilingual country) review. This identified two further studies which were included in the review.

2.3.1. Screening and inclusion criteria

Based on the review of the title, abstract and the full documents, studies were included only when they met the following inclusion criteria, namely that the item:

- describes and/or evaluates the use of child development indicators and measures in the policy areas/contexts of interest to the study (that is to say, the early years, education, health and/or children's services)
- includes discussion of child development measures or indicators in an OECD country
- was published within the last 15 years (from 2010)
- is a descriptive study that identifies, maps and describes different child development indicators and measures, or
- is an evaluative study that critically appraises different child development indicators and measures

Furthermore, if one or more of the below inclusion criteria were not met then the study was excluded. These further inclusion criteria were that the item:

- was published by a credible institution; a peer-reviewed journal, government agency or academic institution
- clearly described the findings and conclusions
- presented data that supports the findings and conclusions

Figure 2.1: Screening Process

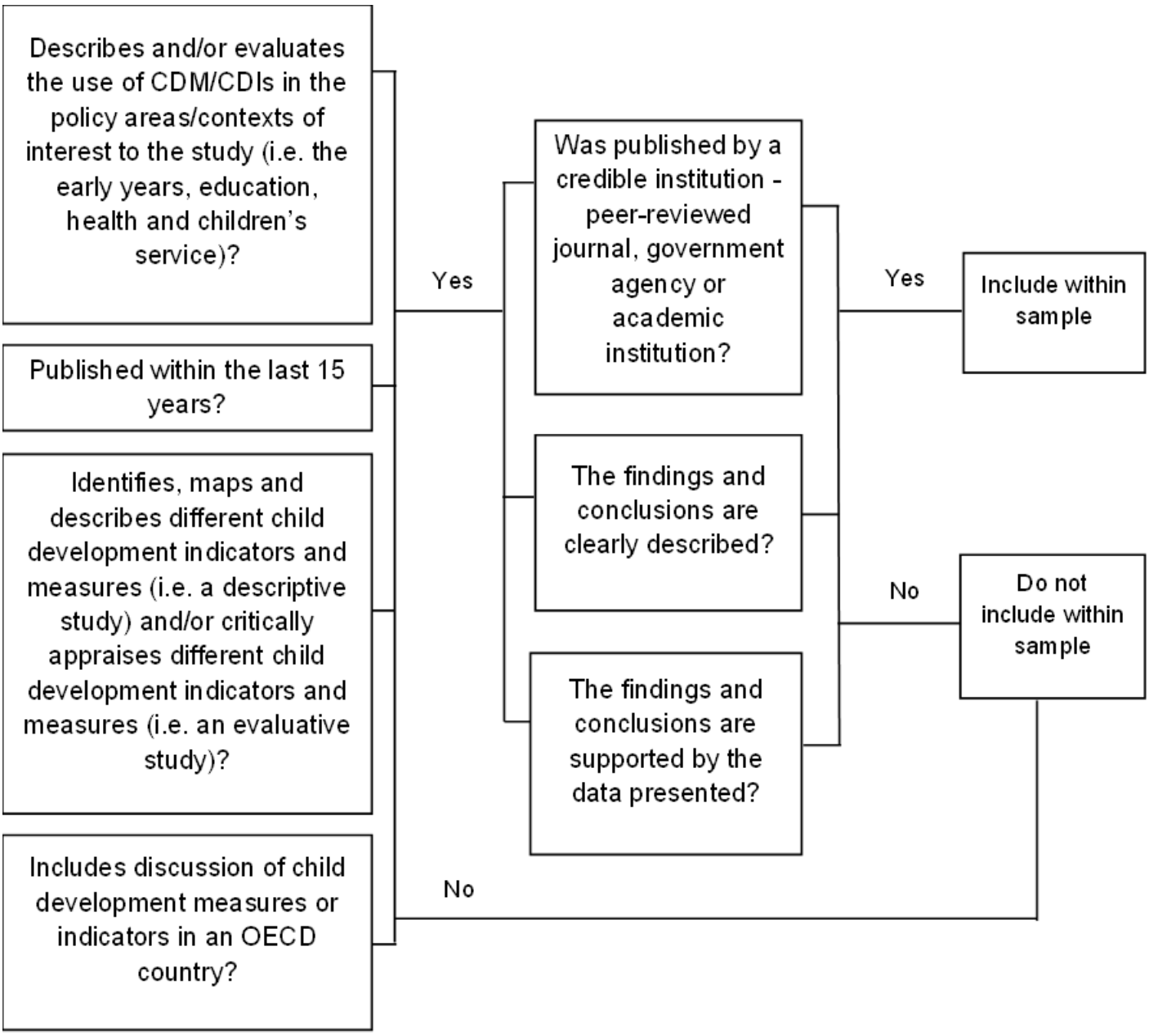
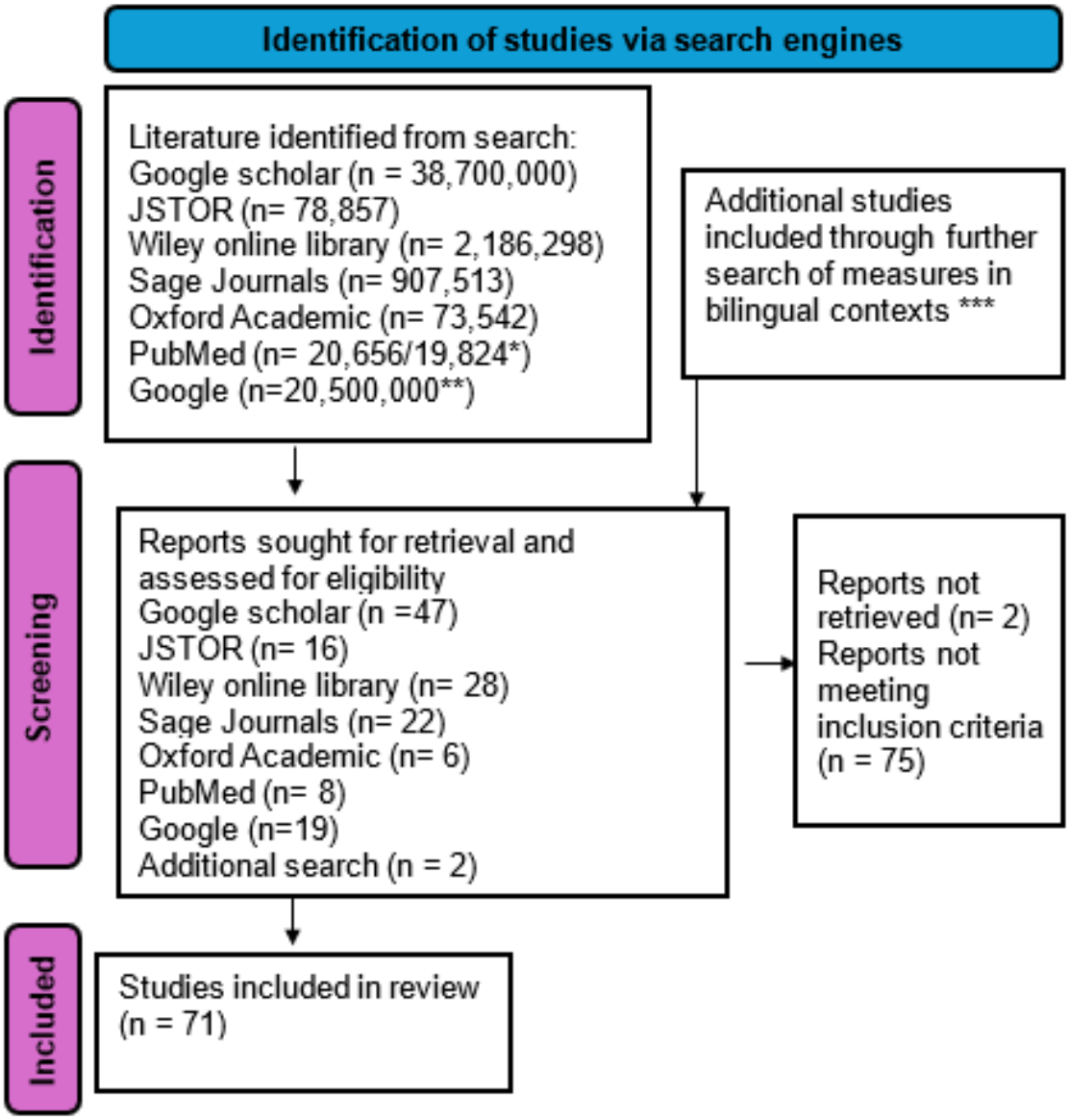


Figure 2.2: Summary of searches and the items included in or excluded from the review



Both the search terms (childhood OR child) development AND measures OR indicators AND review and the search term (child development) OR (child development) AND (measures) OR (indicators) AND (review) were used.

**Search term changed to: (child development OR childhood development) (measures OR indicators) review.

*** additional targeted search terms.

Adapted from: PRISMA 2020 statement: an updated guideline for reporting systematic reviews.

2.3. Extraction and analysis of data

Items included were reviewed to extract and analyse relevant data. This aimed to:

- harness the strengths of Artificial Intelligence (AI) in reviewing material in a swift, structured and consistent way and
- the strengths of a human researcher in areas like critical analysis and checking for accuracy of interpretation

Therefore, a hybrid approach to the extraction and analysis of data was developed, which involved three steps:

Step 1. ChatGPT reviews and extracts relevant information from the research report, based on predefined research questions

Step 2. a human researcher reviews Chat GPT's extract (see Step 1) and then reviews the research report to independently verify and assess the answers to the research questions, considering both the report and ChatGPT's initial output

Step 3. the final output is a synthesis of both the human's and ChatGPT's review of the report

2.5. Stakeholder workshop

An online stakeholder workshop was held in September 2025 to critically appraise and discuss the emerging findings from the data collected from the interviews and systematic desk review. The workshop included 21 Welsh Government staff working in the following policy areas: Health; Health and Social Care research; Flying Start; Early Years research; ECPLC; Speech, language and communication; Curriculum for Wales; School standards and information and Equity in Education.

2.6. The strengths and limitations of the evidence base

The search strategy review identified a range of literature that satisfied the inclusion criteria. However, most of the studies (n=61) were descriptive studies which identified or mapped different child development indicators but which did not evaluate the measures in terms of their psychometric quality (psychometric quality describes the characteristics of a psychological assessment tool, such as its reliability and validity). Only a relatively small number of evaluative studies (n=11) that critically appraised the psychometric quality of the measure they discussed were identified. This in turn meant there was limited data from the desk-based review on the validity and reliability of different child development indicators and measures. In addition to the small number of critical / evaluative studies, the search identified few studies considering the use of child development measures in:

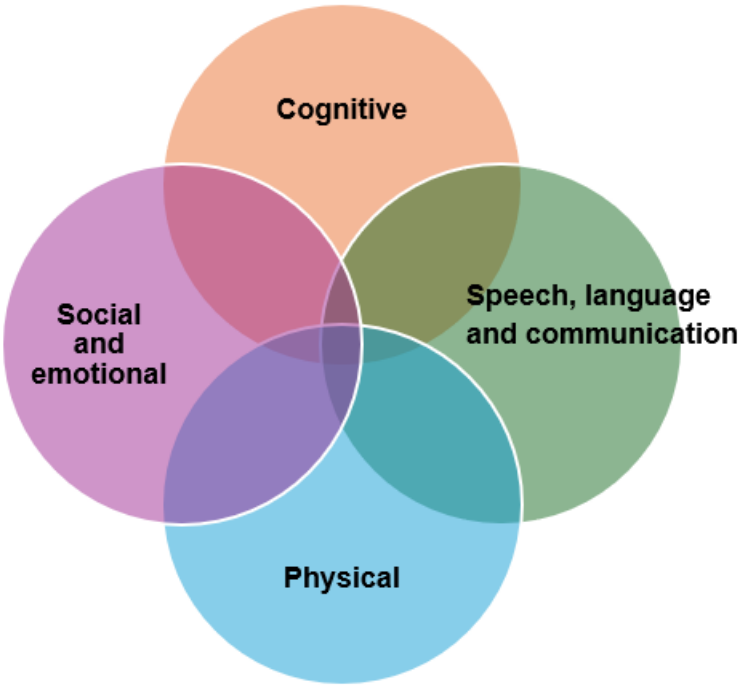
- bilingual countries
- European countries outside of England (many were from English speaking Western countries, most notably the USA, followed by Canada and Australia)

3. Findings: The Importance of, and the Effective Use of, Child Development Indicators and Measures

3.1. What is child development

Child development has been described as the "sequence of physical, sensory, language, cognitive, emotional and behavioural changes that occur in a child" from conception to adulthood (NEST framework: full report, pages 28 to 29). As Figure 3.1, a Venn diagram, illustrates, these different changes are typically grouped into overlapping "domains", such as physical, social and emotional, SLC and cognitive development. The overlaps illustrate the ways in which change in one domain can affect change in another domain.

Figure 3.1: Example of child development domains



There was agreement on this definition amongst stakeholders who contributed to the review's workshops. Nevertheless, the interviews conducted for the review (before the workshop) identified that some stakeholders treated measures of a child's environment, such as adverse childhood experiences (ACEs), or outcomes such as well-being, that child development could contribute to, as if they were measures of child development. We discuss these different types of measures that are linked to child development, but which are not actual measures for child development *per se*, below.

Moreover, it is important to note that:

- within the literature reviewed, as Table 3.1 illustrates, the grouping of different types of change into domains and the naming (nomenclature [footnote 7]) of those domains differed
- as the representation as a Venn diagram in Figure 3.1. illustrates, each of the domains is interlinked. For example, cognitive development underpins physical, social-emotional and language and communication development, but is also enabled by physical, social-emotional and language and communication development [Footnote 8]. Consequently, the grouping of different types of change into domains, and the drawing of boundaries between domains, is somewhat artificial
- the importance of each domain, and the extent to which change in each domain is measured, differed within the three main policy areas considered by this review (the early years, health and education). Stakeholders also noted that the importance of, and measurement of change within each domain, also changed over time, within each area of policy
- some tools aim to measure development in all four domains, while others only measure development in one (or more) of the domains

[7]'A system of names for things, particularly a system of names, terms, or symbols used in a particular field of science' (Merriam-Webster).
[8] For example, as the Early childhood play, learning and care: Developmental pathways 0 to 3 identifies, "Physical activity has multiple benefits for the developing child. Movement is strongly linked to cognition and learning".

Table 3.1: Examples of differences in groupings and nomenclature of domains of child development used by selected measures / frameworks

Meta domains **Examples**	**Physical**	**Cognitive**	**Social-emotional**	**Language and communication**
Early childhood play, learning and care: Developmental pathways 0 to 3 (Wales) and Enabling Learning (Curriculum for Wales')	"Physical development"	"Exploration" [Footnote9]	"Belonging" and "Well-being"	"Communication'
Ages & Stages Questionnaires (ASQ) Third Edition	"Gross motor" and "fine motor" skills	"Problem solving"	"Personal – social"	"Communication skills"
The Early Years Foundation Stage Profile (EYFSP) (England)	"Physical development"	"Literacy" and ""numeracy"	"Personal, social and emotional development"	"Communication and language"
Australian Early Development Census	"Physical health and well-being"	"Language and cognitive skills"	"Emotional maturity" and "Social competence"	"Communication skills and general knowledge"
Parents' Evaluation of Developmental Status – Revised (PEDS-R)	"Gross motor, fine motor and coordination"	"Thinking, reasoning, problem solving, learning abilities"	"Behaviour, temperament, personal social skills and emotional regulation"	"Speech clarity, vocabulary, use of sentences, and understanding of instructions"
Bayley Scales of Infant and Toddler Development (BSID-III/BSID 4)	"Fine motor and gross motor skills"	"Attention, memory, problem-solving, and object permanence"	"Social engagement, emotional expression, and	"Receptive and expressive communication"

[9] Interviewees stressed that (as outlined above) cognitive development underpins all of the domains of development and that specifically in relation to ECPLC, that "exploration" is not synonymous with cognitive development; it is described as being about "learning" and the acquisition of "skills [and] knowledge", and is therefore an approximation of the cognitive development domain.

			adaptive behaviours”	
Denver II (Denver Developmental Screening Test II)	“Fine motor and gross motor skills”	“Adaptive behaviour and problem-solving”	“Self-care and play with others”	“Receptive and expressive communication”

3.1.1. Two Conceptions of Child Development: Linear and Pluralistic Models

Child development can be understood in linear terms, where (unless there is a problem) children are expected to pass through a universal sequence of stages. This normative conception of child development allows for natural variation, but is predicted on most children passing along a similar pathway. In contrast, pluralistic models allow for multiple (including non-linear) pathways. The differences between the two different conceptions of child development are summarised in Table 3.2. As we outline below, this distinction has important implications for how children’s progress is assessed and supported across health, education, and early years policy areas.

If child development follows a linear sequence of changes that most children are expected to pass through, it is possible to define the norm, describing what is usual or typical. By measuring change in development in different domains across a population (using standardised tools and representative samples) the distribution of measurements can be mapped to create a norm, identifying what changes would be expected when, amongst most children. This norm can then be used as a benchmark against which an individual child’s or a group of children’s development can be assessed. These are often described as developmental “milestones” that most children would be expected to pass unless, for example, they have needs that slow or block their development.

A linear model of development does not imply that every child develops at the same rate, unless there is a problem. The distribution of measurements used to create norms, will reflect natural variation in a population. However, in the stakeholder workshop, while norms and milestones were not dismissed, there was concern that they could be used in a rigid or binary way to judge an individual child’s development. For example, it was observed that individual variation meant that although a range, such as the interquartile range between the upper and lower quartile, of values might be considered the norm, falling outside the norm was not necessarily a cause for concern.

Table 3.2: The linear and pluralistic models of child development

Dimension	The linear model	The pluralistic model
Philosophical roots	Developmental psychology	Ecological, sociocultural, neurodiversity paradigms
Underlying Assumption	'Normal' development is linear and follows a universal sequence of stages	Every child is unique and development follows multiple diverse pathways
Purpose of Measurement	To identify delay or deviation from the norm	To support individual progression and inclusion
View of divergence from a norm	Deficit / delay	Difference / diversity
Typical Context	Screening in the early years by health services	Education with an inclusive pedagogy
Policy implications and examples in Wales	Standardised milestones, such as Healthy Child Wales, SOGS	A flexible progression framework, such as Curriculum for Wales and the ECPLC

The focus upon individual variation meant that developmental "milestones" (the things most children can do by a certain age) or height and weight percentiles were described by stakeholders (in the workshop) as best understood as "reference points". Stakeholders (in the workshop) observed that they enable comparison and the importance of this to, for example, help identify unmet needs, was stressed. However, stakeholders (in the workshop) consistently stressed that care was needed not to reduce an individual child to "bags of outcome measures" (as one stakeholder put it). Too much focus upon whether children had passed particular milestones or not was felt to create risks such as:

- a checklist mentality in child development assessment, that focuses upon what can be measured, rather than what is important, and therefore that standardising measurement of a small number of indicators could actually damage (rather than aid) child development, as practitioners might end up focusing upon what is measured, rather than what is important to and for the child
- black or white judgments based upon whether a child had reached a particular level or not, obscuring the wide natural variability in children's development, and the idea of a developmental continuum
- measuring development in different domains in isolation from each other, which can mean the interconnection between domains is missed

More fundamentally, some stakeholders in the workshop also suggested that every child's development is unique and that they might differ not only in the pace of change (which is

consistent with a linear model) but also in the sequence and/or nature of change. In place of what was seen as a "reductionist" linear model of development, some stakeholders who contributed to the study argued for a more holistic and person- centred approach. This stressed the importance of seeing each child as a developing whole person following their own unique pathway. This represented a more pluralistic conception of development. Curriculum for Wales, discussed further below, was seen as embodying a focus upon the individual and development as a continuum.

As we outline below, in the discussion of Curriculum for Wales, these differing conceptions of childhood development have important implications for how policies, programmes and interventions are evaluated. If development is understood as a linear process, where delay or divergence is a cause for concern, it is relatively easy to set targets based upon developmental milestones tied to particular ages. In contrast, where development is understood in pluralistic terms, developmental milestones, tied to particular ages, cannot easily be used to set targets at an individual, system or population level. Comparisons between the progress made by different groups of children (such as those benefiting from an intervention or programme and those not) also becomes more complex.

Nevertheless, while each individual child's pathway might differ, it was also stressed by stakeholders who contributed to the study that this did not mean that every pathway is so different, that it is impossible to generalise about the pathways most children follow and the speed at which they progress along these. Indeed, the ability to identify the changes most children experience underpins the progression steps which describe the ways in which learners are expected to progress throughout the continuum of learning (in Curriculum for Wales) and the developmental milestones used by health (in the Healthy Child Wales programme).

Moreover, although as table 3.2. outlines, the pluralistic model emphasises difference and diversity, rather than deficit or delay. A number of Welsh Government officials who contributed to the study, who advocated for a more pluralistic approach, were very concerned about what they considered deficits or delays in domains such as children's SLC or social and emotional development. Suggesting that while developmental pathways may differ, not all developmental pathways will enable the same level of functioning [Footnote 10], and therefore not all pathways are considered equally desirable, as some may limit a child and later adults' ability to live independently, engage socially, work, learn, and take care of themselves.

3.1.2. Measuring child development at an individual and population level

In part the tensions between linear and pluralistic conceptions of development appears to reflect differences in scale. For example, our interpretation of what was said during interviews, was that at the level of an:

[10] Functioning describes how effectively a person can live independently, engage socially, work, learn, and take care of themselves

- **individual child**, a more person-centred, holistic approach, in which tools supported and informed professional judgement, was considered by most contributors, to be the most appropriate and effective way to measure and support child development
- **population, or system,** standardised measures and comparison against defined outcomes, in line with a more linear conception of development, were considered by most contributors to be the most appropriate and effective ways to measure child development. Indeed it is difficult to imagine how childhood development could be meaningfully measured at a population or system level, if every child's development was considered unique and equally valid.

3.1.3. Screening or surveillance

In part the tensions between linear and pluralistic conception also appears to reflect the different purposes of measurement. For example, it was observed (by interviewees) that identification or diagnosis of specific issues, such as hearing loss, developmental delay or SLC needs (SLCN), required comparison against a norm. Therefore, when the purpose of measurement is screening, identifying specific issues, such as hearing loss or developmental delay, at a point in time, a more linear conception of childhood development, with its concern about identifying deficits or delays in development, is often appropriate. Although, as noted, this is not without risk, given for example, the dangers of overly mechanistic or binary (black or white) judgments. In contrast, where the purpose is surveillance and the ongoing monitoring of overall child development, which is usually done at the level of an individual child, a more pluralistic conception of childhood development, with its concern to support individual progression and inclusion, is generally more appropriate.

The differences in purposes of individual and population level measurement of child development can create tensions. As we outline in Section 4, standardised tools, such as the Schedule of Growing Skills (SOGS) were intended to be used by a Health Visitor, to "inform professional judgement" (as one stakeholder put it) about how best to support an individual child and their family as part of the Healthy Child Wales Programme. However, it was reported that while they were used across populations, the inconsistent use of SOGS, which was less of a problem at the level of an individual child, meant that it could not be used to generate robust data on children's developmental outcomes at regional or system level that could inform the commissioning or evaluation of services.

Different models of child development for different types of development?

It is also possible that the conception of child development used might differ, depending upon the domain of child development being considered. For example:

- children's physical growth[Footnote11] such as changes in height and weight, is understood as a primarily physiological process, albeit one that depends upon

[11] "Growth" refers to quantitative, measurable changes in size or number, such as height, weight, whereas "development" refers to qualitative, functional changes such as improvements in abilities, skills, or like motor skills, cognitive abilities, or emotional regulation. The physical changes such as increases in height and weight are important aspects of childhood development and measurement of these is a key part of programmes that monitor and support childhood development such as The Healthy Child Wales Programme.

environmental factors such as having adequate nutrition. As such, these changes typically occur in a relatively predictable pattern, especially in early life, and are therefore conceptualised in more linear and normative terms

- changes in social and emotional development are understood as the outcome of the dynamic interplay between environmental processes — such as experiences of play, learning, and caregiving — and physical and neurological changes such as the development and maturation of the brain in the early years [Footnote12]. As such, development is less predictable and is understood in more pluralistic ways

Therefore, the degree to which differences in growth or development are attributed to physical causes such as brain development and neural maturation and the extent to which they are attributed to environmental factors, such as the quality of early childhood experiences of experiences of play, learning, and caregiving, is also an important consideration. The former is more likely to be understood in linear and normative terms, with deviation from this understood in terms of deficit and delay in physiological development. Whereas the latter is more likely to be considered in more pluralistic terms, as environments differ.

However, the review identified several examples that did not fit neatly into this framing. For example:

- it is not known what causes neurodevelopmental conditions, such as autism. It is thought that they have a genetic component, and although causes linked to early childhood experiences, such as different parenting styles have been ruled out, environmental factors may also contribute (What is autism?). Nevertheless, neurodiversity is a pluralistic conception of development. While it still implies divergence from the norm, as neurotypical is the most common neurotype, it stresses the differences between neurotypes and the concept of different but equal developmental pathways for neurotypical and neurodivergent children
- SLCNs can be the result of differences in physical development and/or differences in environments. The interplay between underlying developmental needs, such as developmental language disorder, conditions, such as autism or Attention Deficit Hyperactivity Disorder (ADHD) and/or the environment can all be important. Different types of SLCN can therefore be understood in more linear or more pluralistic terms, depending, for example, on whether the cause is a developmental disorder that requires ongoing support from a speech and language therapist [Footnote13] or is transient need caused by environmental factors, that can be resolved by changing the environment (e.g. through high-quality interactions in communication-rich environments).

[12] The development of the brain, particularly the prefrontal cortex and limbic system, is the key physical foundation for emotional and social growth. As the prefrontal cortex matures, children's self-control increases, and they begin to understand others' perspectives. Meanwhile, maturation of the amygdala and hippocampus allows for more complex emotions, emotional memory, and empathy. Processes like synaptic pruning and myelination make brain communication faster and more efficient, supporting emotional regulation, attention, and social understanding (Thompson and Lagattuta, 2006).

[13] Speech and language therapists aim to reduce the impact of a child's difficulties and maximise their language abilities.

3.1.4. A move toward a more pluralistic model of child development

Within Wales, our analysis of interviews and the discussions in the stakeholder workshops indicated that there has been a move away from the linear model toward more pluralistic models of child development, with measurement against stages of development, which are treated as “reference points” rather than “milestones”. In this conception of child development, variation in both the pace of development and also in the sequence and/or nature of change is seen as natural, and is not necessarily a cause for concern (it is seen as difference rather than a deficit or delay). For example, it was reported by stakeholders (who contributed to the study) that children’s developmental pathways may include stops, diversions and changes in pace. This shift is clearest in education but is also apparent in approaches to surveillance in the health and the early years, and as the boxed text below illustrates, is in line with other approaches that aim to create a more inclusive society.

Diversity, difference and inclusion

The shift toward more pluralistic conceptions of development, is in line with other models that promote inclusion and a focus upon difference and diversity, rather than deficits. For example:

* trauma informed approaches emphasise the importance of understanding that some people may struggle because of “adversity, trauma or distress” and responding to this with “understanding, compassion and kindness” (The Trauma-Informed Wales Framework)

*the social model of disability, shifts the focus from the individual impairment (the characteristics of an individual) to the societal barriers that disable people (The Social model of Disability)

* neurodiversity emphasises that there are natural human differences in how people’s brains process information. There are also groups of people that process information in a similar way to each other and are referred to as having the same neurotype, and that there can be big differences between neurotypes (Neurodiversity Definitions)

However, each of these models is predicated upon societal acceptance of difference, and unless and until this happens, a difference in a child’s development from the norm, may exclude them from aspects of society.

Nevertheless, as outlined above, aspects of more linear conceptions of development, such as the continued use of milestones (even if treated as “reference points”, rather than rigid boundaries), and concerns about developmental deficits or delays, remain. Therefore, while it is useful to consider the differences between the two models (summarised in Table 3.2), rather than a binary distinction, it is probably more useful to consider the normative and pluralistic models as opposing ends of a continuum, with some stakeholders tending more toward the normative end and others the diversity end of the spectrum. Although stakeholders were not asked to identify where they sat on this continuum, their comments suggested that they could each be placed somewhere on this continuum.

As a consequence of these differences in (and tensions between) how growth and child development is conceptualised, taxonomized and codified (for example, in terms of the grouping of changes and their nomenclature) there is no single, shared definition of child development (beyond the high level statement outlined above) nor a single standardised measure or set of measures across the three policy areas considered. This was confirmed by the stakeholder interviews and the desk-based review of Welsh Government documents.

3.2. Why is child development important?

Childhood is a highly influential time for human development and the early years of a child's life in particular, are seen as critical for their physical, cognitive, SLC and socio-emotional development. The acquisition and development of skills is not seen by stakeholders as a purely physiological process. Instead it is understood as a complex process determined by a child's interactions with their environment, such as their family, peers and school (see for example, The social determinants of early child development: an overview)**.** Bronfenbrenner's 1979 Ecological Model (see boxed text) is a widely cited and discussed example of this. As outlined above, this appears to be one reason for the apparent shift toward more pluralistic conceptions of child hood development. Development pathways are not fixed and the interaction between the environmental and physiological factors creates opportunities to intervene to support and nurture child development. This is supported by research that identifies how quality interventions in the early years can strengthen child development (see for example, Reducing Inequalities by Investing in Early Childhood Education and Care).

Bronfenbrenner's 1979 Ecological Model

Bronfenbrenner's Ecological Model aimed to explain how a child's development is shaped by the complex and dynamic interaction [footnote 14] between the child and their surrounding environment. As Figure 3.2 illustrates, Bronfenbrenner identified 5 interconnected systems:

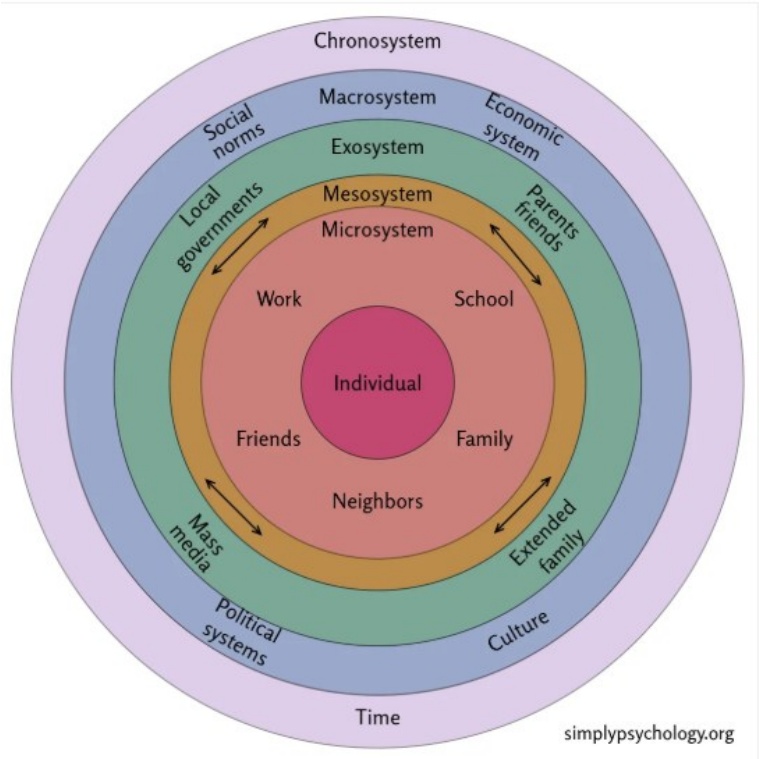
The **Microsystem** – immediate settings directly experienced by the child (for example, family, school, peers, childcare)

The Mesosystem – interactions between elements of the microsystem (for example, relationships between parents and teachers)

The Exosystem – external settings that indirectly influence the child (for example, parental workplace, community services)

The Macrosystem – wider societal factors such as cultural values, laws, and socioeconomic conditions

The Chronosystem – the dimension of time, reflecting how environmental changes and life transitions affect development (for example, family breakdown, policy reforms, historical context)



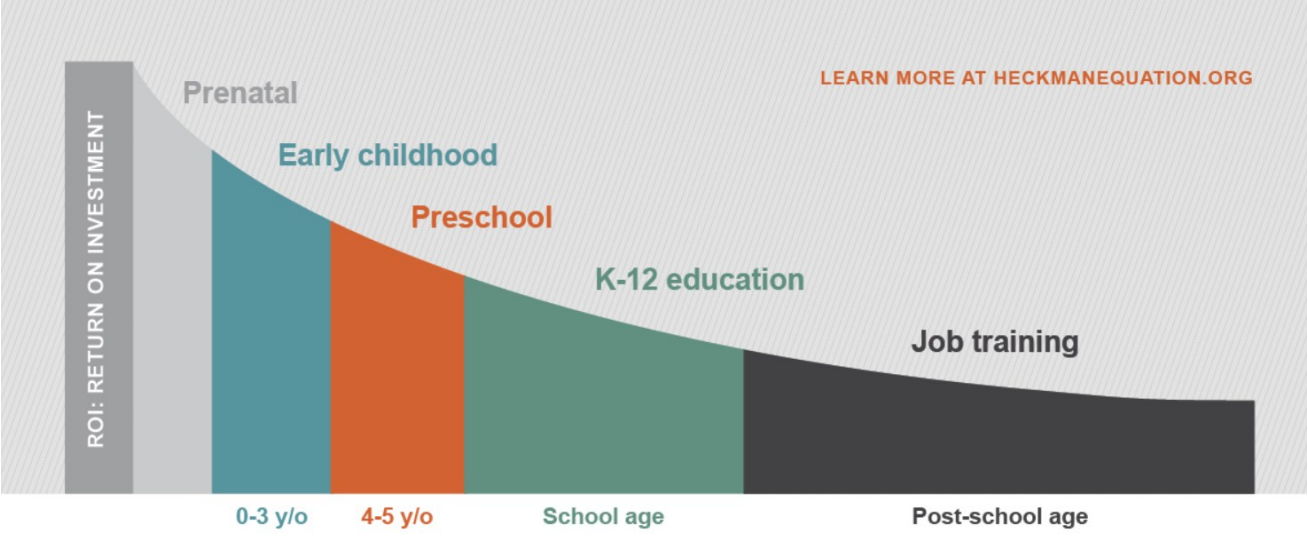
Source: Bronfenbrenner (1979)

[14] Children develop through reciprocal interactions with their environments, both influencing and being influenced by them.

The skills developed during childhood provide the basis for the further acquisition and development of skills throughout a child's lifetime (New evidence on the Heckman Curve). They therefore lay the foundations for children's future development and life chances, enabling children to thrive and fulfil their potential throughout their lives. This is shown in evidence of how investment in the early years can improve long-term outcomes (see, for example, Flying Start programme and the Study of Early Education and Development (SEED)). Conversely, constraints on development, such as ACEs, are seen as potentially risking constraint on an individual's capacity to thrive and fulfil their potential throughout their lives.

Interviewees also highlighted evidence such as the Heckman Curve (see Figure 3.2) which identifies that the highest rate of economic return comes from the earliest investments in children (which reflects the importance of the early years). However, other contributors to the study identified that other research identified that the effectiveness of human capital investments may depend more on the quality and implementation of the programs rather than solely on the age of the recipients.

Figure 3.2: The Heckman Curve



Source: The Heckman Curve

Therefore, as Section 1 outlines, a focus upon child development and the early years is in line with key goals of the Well-being of Future Generations Act, such as:

- the goals of a healthier and more equal Wales
- the principle of long-term thinking and a preventative approach.

In addition to the long-term impacts, interviewees who contributed to this study, also highlighted the medium term impacts, most notably the impacts upon children's readiness to learn. This was illustrated by concerns that schools were reporting increasing numbers of children with behavioural and social and emotional difficulties, and is discussed further below.

Consequently, the review of policy documents and stakeholder interviews confirmed that child development is of significant importance to the Welsh Government (including the 3 main policy areas covered by this review).

3.3. Why is measuring child development important?

Given the importance of child development to individual's outcomes across their lifetimes, understanding how and at what pace children are developing is seen as essential (in the literature reviewed and by the stakeholders who contributed to this study) because it can be used to:

- identify children who are not developing at the expected rate, enabling early intervention to better support the child and/or their family
- measure development or "progression" (in effect the distance travelled by an individual child)
- measure outcomes (that is to say, identify the level of development reached by an individual child at a point in time) which can be used to help understand how well early years, health and education systems are working and where, for example, to target support[footnote 15]. This can include using data on outcomes to inform self-evaluation, improvement within settings and services, and to support holding them to account[Footnote 16]
- explore how and why children develop, such as research exploring how early experiences shape later outcomes, including academic attainment, health, and well-being.

Measurement of child development therefore provides important evidence that can inform policy and practice decisions at differing scales ranging from an individual child (for example, is this child making slower progress than we would expect?) to a system (for example, are schools in Wales effective?) or a population (for example, are children in Wales developing as we would expect?)[footnote 17].

3.3.1. Formative and summative assessment of individual children

Assessment is central to supporting individual children (learners) on an ongoing, day-to-day basis in both Early Childhood Play, Learning and Care and Curriculum for Wales. It helps practitioners identify an individual's strengths and areas for development, identify and reflect

[15] Although data on outcomes is collected at a point in time, for the purposes of evaluation it was noted that longitudinal outcomes data, which enables change in outcomes over time, might often be needed.
[16] Although in Wales there has been a move away from the use of school level data for use by the Welsh Government for accountability purposes, Estyn and school governing bodies might still use this type of data to help fulfil their responsibilities to hold schools to account. The use of data in the education system is discussed further in Research exploring a new information system for schools.
[17] The distribution of assessments in personal and social development amongst children following entry into reception class was one of Wales's National Well-Being Indicators (the measurement of the development of young children). This was based upon a now discontinued indicator, which relied upon data from the Foundation Phase profile, which was discontinued when the new curriculum was introduced.

upon an individual's progress and therefore, next steps to support each individual child's learning and development.

Formative assessment can also help practitioners understand the progress of groups of learners to help them reflect on practice and can support self-evaluation and improvement (Supporting learner progression: assessment guidance). However, as the guidance makes clear "Assessment should not be carried out for the purpose of accountability" and Evaluation, improvement and accountability "arrangements within the education system are separate to assessment arrangements" Supporting learner progression: assessment guidance).

3.3.2. Information and evidence at systems and population levels

The collection and use of information and evidence is a key pillar of both Early childhood play, learning and care in Wales and the School Improvement Guidance. As one stakeholder from Early Years, Childcare and Play who contributed to the study put it, it was important "for us to know that the policies that we've got in place are making a difference and they're making a difference to the children because we have got our sort of underpinning ethos of the child and child development being at the heart of everything we do." Similarly, other stakeholders from Early Years, Childcare and Play and health who contributed to the study reported that data on child development at systems and population levels is essential to:

- inform the commissioning of services, for example, by identifying the nature and extent of need
- to evaluate the effectiveness of policies and programmes

and therefore guide Welsh Government, local authorities and local health board (LHB) decisions on resource allocation.

As we discuss further below, our interpretation of the responses given by interviewees and contributors to the workshop was that most agreed that the focus on measurement of child development was shifting toward the individual child at the expense of measurement at population or system levels [Footnote 18]. Moreover, our interpretation was that a majority welcomed this, although it was also felt to have created challenges. For example, a number of stakeholders observed that the impacts upon child development of the COVID-19 pandemic and policy responses, such as lockdowns and school closures, had raised the salience of child development. This was often framed in terms of concerns about "school readiness", with anecdotal examples of, for example, children "who were not toilet trained" and "arriving at school still wearing nappies" being discussed. There was consensus amongst stakeholders that the Welsh education system was under pressure. The concern was that, in the absence of standardised measurement, it was very difficult:

[18] Because semi structured interview and a workshop discussion were used to gather data from stakeholders, it is challenging to precisely quantify what number (or proportion) of stakeholders would hold a particular position on a particular issue.

- at a system level to accurately assess the scale of the challenge these sorts of issues presented or evaluate the effectiveness of policies or programmes (which as noted, were identified as important when making decisions about commissioning or decommissioning services)

- to enable research to understand what was driving any decline in readiness to learn; for example, by exploring the impact of changes in the behaviour of parents or carers and early years, educational and health practitioners, in response to the pandemic and policy responses like lockdowns. This could also involve exploring interactions between the two (where for example, changes in parental behaviours led to changes in the behaviour of early years, educational and health practitioners)

Examples of how the gaps in child development data at a system or population level can weaken the development of services

Commissioning services: It was reported by stakeholders that proxies of need, like socioeconomic disadvantage could be used, and were used to inform programmes like Flying Start. However, they were seen as imperfect and meant that the targeting of those most in need was not as effective as it could be. As one interviewee put it, “because you're using a geographical measure, some families with lower need are getting more support” while others with higher levels of need were missing out, as “they just don't happen to live in the post code” area.

Evaluating services: It was reported by stakeholders that it was difficult to evaluate the cost-effectiveness of key programmes and interventions, such as Flying Start, in the absence of standardised systems or population level data on child development. This in turn, was reported to make it more difficult to make the case for continuing or increasing funding for services.

Research and development of services: As one interviewee observed, there can sometimes be a tendency (they did not endorse) to “blame” parents or health visitors for the difficulties children experienced in their first years of school. However, as they observed, on the absence of research “we don't know [what is causing the difficulties children experience], do we?” Others pointed to the difficulty in understanding what might be driving trends in the numbers of children with additional learning needs, in the absence of better systems or population level data on child development.

3.4. How is child development measured

Child development can be measured in different ways; the review identified:

- two conceptions of child development (presented above in Table 3.2), as a:

    - a linear process, which all children are expected to follow. This expectation can be used to construct a series of norms, which progress can be measured against and which can be used to identify deficits or delays in development

    - a pluralistic process, where an individual child's development is considered unique, given differences in for example the pace and sequence of development

- two main types of approach used by health services: screening and surveillance, and two main types of approach used by education settings: summative and formative assessments. These approaches are presented below in Table 3.3.

Screening is associated with a linear model of child development and the use of standardised tools. In contrast, surveillance, formative and summative assessment can be informed by either a linear or pluralistic model of child development, and all can use standardised tools. However, although surveillance and formative assessment are associated with the use of standardised tools, these are usually used together with other methods, to inform a professional judgment, when measuring child development.

Table 3.3: Two types of measurement: Screening and summative assessment and Surveillance and formative assessment

Purpose	Screening and summative assessment	Surveillance and formative assessment
Description	Assessment of the child at a point in time (providing a snapshot of development), or points in time [footnote[19]], using standardised tools to enable comparison against the norm to, for example, help identify potential developmental delay and/or unmet needs or outcomes	On-going assessment of the child and/or observation, using more personalised approaches, focused upon understanding where the individual child is and measuring their progression, to inform the support or challenge they, and/or their parents or carers, need for their development or progression
Model of child development	Associated with a more normative model, with its focus upon identifying deficits or delays	Associated with a more pluralistic model, with its focus upon supporting an individual child's progression
Examples of / approach to measurement	Aims to be objective, using standardised methods that aim to ensure that measurement is independent of the assessor's feelings, opinions, or prejudices • standardised tests completed by the child, such as reading and numeracy assessments and GCSEs • in the case of physical development, direct measurement (for example, of height or weight using a stadiometer or scales) • observation of the child by, for example, education staff, health visitors and/or parents and carers, including behavioural ratings of classroom behaviour and social interaction.	Aims to be objective, by ensuring that professional judgments are underpinned by practitioners' understanding of child development and draw upon a range of methods (and therefore evidence), including observation, tools and tests and assessment in different contexts, with judgments made against defined standards. • This approach underpins both Early Childhood Play, Learning and Care Plan and Curriculum for Wales.

[19] Longitudinal cohort designs, where data is collected at multiple ages (for example, 2, 3, 5, and 5.5 years) to track change (development) over time, are also common, although measures can also be used to generate a snapshot of development at a single point in time.

Standardised measurements

The use of standardised measures which aim to ensure consistency (uniformity) in the administration and scoring of tests is common, to:

- enable direct comparisons to be made over time (for example, to measure an individual child's development) and/or between children (for example, to assess if development of an individual child is in line with what would be expected, the 'norm')
- strengthen the validity and reliability of measurement, as standardisation can help strengthen reliability by ensuring consistency and, more fundamentally, by standardising the use of instruments that have proven validity and reliability

However, as noted above, the use of standardised measures is also seen as increasing the risk of a reductionist and inflexible view of child development.

Examples of standardised assessment tools

Direct assessment of the child using standardised tests completed by the child or observation of the child, used throughout Wales, include:

- Reading and Numeracy Personalised Assessments which are mandatory for learners in Years 2 to 9 in maintained schools in Wales [footnote 20]

- the Child Measurement Programme for Wales which measures the height and weight of children in reception class.

- the Movement Assessment Battery for Children (ABC), an individually administered test used by the Betsi Cadwaladr LHB, designed to assist professionals responsible for helping children with movement difficulties, which includes both fine and gross motor control skills

-the Schedule of Growing Skills (SOGS) is a screening and developmental assessment tool for children aged 0 to 5 years. It assesses development across nine domains [footnote 21] and is intended to provide a 'snapshot' of developmental strengths and possible delays, helping identify where further assessment or intervention might be needed

The inclusion of tests of literacy and numeracy, such as the personalised assessment of reading and numeracy in Wales, as measures of child development, raises some questions. Literacy (reading, writing, language comprehension) and numeracy (understanding numbers, arithmetic, problem-solving) assess specific cognitive and language skills, that as outlined in paragraph 3.1. are considered key elements of child development. However, both cognitive and language development encompass a broader range of skills that those covered by literacy and numeracy tests, and these tests do not directly assess other domains off child development such as physical and social and emotional development. Because this study includes a range of measures, which only focus upon some elements of child development, such as physical development (like the development of fine motor skills), we have also included literacy and numeracy tests as examples of measures of child development. However, it is important not to treat these narrow measures of distinct elements of child development as if they were comprehensive measures of child development.

Curriculum for Wales: Measuring children's progression

Curriculum for Wales identifies the 4 purposes of the curriculum, to develop children and young people as:

- ambitious, capable learners, ready to learn throughout their lives

[20] The assessments use a bank of standardised questions, but the assessments are adaptive (and tailored to each individual learner) and the standardised score is a relative score. This limits the value of assessments to understand change over time or between cohorts.
[21]The domains are: passive posture, active posture, locomotor, manipulative, visual, hearing & language, speech & language, interactive social, and self-care social.

- enterprising, creative contributors, ready to play a full part in life and work
- ethical, informed citizens of Wales and the world
- healthy, confident individuals, ready to lead fulfilling lives as valued members of society

Interviewees stressed that this meant the new curriculum embodied a holistic concept of child development, which viewed the different domains as interconnected (meaning they "all have to work together to support a child's development" as one interviewee put it). This also meant that it does not privilege any one domain, such as the cognitive, or create a "hierarchy", as one interviewee put it. In contrast, it was observed that, in the past, too much emphasis had been placed upon attainment (and by implication, elements of the language and cognitive domains of child development) as the principal measures of both an individual child's and a school's success.

Understanding and supporting child development (in this holistic sense) is at the centre of Curriculum for Wales. As the Curriculum for Wales guidance, Enabling Learning, identifies, "When designing a curriculum, the practitioner's knowledge and understanding of child development is essential" and "The focus of teaching and learning should include the traditional areas of child development"[Footnote22]. Development is described as an integral element of children's/learners' "progression" "throughout their learning journey" (no page, ibid).

As the Supporting learner progression: assessment guidance outlines, "learner progression along a continuum of learning from ages 3 to 16 is central to the Curriculum for Wales." Descriptions of Learning provide guidance on how learners should progress and are "arranged in five progression steps which provide reference points for the pace of that progression" [footnote23]. (Principles for designing your curriculum). Assessment is seen as central to progression and has three main roles:

- supporting individual learners on an ongoing, day-to-day basis
- identifying, capturing and reflecting on individual learner progress over time
- understanding group progress in order to reflect on practice (Supporting learner progression: assessment guidance)

[22]These are "expressed....as….five developmental pathways", "belonging", "communication", "exploration", "physical development" and "well-being".
[23] The progression steps broadly correspond to expectations at ages 5, 8, 11, 14 and 16.

Developing progression steps

In order to identify "what matters" in each Area and how progression within each Area could be described, the Welsh Government established a national network of Pioneer Schools[Footnote24] and national groups for each Area. In order to support their work, the Camau i'r Dyfodol project was commissioned to undertake research into progression as both a construct and also its application in practice. The Camau project worked with the 6 national groups to "determine how progression might best be described and developed in the six curricular areas and how progression steps might be most helpfully identified and described to support future learning."

Adapted from: Camau: Progression and Assessment in the Curriculum for Wales

As one interviewee observed, the new system was about "meeting learners where they are" and building from that using a "strengths-based approach." In contrast, the previous system was described as "more of a deficit model of identifying what it is that learners could do and attempting to fill gaps in that."

Importantly, the new curriculum offers more flexibility about how progression (and therefore child development) is measured. Interviewees described how it gives more respect for professional judgment to measure what is important to or for the child (to reduce the risk of only "valuing what is measured" as one interviewee put it). Nevertheless, it is intended that this agency is exercised within a national framework, and the guidance identifies the need to develop a "shared understanding of progression" to ensure "coherence and equity across the education system" (Supporting learner progression: assessment guidance).

Practical considerations

The nature and type of change being measured and the capacity of children also contribute to differences in how child development is measured; for example, height and weight can be directly measured using instruments like a stadiometer or scales respectively, while some behaviours are measured using observation by practitioners, using tools like the Boxhall Profile, or, where a child is capable, self-report data.

3.5. Types of child development measures and indicators and the use of data

Because, as outlined above, child development is understood in different ways and child development measures can (and are) used for different purposes, the information the measure is designed to generate also differs. As outlined below, the review identified a range of measures reflecting differences in their purposes and the conception of child

[24] The Pioneer Schools Network worked in collaboration with regional consortia, experts and higher education institutions, and key partners such as Qualifications Wales and Estyn, "to develop a broad, balanced, inclusive and challenging curriculum" for Wales (A new Curriculum for Wales: The story so far…).

development, also in the tools used and timings. These differences can (and should) shape the choice and use of measures.

As noted above, stakeholders identified tensions between using measures for more than one purpose. Using measures for purposes different to those for which they were intended, creates risks such as distorting practice where, for example, practitioners 'teach to the test' or where data intended for assessment was used to hold schools to account. However, the use of existing data can also create opportunities, such as research into the drivers of child development. Using existing data, even if not for the originally intended purpose, can also be more cost effective and more ethical than developing new measures and collecting more data [footnote 25] .

3.5.1. Examples of different approaches to measuring child development in different policy areas in Wales

Policy area: Health

How and when is child development measured?

- The Healthy Child Wales Programme supports screening using standardised tools to enable the early identification of specific needs, also surveillance, monitoring, and assessing a child's overall development and well-being over time. This can be informed by standardised tools such as SOGS, but these tools should be used, alongside other data, to inform a professional's judgment about a child's development.
- The programme defines 9 core contacts between 10 days and 3.5 years of age. Health visitors review a baby`s growth and developmental progress, using tools such as a stadiometer and scales, Health Observation and Assessment of the Infant (HOAI), the Family Resilience Assessment Instrument and Tool (FRAIT) and Schedule of Growing skills (SOGs). Later contacts are made by school nurses, with measurement via the Child Measurement Programme.

Policy area: The Early Years

How and when is child development measured?

- The Flying Start programme builds upon the Healthy Child Wales Programme, with more frequent contacts and broader support to better detect and address developmental issues in higher-risk families. There is a particular emphasis upon identifying children at risk of developing speech, language or communication needs.
- ECPLC: Assessment Arrangements for 0 to 3 year olds in Wales are observation based and intended to support the development, learning and well-being of all babies and young children from birth to age three.

[25]Sometime described as the 'collect once, use many times' (COUMT) paradigm.

- Assessment arrangements for funded non-maintained nursery settings aim to support progression in children's learning, for those children in in funded non-maintained nursery settings which have adopted the curriculum for funded non-maintained nursery settings.

Policy area: Education

How and when is child development measured?

- Curriculum for Wales aims to enable every learner to progress in their learning. Assessment should be ongoing and formative. Progress is measured against descriptions of what learning should look like at different stages, not against specific age-related levels.
- Reading and Numeracy Personalised Assessments in Years 2 to 9 in maintained schools in Wales and assess children's (learners') skills in literacy and numeracy.
- At the end of compulsory education, examinations, such as the GCSE, provide a summative assessment of learners' skills and knowledge.

3.5.2. Examples of different approaches to measuring child development in different policy areas in England

Policy area: Health

How and when is child development measured?

- As part of the Healthy Child Programme [footnote 26]), Health visitors assess development across a range of domains at a number of intervals including, 10 to 14 days, 6 to 8 weeks, around 9 to 12 months and around 2 to 2½ years
- Health visitors are recommended to use tools like the Ages & Stages Questionnaire (ASQ-3 or ASQ:SE-2) for the review at around 9 to 12 months and 2 to 2½ years. However, data quality varies and there is limited national reporting
- Assessment aims to support children and families, improve health and wellbeing outcomes and reduce health inequalities

[26] The healthy child programme is the national prevention and early intervention public health framework. It includes screening, immunisation, health and development reviews, health improvement, wellbeing and parenting.

Policy area: Early Years Foundation Stage (EYFS) Framework (0 to 5)

How and when is child development measured?

- Children's progress in the Early Years is measured across seven key areas grouped into three "prime areas": Communication and Language, Physical Development, Personal, Social and Emotional Development and four 'specific areas': Literacy, Mathematics, Understanding the World and Expressive Arts and Design
- Assessment in the early years is observation based and the aim is to ensure all children are developing well and to identify those needing additional support before formal schooling begins. There is a strong focus upon "'school readiness'"

Policy area: National Curriculum Assessments at Key Stage 1 (Ages 5 to 7) and Key Stage 2 (Ages 7 to 11)

How and when is child development measured?

Most assessment is teacher-led and formative. Nevertheless, schools will also undertake summative assessment and standardised national assessments, including:

- the Phonics Screening Check (Year 1, repeated in Year 2 if needed) which measures early literacy and decoding skills (a strong indicator of language and cognitive development)
- end of Year 2 assessments in Reading, Writing, Mathematics and Science, informed by teacher observation
- end of Key Stage 2 (end of year 6) Statutory Tests (SATs) in Reading, Mathematics, Grammar, Punctuation and Spelling, alongside teacher assessments of Writing and Science. These results help monitor progress and identify children needing support in the transition to secondary school

3.5.3. Examples of different approaches to measuring child development in different policy areas in Scotland

Policy area: Health

How and when is child development measured?

- As part of the Child Health Systems Programme, there are a series of child health reviews, including an assessment of children's development at 13 to 15 months, 27 to 30 months and 4 to 5 years
- the reviews involve asking parents about their child's progress, carefully observing the child, and supporting parents to complete a structured questionnaire about the child's development. involving assessment of development, health, growth, and wellbeing

- the reviews provide opportunities to provide parenting support and make referrals to additional support and/or further assessment, where needed. They aim to support child development and detect early developmental concerns and promote early intervention

- the dataset generated by the reviews is also used to support the planning and provision of services and national data is published on the Health in the early years (HEYS) dashboard

Policy area: Early Years Framework And Curriculum for Excellence

How and when is child development measured?

- Assessment in the early years is observation based. Practitioners observe children's play and engagement to track progress. This is recorded in Personal Learning Journeys / Profiles, Individual Portfolios recording developmental progress, achievements and next steps

- At the end of Early Level (typically by age 7), teachers make professional judgments about whether a child has achieved expected developmental milestones across the Curriculum for Excellence, Experiences and Outcomes

- The Scottish National Standardised Assessments (SNSA) are a series of standardised online literacy and numeracy assessments for children in Primary 1 (typically age 5 to 6), Primary 4 (typically age 8 to 9), Primary 7 (typically age 11 to 12) and Secondary 3 (typically age 14 to 15). They are designed to offer diagnostic reports that teachers use to inform their professional judgements, rather than for a pass/fail assessment

Sources: Curriculum for Excellence Experiences and Outcomes; Early child development; Early years foundation stage statutory framework for group and school-based providers; Realising the ambition: Being Me; Population health needs assessment: a guide for 0 to 19 health visiting and school nursing services; What is the Child health Programme

3.6. Other types of measures

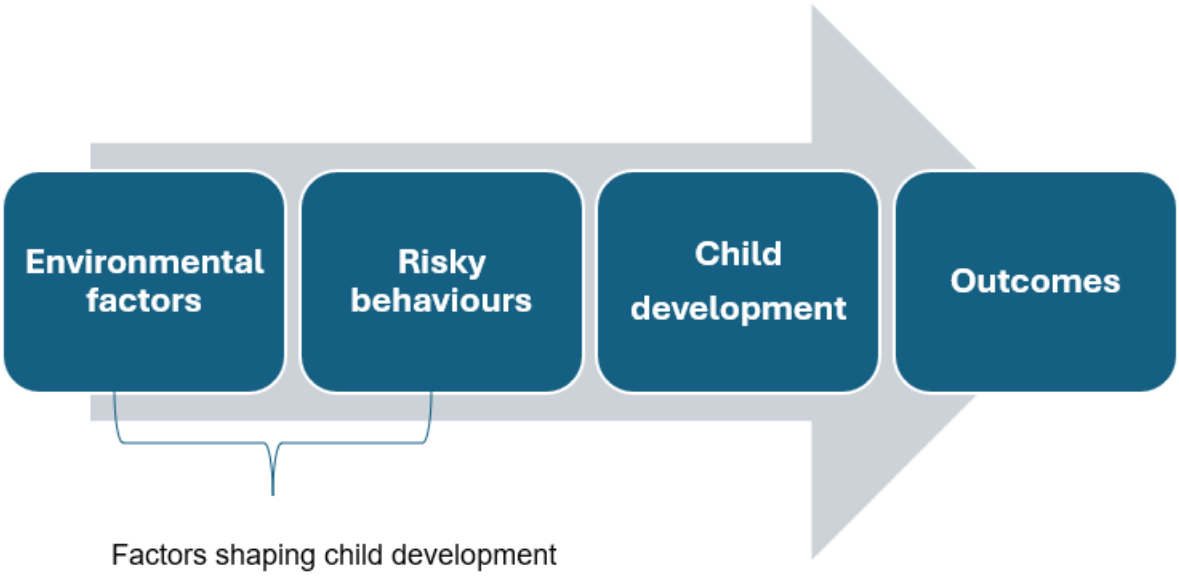
As Figure 3.3 illustrates, the review also identified a number of other measures linked to child development, focused upon:

- children's experiences, behaviours (such as 'risky' behaviours) and environments (which could create ACEs) which can impact upon child development

- wider outcomes for children, such as levels of well-being or educational attainment, which are linked to child development [footnote 27]

These are not in themselves measures of child development, as they do not describe the sequence of physical, sensory, language, cognitive, emotional and behavioural changes that occur in a child from conception to adulthood.

Figure 3.3: Measures of child development and measures of change linked to child development



Environmental factors

The focus upon behaviours and environments and experiences is often associated with an ecological model of child development, such as Bronfenbrenner's (1979) 'ecological' framework (see Section 3.2). It helps identify opportunity for interventions to support and aid child development and to identify risk factors that may predict the likelihood that child development will not follow the expected pace or path. It was reported that parent/infant relationships are seen as critical to child development and therefore, as one interviewee described, "understanding the quality of a parent infant relationship is also something that could be a really valuable and additional area to explore and look at."

[27] For example, social and economic development is likely to contribute to levels of subjective well-being and cognitive and language development is likely to contribute to educational attainment.

Environment measurement tools identified by the searches include:

- the Infant and Toddler Environment Rating Scale (ITERS-R)
- the Early Childhood Environment Rating Scale (ECERS-R).

This approach is evident in the Review of Early Language Screening, which considers how risk and protective factors, such as premature birth, low socio-economic status or low level of parental education, or conversely, being born full term, high levels of parental education and knowledge of child development, are associated with higher or lower risks of SLCN. However, it stresses that these factors are to be used to identify which children are most at risk of developing speech, language and communication needs, rather than identifying which children do have speech language and communication needs.

3.6.1. Adverse childhood experiences and risky behaviours

Adverse childhood experiences (ACEs) are traumatic events[footnote28] particularly those in early childhood that have lasting effects on health, development and life outcomes. They are typically things that happen to a child, rather than things a child does. Periodic population-based research surveys have estimated the incidence of ACEs in Wales (see for example, Adverse Childhood Experiences and their impact on health-harming behaviours in the Welsh adult population). However, while data on children's exposure to individual ACEs such as abuse are collected by, for example, social services, there is no routine measurement of exposure to the full set of ACEs or traumatic experiences.

"Risky behaviours" are often associated with ACEs and describe behaviours, actions or choices that can compromise a young person's physical health, psychological well-being or development. These include health-related behaviours such as:

- poor diet and nutrition (high sugar or energy drink consumption)
- physical inactivity or excessive screen time
- sleep deprivation
- substance use (for example, early experimentation with smoking, alcohol, or vaping)

3.6.2. Measuring health related behaviours and outcomes

A range of health-related behaviours and outcomes such as well-being, are measured through both the HAPPEN and the SHRN surveys. They provide robust, population-level evidence to inform school practice and Welsh Government policy on child development, education and public health.

[28] These include physical, emotional, or sexual abuse, physical or emotional neglect, domestic violence, parental substance misuse, parental mental illness, parental separation or divorce and incarceration of a household member Adverse Childhood Experiences and their impact on health-harming behaviours in the Welsh adult population.

Summary of the HAPPEN and SHRN surveys

HAPPEN

Purpose

To explore links between children's health behaviours, well-being and school attainment, enabling data-driven research and self-evaluation and action planning by schools.

Focus

Primary school pupils, ages 9 to 11.

Measures include

- Physical activity, healthy behaviours such as eating fruit and vegetables and sleep
- Emotional well-being and happiness
- Social relationships and school belonging
- Health behaviours (for example, screen time, dental hygiene)

Use

Schools receive tailored feedback reports. Data is linked via the SAIL Databank to assess wider developmental and educational outcomes.

SHRN

Purpose

To monitor children and young people's health, well-being, and risk behaviours enabling data-driven research and self-evaluation and action planning by schools.

Focus

Primary and secondary school pupils ages 7 to 16.

Measures include

- Physical activity and healthy behaviours such as eating fruit and vegetables and sleep
- Mental health and emotional well-being
- Relationships, bullying, inclusion, and safety
- Substance use (smoking, vaping, alcohol)

Use

Schools receive benchmarked reports. National data informs Welsh Government strategies, such as the Whole-School Approach to Mental Health and Well-being and the Curriculum

for Wales health and well-being area. Data from the School Health and Wellbeing Survey is available for linkage to other datasets via the SAIL Databank.

Sources: HAPPEN; The School Health Research Network (SHRN); Data Resource Profile: The School Health Research Network (SHRN) Student Health and Well-being (SHW) survey of 11–16-year-olds (2017–2023)

4. Findings: the characteristics of indicators and measures

4.1. Introduction

As Section 3 outlines, child development measures and indicators differ in multiple dimensions, with different measures designed:

- for different concepts of child development (such as linear or pluralistic)
- for different purposes (such as screening, measuring development, progress, or outcomes or for research)
- for use at different scales (ranging from an individual child to a population)
- for children of different ages, with different capabilities, including languages, in different contexts
- for use with different methodologies (such as direct testing, measurement, observation of a child and/or professional judgment)

The diversity of child development measures and indicators makes it difficult, and in some ways unhelpful, to generalise about measures. It is also important to consider not only the measure but also the context in which it is used, how it is used and its purpose, when considering questions such as validity, reliability and cost-effectiveness. Subject to this important caveat, the review identifies some high-level findings, discussed in this Section.

4.2. The validity and reliability of different measures

The review identifies that, given the importance of child development (discussed in Section 3) and the costs associated with large scale testing (discussed below) there are strong incentives to use only valid and reliable measures. The review also identifies that a number of studies discussing tools, such as Preschool Early Literacy Indicators (PELI) [footnote29], Clinical Evaluation of Language Fundamentals Preschool (CELF-P3 UK) [footnote 30] and Dynamic Indicators of Basic Early Literacy Skills (DIBELS) [footnote 31], provide evidence of reliability and validity. Of the 11 evaluative studies included in the review, around:

- three quarters showed construct validity [footnote 32]

[29] Measures early literacy, for example, vocabulary and phonological awareness delivered through a storybook format (Preschool Early Literacy Indicators (PELI™): Establishing Benchmark Goals).
[30] Language assessment for preschoolers measuring understanding and use of language (Clinical Evaluation of Language Fundamentals Preschool-3 UK). CELF is used in Wales by Speech and Language Therapists and Educational Psychologists as a standardised clinical language assessment.
[31] Brief, standardised assessments for monitoring early reading and literacy skills in children from nursery to Year 8 (What is DIBELS?).
[32] That is to say, does it measure the developmental construct it aims to measure?

- two thirds narrative validity [footnote 33] and discriminative power [footnote 34]
- one third, internal consistency [footnote 35]
- one fifth, external validity [footnote 36]

However, for many of the measures identified by the review, there was little or no discussion of their psychometric qualities, such as their validity and reliability. Moreover (where discussed), the review identified weakness in, for example:

- tools' validity or reliability, including measures that were either untested or poorly adapted for diverse socio-economic and cultural contexts, were outdated, that have limited discriminative power or that are vulnerable to potential bias in observer reporting
- how instruments/tools are used (for example, where they are used inconsistently, which can mean that the data collected is invalid and/or unreliable)
- samples (which may be too small and/or unrepresentative) which can make it difficult to generalise findings; for example, while the PELI was identified as having sound construct validity with moderate to strong reliability, problems were also identified when it was used with samples that were not fully representative of the populations covered. For example, samples that may not adequately represent minority groups.[Footnote 37]

[33] That is to say, do the findings align with real world observations or narratives?
[34] Discriminative power describes a research tool or instrument's ability to differentiate meaningfully between children with different developmental levels. It can be considered an element of construct validity; for example, the measure's ability to distinguish between different developmental levels.
[35] Does it reliably measure the same construct? for example, is Cronbach's alpha (usually done through SPSS) reported?
[36] For example, can the findings be applied to other contexts, settings, populations or periods of time?
[37] For example, in a US review of assessments and developmental screeners identified that there was a lack of psychometric evidence for certain populations, such as dual language learners, children with disabilities and American Indian/Alaska Native children (Understanding and choosing assessments and developmental screeners for young children).

Examples of findings on psychometric quality from the literature reviewed

Overall, the studies showed a mixed picture of validity and reliability; for example:

-exploratory studies created shorter item sets from the Early Childhood Environment Rating Scale (revised), the Early Childhood Environment Rating Scale (extended), and the Sustained Shared Thinking and Emotional Wellbeing scale. These have been used in England with children aged 3 to 5 and it is reported that the abbreviated sets showed promise for distinguishing settings and aligned with observed practice. However, the studies did not report internal consistency, and independent replication was recommended

-for population surveillance at age 2 to 2.5 years (although it is designed for use with children from one month to 5.5 years), the Ages and Stages Questionnaire (third edition) was able to discriminate across developmental domains but there were gaps in routine data coverage and representativeness limited confidence in area level comparisons

- across the SEED impact reports, which drew upon a range of measures used in England for children aged 3 to 7, measurement sensitivity was a concern with binary results such as phonics pass/fail and achievement (or not) of the 'expected level' compressing variation and the use of small observed samples weakening the ability to validate links between quality and outcomes.

- reviews of social emotional tools concluded that although screeners [Footnote 38] were quicker to administer than full assessment or screening instruments, the latter tended to have stronger evidence of validity and reliability.

4.3. The cost effectiveness of data collection and use

Measuring child development is costly. It requires the development and testing of robust measures which can require expertise to use correctly and are often time consuming to administer. When used at a population or system level, the costs are considerable; for example, it is reported that the contract for delivery of the Personalised Assessments in Reading and Numeracy Service in Wales was worth £20m over a four year period (Sell2Wales Award Notice). There will also be (additional) costs for the Welsh Government related to this contract (such as staff time. The costs create incentives to use existing routine data systems to reduce costs, rather than commissioning entirely new surveys. It should be noted that the use of sample rather than census surveys can be useful for measurement at population or system level. Although this approach presents challenges adequately comparing the indicators over time from actual change compared to sample changes and may mean analysis for sub groups is not viable.

[38] A screener is a standardised set of items, such as questions in a questionnaire and/or simple direct tasks, intended to be used to quickly identify children who may be at risk of developmental delay and who should be offered follow-up assessment or support.

Evidence from the desk-based review on the costs of data collection

There was a lack of data regarding monetary costs and there were no formal economic analyses within the studies included in the desk-based review. Studies mainly reported costs in terms of time and work for staff, in terms of administration time, training and the frequency of testing. These ranged considerably according to the methods used. For example, an Australian study, (Evaluating resources required to evaluate child outcomes following indirect services in early childhood education centres: A scoping review) identified number of different options for measuring communication/language outcomes, with different costs in terms of time, including:

*video-recording of educator–child interactions, estimating that each 10 to 20 minute clip would require around 30 to 60 minutes to code (so 1 to 2 hours in total, given two clips per child)

*direct assessment of children's language/speech using tools like CELF-P2, which would take at least one hour to administer

*indirect/proxy measures, such as the educator checklists of children's communication, or parental observation, where the time require is minimal (as a third party, such as an educator or parent or carer, is collecting the data)

in order to reduce burden and cost, the Study of Early Education and Development (SEED) proposed shorter, more predictive item sets, noting that these would ease participation for services and policymakers; a consideration that needs to be balanced with the usefulness and value of data provided. For example, shorter item sets might be swifter to administer, but also less sensitive.

In relation to impact (and therefore effectiveness), some studies included in the review identified that child development measures could be used to:

- justify and guide investment in the early years, by enabling research or evaluation that demonstrated that high quality early education lifts children's outcomes. For example, the SEED is often suggested as an example of this
- strengthen monitoring and evaluation of early years, health or education provision, which could, for example, guide decisions about investments, support and/or challenges
- more effectively and efficiently target resources, by improving the early identification of children with a developmental delay, which may indicate unmet needs[footnote 39].

[39] Developmental delay may be persistent, rooted in biological or physiological differences that cannot be treated or changed, or transient if, for example it is caused by environmental factors, such as weaknesses in parent-child interactions, which can be changed. It was reported that around 90% of SLCN in Wales were transient.

4.4. Perceived gaps and weakness in child development data and risks associated with its collection or use

A range of gaps, weakness and risk associated with the measurement and use of child development data was identified by stakeholders and through the literature reviewed. These are summarised below.

Practical and operational challenges associated with the design of tools, such as:

- reliance upon dated standardisation samples or samples that were developed in different countries, raising cultural and language fit questions
- the need to strike a balance between the validity and reliability of tools with the practicalities of using them, so that data collection is feasible in 'real world' settings

Examples identified by stakeholders as an issue in Wales

- The need for tools to be culturally and linguistically adapted, most notably the use of English language tools in a multilingual nation (see para 4.5.)

Weakness or limitation in the data due to design issues, such as:

- poorly designed samples

Examples identified by stakeholders as an issue in Wales:

- the lack of data that is collected on change over time (that is to say, longitudinal data)
- differences in priorities across the early years, health and education, which mean that different aspects of child development are measured by different policy areas, which can limit the value of data collected in one policy area to other policy areas
- the gap in data due to discontinuing the use of the Foundation Phase Profile which means that (as reported by one stakeholder) there is no national measure of "school readiness" in Wales

Weakness or limitations in the data that is collected due to operational difficulties in data collection, such as:

- inconsistent approaches to the use of tools across schools and settings
- low response rates or attrition in longitudinal studies (declining participation over time across study waves), making it difficult to compare findings
- failures to adequately train those who are administering tools

Examples identified by stakeholders as an issue in Wales:

- inconsistencies in how child development is measured by health staff such as health visitors, that (as reported by one stakeholder) limits its use at a population or system level for commissioning and/or evaluating services and programmes. In response, some stakeholders advocated for standardising the use of existing tools, rather than focusing upon trying to develop or use new tools

Weakness, limitations or risks in how data (even if valid and reliable) is used; for example:

- the risk that measurement distorts practice (for example, 'teaching to the test')
- many studies highlighted attribution issues as, even when background factors were measured, it is often still challenging to isolate the effects of an intervention from other factors, such as early education, from family and home influences
- treating a screening result as a diagnosis or where users misinterpret data (for example, as a result of expectancy effects [footnote 40])
- it can be difficult (often impossible) to combine or compare data collated using different tools

Examples identified by stakeholders as an issue in Wales:

- Concerns that measurements lead practitioners to focus upon what is measured, rather than what is important to or for the child (which is a particular concern given the risk that is only that which is measured that is valued or seen as important)
- understanding and assessment of child development is reduced to individual measures (likened by one stakeholder to seeing children as "bags of outcomes")
- measurement stigmatises those children who 'fail' to meet development milestones or to progress as expected, by focusing upon their deficits, rather than their strengths

[40] Expectancy effects describe how practitioner's expectations or beliefs about an individual child or group of children influence the way results are interpreted.

- data silos which separate health, education and social care can lead to missed opportunities created by the lack of linked data. In response, stakeholders advocated creativity in data use, exploring existing datasets and improving data-sharing (for example, by using The Secure Anonymised Information Linkage (SAIL) Databank more fully (see boxed text).

Data Linking: SAIL

The Secure Anonymised Information Linkage (SAIL) Databank, based at Swansea University, securely links data from multiple public service sources in Wales (for example, health, education, social care, housing). Personal identifiers are removed, and data is anonymised and linked at the individual level using privacy-protecting techniques. Researchers can access the data within a highly secure digital environment to conduct approved studies in areas such as child development; for example:

- SAIL enables longitudinal research tracking children's development from birth through education and health systems

- SAIL supports evidence on the impact of early years programmes (for example, Flying Start, Healthy Child Wales Programme) and socioeconomic factors on child outcomes, and findings from SAIL-based research have informed Welsh Government policy on health inequalities, education, and child well-being.

Source: The SAIL Databank: building a national architecture for e-health research and evaluation

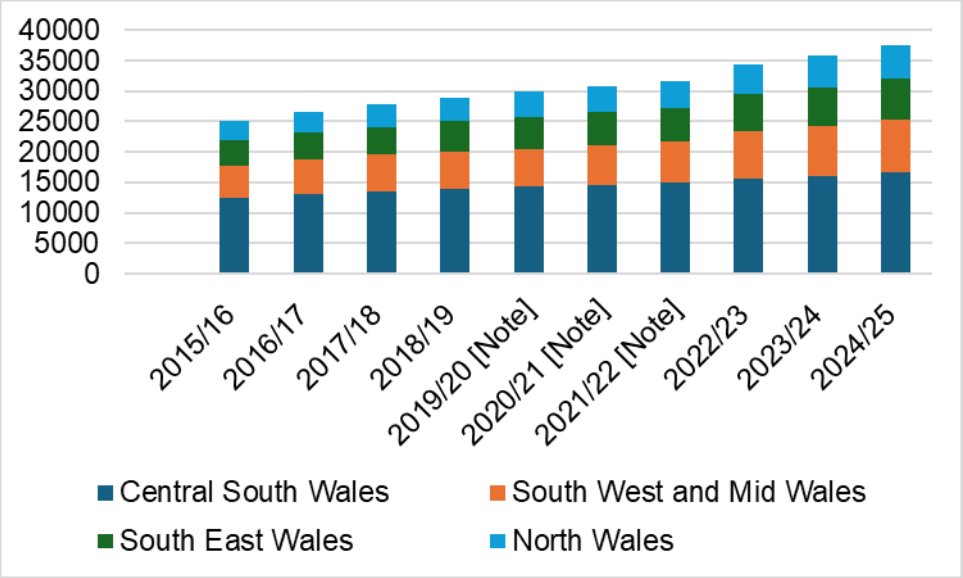
However, although SAIL is a powerful platform for linked data research, the scope to use it depends upon the data it hold (and it depends entirely on external organisations to collect and supply the data it holds). Therefore as one contributor observed, "even with SAIL, we face challenges evaluating early years interventions due to issues with child development data (e.g. limited education attainment data below GCSE level and data quality issues with some of the health data)".

4.5. Measuring child development in a bi- and multilingual country

In a bilingual country such as Wales, stakeholders reported particular challenges in relation to language development norms, but also in relation to other domains where indicators were expressed in English. Some indicators, such as measures of weight, height or behaviour (such as smiling for the first time or taking first steps) could be directly translated from English into another language, most commonly Welsh, but also other languages. However, for others, particularly in relation to language norms, it was reported to be more complex than this. This was primarily emphasised in relation to the Welsh language, but the number of learners for whom neither English nor Welsh is a first language is increasing, meaning that challenges associated with measuring child development in this group are also growing. As Chart 4.1 illustrates, the total number of learners with English as an additional language (EAL) has

increased by almost 50% over the last 10 years, even though the total number of learners in schools has remained broadly stable over this period [footnote 41].

Chart 4.1: The number of EAL/WAL learners aged 5 and over in school in each region of Wales, 2015/16 to 2024/25



Note: the PLASC was affected by the pandemic in these years.
Source: Pupil Level Annual School Census (PLASC), StatsWales: Pupils aged 5 and over with a first language other than English or Welsh by local authority, region and year

The issues raised when measuring the language development of bi- and multilingual children [footnote 42] are explored further in the Early language screening review. It identifies that "language-specific aspects, such as word order and specific grammatical structures" may be missed or, when evaluation is "based on what is expected within typical development", this may not be an appropriate benchmark against which to compare children with very "different linguistic and cultural experiences" (ibid., pages 21 to 22).

4.6. Future plans

A number of stakeholders highlighted future plans in each of the three main policy areas considered, which are likely to shape the landscape in the future. In particular, it was reported that:

- in health, PHW have commissioned research to look at the evidence base around an agreed number of tools, with the aim of making recommendations about how current practice could be improved. In addition, The Prosiect Pengwin research group is working on behalf of Welsh Government to develop tools and resources that will support health,

[41] The PLASC does not capture corresponding information for learners with WAL. A 2014 study estimated there were between 460 to 240 learners with WAL in Welsh medium primary schools and between 228 to 430 learners with WAL in Welsh medium secondary schools (Welsh as an additional language).
[42] Bilingual children are able to produce two languages, such as Welsh and English and multilingual children are able to produce more than two languages (Early language screening review).

education and childcare practitioners to identify and support children with or at risk of developing SLCN in the early years

- the Early Years team have identified the need to continue improving developmental pathways, including issuing Early Childhood Play Learning and care: Assessment Arrangements for 0 to 3 years in Wales. The Welsh Government is also actively exploring how data collected within SAIL could be used to inform ongoing research and evidence needs around early years programmes. It is also working to improve the quality of data collected on early years programmes and ensuring that this is entered into SAIL
- in 3 to 16 education, the Welsh Government has committed to developing a new data and-information ecosystem that “draws on a broader range of data and information to support the three functions of self-evaluation and improvement, accountability, and transparency”

5. Conclusions

5.1. What defines child development and its components?

Both the stakeholders interviewed for this study and the literature reviewed agree that child development describes the sequence of changes that occur in a child from conception to adulthood. These different changes are typically grouped into overlapping “domains” of development, such as physical, social and emotional, SLC and cognitive. These changes are understood to be the result of dynamic interactions between the child and their surrounding environment.

However, while stakeholders agreed with this high-level definition of child development, there remain differences in the emphasis placed upon different domains, the grouping of different changes into domains and the nomenclature used for domains. More fundamentally, the review also identifies a conceptual divergence in how child development is understood across policy areas in Wales; is it understood as:

- a sequence of changes that most children are expected to go through, where deviation from this norm is a cause for concern?
- a sequence of changes that differ from child to child and where, rather than a single developmental pathway that is the ‘norm’ in both the normative and also statistical sense, the diversity of pathways is regarded as natural and normal, like other forms of biological or socio-cultural diversity, rather than deficits or cause for concern?

Some frameworks and policy areas adopt a more normative model, viewing development as a predictable sequence of milestones against which children’s progress can be measured, while others adopt a more pluralistic model, recognising diverse, non-linear (and pluralistic) developmental trajectories shaped by individual, cultural, and neurodevelopmental differences.

Adjudicating between these two positions is beyond the scope of this review. Moreover, as Section 3 outlines, this may be a false choice, as these two positions can be understood as two ends of a continuum. Therefore, although there appeared to be a shift toward more pluralistic conceptions, stakeholders who contributed to this study:

- still regraded developmental norms as “reference points”
- embraced diversity in the pace and nature of developmental pathways, but did not conclude that all developmental pathways were equally desirable. Nor did they suggest that opportunities to address developmental delays or deficits in areas such as speech language and communication should be ignored

Moreover, when the perspective shifted from a focus upon an individual child to a population, and individual differences are translated into the distributions of values across the whole population, there is a strong case for measurement to identify if and how this

changes over time. This is important information that can help inform commissioning and evaluation of services.

These differing perspectives coupled with variations in measurement practice help explain why the Welsh Government does not use (or have) one definition of child development, or measure of child development, despite the importance of child development to a range of Welsh Government policies and teams.

This study also identified (but did not review) a number of measures of children's behaviours or outcomes, such as the SHRN and HAPPEN surveys. These behaviours or outcomes are linked to child development, either as factors contributing to child development, such as ACEs and parenting or well-being, are outcomes that child development contributes to, but which are not in themselves measures of child development.

5.2. The characteristics of indicators and measures of child development for 2- to 11-year-olds

Child development indicators and measures can be used for four main purposes, to:

- identify children who are not developing at the expected rate, enabling early intervention and informing decisions about the commissioning of services, by proving a better understanding of need
- measure development or "progression" over time and, for example, inform teaching and learning, (but which could also be used for evaluation)
- measure outcomes at a point in time, which can, for example, be used to help evaluate the effectiveness of policies, programmes and interventions
- explore how and why children develop, such as research exploring how early experiences shape later outcomes, including academic attainment, health, and well-being

Each purpose is important and a measure of child development can be used for more than one purpose. However, as we discuss below, a child development measure developed for one purpose may not be suitable for another and it was observed that using measures for unintended purposes can have unintended consequences. The main example given of this, was the way the use of educational assessment data which could be considered a measure of child development (albeit a narrow one), as a measure of accountability, was felt to have distorted teaching and learning. Therefore, as Section 3 outlines, Curriculum for Wales makes it clear that assessment data is not to be used for accountability, although it can be used to help inform self-evaluation.

Because form should follow function, differences in purpose (outlined above) and also in how child development is conceptualised (that is to say, in terms of norms or diversity), contribute to differences in how child development is measured. For example:

- in health, to identify children who are not developing at the expected rate, screening is carried out using standardised tools
- in early years and education settings, where formative assessments are personalised and individual to the child, with a focus upon understanding progression and meeting each child where they are, focusing upon their strengths rather than weaknesses

5.3. The importance of, and the effective use of, child development indicators and measures

As Section 3 outlines, the early years of a child are critical for children's development. They lay the foundations for children's future development and life chances, enabling children to thrive and fulfil their potential throughout their lives. The pace, extent and nature of development is shaped by the dynamic interaction between the individual child and their environment. Therefore, there are opportunities to shape the environment to support child development through, for example, support for parenting and investment in improving access to quality childcare and early education.

However, there remains the long-standing tension between:

- the ways in which (as outlined above) measurement can have unintended consequences by distorting practice, which can damage what is being measured by, for example, encouraging 'teaching to the test' and narrowing the focus to what could be easily and systematically measured, rather than what is important to or for the child, which could damage child development
- the ways in which not measuring what is important to or for the child can mean that this is neglected or deprioritised. As one stakeholder put it, "what's measured gets monitored and gets managed. And at the moment we're not measuring it and we're not managing it". More broadly, it was reported that a move away from standardised measurement of child development at system or population levels, can limit the information available to inform the planning, commissioning, monitoring and evaluation of policies and programmes [Footnote 43]. This was identified by stakeholders as a key weakness in the Welsh child development evidence eco system

The introduction of the Curriculum for Wales illustrates some of these tensions. Its introduction means that standardised data is no longer collected at a national system level and this has limited the scope to use data on components of child development generated by education settings to evaluate outcomes or undertake research at a national or system level [footnote 44]. For example, the Foundation Phase Profile was used as the basis for the Wales National Indicator on child development until discontinued in 2022, when the new

[43] Nevertheless, it is also important to note that it was reported by stakeholders that the inconsistent use of health tools limited their use to assess need or evaluate outcomes at a population or system level (demonstrating that the introduction of standardised tools may be a necessary, but not sufficient condition for evaluating need or outcomes at a population or system level).
[44] Stakeholders reported that Curriculum for Wales was not designed for child development. It includes aspects of child development, but it is a curriculum. Nevertheless, at school level, schools are still expected to evaluate outcomes for groups of learners and may, for example undertake their own research.

curriculum was rolled out. As an illustration of the impact of this, stakeholders who contributed to the study, reported anecdotal evidence suggesting that the pandemic affected what had been considered 'normal' patterns of child development. However, in the absence of measurement, it was not possible to verify if this was the case or not. Therefore, as one contributor put it, "I can't emphasise enough how problematic the loss of [Foundation Phase Profile] data is for the Early Years."

As Section 3 outlines, the changes introduced by Curriculum for Wales also illustrate the tension between using child development measures to inform continuous formative assessment of an individual child and using child development measures to systematically measure specific outcomes at a population level. As the School improvement guidance: framework for evaluation, improvement and accountability identities "While information can be used legitimately for multiple purposes[Footnote45], it is important that the way in which it is used is appropriate. In particular, the Supporting learner progression: assessment guidance is clear that "The purpose of assessment within the Curriculum for Wales is to support individual learner progression" and therefore, "Assessment should not be carried out for the purpose of accountability", although it can still be used to inform and support improvement, at the level of individuals groups and settings. This has led to changes in assessment and markedly reduced that amount of information available at a system or population level on learner progression.

These changes to assessment in education settings helps explain why, particularly for those working in the early years, there is a perceived gap in data on child development of children aged 2 to 11, despite the volume of data collected by health and education services on these children's development. These differences in how child development is measured also mean that, although child development is central to each of the three main policy areas considered by this review (the early years, health and education) there is, as one stakeholder put it, a degree of "disconnect" between policy areas.

These are not new tensions and work is underway, as a result of the introduction of Curriculum for Wales, to develop outcome measures for education (see Research exploring a new information system for schools and the Welsh Government's response), given the perceived gaps in population and system level measures. A key challenge here is that measuring child development systematically is costly and limited capacity in services makes additional data collection difficult. In contrast, when the aim is to identify if children are developing at the expected rate or not, to enable early intervention or to support each child's progression in learning, census surveys are appropriate.

[45] For example, the School improvement guidance: framework for evaluation, improvement and accountability, identities "3 main purposes for the use of information in the new system": "Improvement", "accountability" and "transparency". This sits alongside the Supporting learner progression: assessment guidance, which identifies that "Assessment has three main roles in the process of enabling learner progression": "supporting individual learners on an ongoing, day-to-day basis"; "identifying, capturing and reflecting on individual learner progress over time" and "understanding group progress in order to reflect on practice."

Stakeholders also observed that if the purpose of measuring child development is to evaluate outcomes, it is important to have a robust theoretical understanding of the outcomes that are anticipated (or expected) if a programme or intervention is effective, and which outcomes need to be measured to assess that effectiveness. This links to the discussion in Section 3 about what is child development, the role of physiological and environmental factors in shaping child development, and other types of measures, such as measures of well-being and ACEs, which are linked to, but not synonymous with child development. A robust theoretical understanding of how policy, programmes and/or interventions are expected to influence and/or interact with these different factors or outcomes is central to understanding how to evaluate them. It was observed that using existing measures or data - which might not capture the full range of expected outcomes - as outcome measures, risks creating incomplete assessments of programme effectiveness. However, here can also be risks, when evaluation only measures what is expected and therefore potentially missing unexpected outcomes.

5.4. The validity, reliability and cost effectiveness of measures

As Section 4 outlines, the diversity of child development measures and indicators makes it difficult, and in some ways unhelpful, to generalise about measures. It is also important to consider not only the measure, but also the context in which it is used, how it is used and its purpose, when considering questions such as validity, reliability and cost-effectiveness. For example, as Section 4 outlines, measures':

- validity and reliability may be strong when used with some groups or populations, but measures may not have been tested for use with other groups (such as minority groups, or groups with different languages or cultures)
- validity and reliability may be impaired by weaknesses in sampling and/or in the administration of tools
- cost-effectiveness depends upon both the cost of a measure and the use of the data it generates. For example even a very costly measure that generates data that can inform the development of programmes (which are typically much more costly than measures), increasing their effectiveness, may be considered highly cost-effective

Moreover, effectiveness can be measured in different ways (such as validity and reliability, policy usefulness, or practitioner acceptance).

Subject to these important caveats, it is clear that the strength of evidential bases underpinning different measures varies. Moreover, as Section 4 outlines, for many of the measures identified, there was little or no discussion of their validity and reliability in the literature included in this review. It is also clear that the costs of systematic data collection are considerable.

Given the costs of developing new measures and of data collection, there is a clear incentive to use existing measures and data. As Section 4 outlines, this could include developing data linking and sharing, which is seen as a potential way of generating evidence on the impact of early years programmes. However, databanks like SAIL (that

enable data linking) only enable the linking of data that is uploaded to the databank. If child development is not being systematically measured (or the data generated by measurement is not uploaded), data linking cannot magically fill gaps, where there is no data to link to.

If gaps cannot be filled through linkage of existing administrative and/or research data, it may be necessary to collect new data on child development. In relation to this, the review identifies that, given the diversity of child development measures and indicators, when selecting a particular measure, it is important to first identify the concept of child development and the purpose of the measurement. It is then important to identify the characteristics of measures that are required for that concept and the purpose of measurement. There are additional practical questions, such as the characteristics of the children to be measured (for example, in terms of language and age) that need consideration before decisions about which existing measures and data should be used, and/or whether new data tools and measures are needed.

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Bronfenbrenner U (1979), ‘The Ecology of Human Development: Experiments by Nature and Design’, Cambridge, MA: Harvard University Press

Thompson, R. A., and Lagattuta, K. H. (2006). *Feeling and understanding: Early emotional development.* In W. Damon & R. M. Lerner (Eds.), Handbook of Child Psychology (6th ed., Vol. 3: Social, Emotional, and Personality Development) (pp. 317–352). Wiley.

Annex A. List of tools and indicators included in the review

Tool

Achenbach's Youth, Young Adult, and Adult Self-Reports

Source(s)

Causadias J, Salvatore J, Sroufe L (2015), 'Early patterns of self-regulation as risk and promotive factors in development: A longitudinal study from childhood to adulthood in a high-risk sample', International Journal of Behavioral Development

Tool

Adaptive Behavior Assessment System–Second Edition (ABAS-II)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), 'Evaluating the Adequacy of Social-Emotional Measures in Early Childhood', Journal of Psychoeducational Assessment

Tool

Ages & Stages Questionnaires, Third Edition (ASQ-3)

Source(s)

Bedford H, Walton S, Ahn J (2013), 'Measures of Child Development: A review', UCL Institute of Child Health

Bonin E, Matosevic T, Beecham J (2016), 'Developing an early years Outcomes Framework using area-level routine data', Big Lottery funded

Bruce M, Salva J, Bell M (2023), 'From terrible twos to sassy sixes: The development of vocabulary and executive functioning across early childhood', Developmental Science, Wiley

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), 'Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures', retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Office for Health Improvement and Disparities (2021), 'Child development outcomes at 2 to 2½ years (Experimental Statistics)', Office for Health Improvement and Disparities.

Office for Health Improvement and Disparities (2025), 'Child development outcomes at 2 to 2 and a half years, 2023 to 2024: statistical commentary, Official Statistics'

Public Health England (2015), 'Feasibility study: developing the capability for population surveillance using indicators of child development outcomes aged 2 to 2 and a half years', Public Health England

Tinajero A R, Loizillon A (2012), ‘The Review of Care, Education and Child Development Indicators in Early Childhood’, Environmental Research and Public Health

Tool

AGES & STAGES QUESTIONNAIRES: SOCIAL-EMOTIONAL (ASQ:SE)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), ‘Measuring child development at the 2-2½ year health and development review’, National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

ALLITERATION 2.0

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

ALPHABET KNOWLEDGE (SOUND IDENTIFICATION)

Source(s)

McConnell S, Wackerle-Hollman K, Roloff T, Rodriguez M (2015), ‘Designing a Measurement Framework for Response to Intervention in Early Childhood Programs’, Journal of Early Intervention.

Tool

ANTHROPOMETRIC INDICATORS

Source(s)

Australian Institute of Health and Welfare (2011), ‘National outcome measures for early child development: Development of an indicator-based reporting framework’, Australian Institute of Health and Welfare

Bonin E, Matosevic T, Beecham J (2016), ‘Developing an early years Outcomes Framework using area-level routine data’, Big Lottery funded

Causadias J, Salvatore J, Sroufe L (2015), ‘Early patterns of self-regulation as risk and promotive factors in development: A longitudinal study from childhood to adulthood in a high-risk sample’, International Journal of Behavioral Development

Peacock S, Konrad S, Watson E, Nickel D, Muhajarine N (2013), ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health

van Ekris E, Altenburg T M Singh A S, Proper K I, Heymans M W, Chinapaw M J (2016), ‘An evidence-update on the prospective relationship between childhood sedentary behaviour and biomedical health indicators: a systematic review and meta-analysis’, Obesity Reviews, 17(9), pages 833 to 849

Tool

ARNETT CAREGIVER INTERACTION SCALE

Source(s)

Gordon R A, Fujimoto K, Kaestner R, Korenman S, Abner K (2013), ‘An assessment of the validity of the ECERS-R with implications for measures of child care quality and relations to child development’, Developmental Psychology, 49(1), page 146

Tool

ARS- LANGUAGE LITERACY

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcome’, PLOS One, 11(12), Article e0167660

Tool

BRIEF INFANT TODDLER SOCIAL-EMOTIONAL ASSESSMENT (BITSEA)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Jeong J, Franchett E E, Oliveira C V, Rehmani K, Yousafzai A (2021), ‘Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis’, PLOS Medicine

Tool

ASSESSMENT PROFILE FOR EARLY CHILDHOOD PROGRAMS (APECP)

Source(s)

Ishimine K, Tayler C (2014), ‘Assessing quality in early childhood education and care’, European Journal of Education, 49(2), pages 272 to 290

Tool

ATTENTION NETWORK TEST

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

AUSTRALIAN EARLY DEVELOPMENT INDEX

Source(s)

Australian Institute of Health and Welfare (2011), ‘National outcome measures for early child development: Development of an indicator-based reporting framework’, Australian Institute of Health and Welfare

Sims M, Brettig K (2018), ‘Early childhood education and early child development: Do the differences matter?’, Power and Education

Tool

BATTELLE DEVELOPMENTAL INVENTORY

Source(s)

Bedford H, Walton S, Ahn J (2013), ‘Measures of Child Development: A review’, UCL Institute of Child Health

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

BAYLEY SCALES OF INFANT AND TODDLER DEVELOPMENT

Source(s)

Bedford H, Walton S, Ahn J (2013), ‘Measures of Child Development: A review’, UCL Institute of Child Health

Peacock S, Konrad S, Watson E, Nickel D, Muhajarine N (2013), ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health

Tool

BAYLEY SHORT FORM–RESEARCH EDITION (BSF-R) MENTAL SCALE

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

BEDTIME ROUTINES QUESTIONNAIRE (BRQ)

Source(s)

Selman S, Dilworth-Bart J (2023), ‘Routines and child development: A systematic review’, Journal of Family Theory and Review

Tool

BEHAVIOR ASSESSMENT SYSTEM FOR CHILDREN–SECOND EDITION (BASC-2)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Tool

BEHAVIOURAL STRATEGY RATING SCALE

Source(s)

Kilkas E, Tang X (2018), ‘Child-perceived teacher emotional support, its relations with teaching practices, and task persistence’, Springer

Tool

BIOLOGICAL MEASURES (STRESS HORMONES, GENETIC AND EPIGENETIC MARKERS)

Source(s)

Shonkoff J (2010), ‘Building a New Biodevelopmental Framework to Guide the Future of Early Childhood Policy’, Child Development

Tool

BRIGANCE EARLY CHILDHOOD SCREENS

Source(s)

Bedford H, Walton S, Ahn J (2013), ‘Measures of Child Development: A review’, UCL Institute of Child Health

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

BRITISH ABILITY SCALES

Source(s)

Melhuish E, Gardiner J (2021), ‘Study of Early Education and Development (SEED): Developing alternative quality scales for Early Childhood Education and Care (ECEC) using exploratory analysis’, Research Brief, Department for Education Website

Tool

CALIFORNIA CHILD Q-SET (CCQ)

Source(s)

Causadias J, Salvatore J, Sroufe L (2015), ‘Early patterns of self-regulation as risk and promotive factors in development: A longitudinal study from childhood to adulthood in a high-risk sample’, International Journal of Behavioral Development

Tool

CAMBRIDGE NEUROPSYCHOLOGICAL TEST BATTERY

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

CARDIOMETABOLIC BIOMARKERS

Source(s)

van Ekris E, Altenburg T M, Singh A S, Proper K I, Heymans M W, Chinapaw M J (2016), An evidence-update on the prospective relationship between childhood sedentary behaviour and biomedical health indicators: a systematic review and meta-analysis’, Obesity Reviews, 17(9), pages 833 to 849

Tool

CAREGIVER INTERACTION SCALE: CIS

Source(s)

Ishimine K, Tayler C (2014), ‘Assessing quality in early childhood education and car’, European Journal of Education, 49(2), pages 272 to 290

Tool

CAREGIVER REPORTED EARLY DEVELOPMENT INSTRUMENTS (CREDI)

Source(s)

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), ‘Measuring child development at the 2-2½ year health and development review’, National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

CAS MATCHING NUMBERS SUBTEST

Source(s)

Johnson G M (2010), ‘Internet use and child development: Validation of the ecological techno-subsystem’, Journal of Educational Technology & Society, 13(1), pages176 to 185

Tool

CAS NONVERBAL MATRICES SUBTEST

Source(s)

Johnson G M (2010), ‘Internet use and child development: Validation of the ecological techno-subsystem’, Journal of Educational Technology & Society, 13(1), pages176 to 185

Tool

CAS WORD SERIES SUBTEST

Source(s)

Johnson G M (2010), ‘Internet use and child development: Validation of the ecological techno-subsystem’, Journal of Educational Technology & Society, 13(1), pages176 to 185

Tool

CHILD BEHAVIOUR CHECKLIST

Source(s)

Black M, Barnes A, Strong M, Brook A, Ray A, Holden B, Foster C, Taylor-Robinson D (2021), ‘Early patterns of self-regulation as risk and promotive factors in development: A

longitudinal study from childhood to adulthood in a high-risk sample', Environmental Research and Public Health

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), 'Evaluating the Adequacy of Social-Emotional Measures in Early Childhood', Journal of Psychoeducational Assessment

Jeong J, Franchett E E, Oliveira C V, Rehmani K, Yousafzai A (2021), 'Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis', PLOS Medicine

Tool

CHILD CAREGIVER INTERACTION SCALE (CCIS)

Source(s)

Ishimine K, Tayler C (2014), 'Assessing quality in early childhood education and care', European Journal of Education, 49(2), pages 272 to 290

Tool

CHILD DEVELOPMENT INVENTORY

Source(s)

Bedford H, Walton S, Ahn J (2013), 'Measures of Child Development: A review', UCL Institute of Child Health

Yang S, Said M, Peyre H, Ramus F Taine M, Law E, Dufourg M, Heude B, Charles M, Bernard J (2023), 'Associations of screen use with cognitive development in early childhood: the ELFE birth cohort', Journal of Child Psychology and Psychiatry

Tool

CHILD DEVELOPMENT REVIEW (CDR)

Source(s)

Bedford H, Walton S, Ahn J (2013), 'Measures of Child Development: A review', UCL Institute of Child Health

Tool

CHILD ROUTINES INVENTORY (CRI)

Source(s)

Selman S, Dilworth-Bart J (2023), 'Routines and child development: A systematic review', Journal of Family Theory and Review

Tool

CHILD ROUTINES QUESTIONNAIRE (CRQ/CRQ-P)

Source(s)

Selman S, Dilworth-Bart J (2023), ‘Routines and child development: A systematic review’, Journal of Family Theory and Review

Tool

CHILDREN’S SOCIAL BEHAVIOUR QUESTIONNAIRE COMPLETED BY TEACHERS.

Source(s)

Melhuish E, Gardiner J (2020), ‘Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age five years’, Research Report. Department for Education

Tool

CLASSROOM ASSESSMENT SCORING SYSTEM (CLASS)

Source(s)

Ishimine K, Tayler C (2010), ‘Assessing quality in early childhood education and care’, European Journal of Education, 49(2), pages 272 to 290

Melhuish E, Ereky-Stevens K, Petrogiannis K, Ariescu A, Penderi E, Rentzou K, Tawell A, Slot P, Broekhuizen M, Leseman P (2015), ‘A review of research on the effects of Early Childhood Education and Care (ECEC) upon child development’, European Commission

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

CLASSROOM PRACTICES INVENTORY (CPI)

Source(s)

Ishimine K, Tayler C (2014), ‘Assessing quality in early childhood education and care’, European Journal of Education, 49(2), pages 272 to 290

Tool

CLINICAL EVALUATION OF LANGUAGE FUNDAMENTALS, PRESCHOOL – SECOND EDITION (CELF-P2)

Source(s)

Masso S, Campell E, Faulkner H, Britton A (2022), ‘Evaluating resources required to evaluate child outcomes following indirect services in early childhood education centres: A scoping review’, Health Promotion Journal of Australia

Tool

COGNITIVE ASSESSMENT SYSTEM

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), 'Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review', BioMed Research International

Tool

COMPREHENSION (WHICH ONE DOESN'T BELONG?)

Source(s)

McConnell S, Wackerle-Hollman K, Roloff T, Rodriguez M (2015), 'Designing a Measurement Framework for Response to Intervention in Early Childhood Programs', Journal of Early Intervention

Tool

CONNERS' PARENT RATING SCALE

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), 'Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review', BioMed Research International

Tool

DEFINITIONAL VOCABULARY WITH PICTURES (DVWP)

Source(s)

Bradfield T, Besner A, Wackerle-Hollman A, Albano A, Rodriguez M, McConnell S (2013), 'Redefining Individual Growth and Development Indicators: Oral Language, Assessment for Effective Intervention'

Tool

DENVER II

Source(s)

Bedford H, Walton S, Ahn J (2013), 'Measures of Child Development: A review', UCL Institute of Child Health

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), 'Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures', retrieved from Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

DEVELOPMENTAL INDICATORS FOR THE ASSESSMENT OF LEARNING-3RD

Source(s)

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), 'Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures', Retrieved from Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

EARLY CHILDHOOD CLASSROOM OBSERVATION MEASURE (ECCOM)

Source(s)

Ishimine K, Tayler C (2014), 'Assessing quality in early childhood education and care', European Journal of Education, 49(2), pages 272 to 290

Kilkas E, Tang X (2018), 'Child-perceived teacher emotional support, its relations with teaching practices, and task persistence', Springer

Tool

EARLY CHILDHOOD ENVIRONMENT RATING SCALE – EXTENDED

Source(s)

Melhuish E, Gardiner J (2021), 'Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age seven years', Department for Education

Tool

EARLY CHILDHOOD ENVIRONMENT RATING SCALE – REVISED (ECERS-R)

Source(s)

Gordon R A, Fujimoto K, Kaestner R, Korenman S, Abner K (2013), 'An assessment of the validity of the ECERS-R with implications for measures of child care quality and relations to child development', Developmental Psychology, 49(1), page 146

Ishimine K, Tayler C (2014), 'Assessing quality in early childhood education and care', European Journal of Education, 49(2), pages 272 to 290

Marshall N, Robeson W, Roberts J (2020), 'Integrating Intervention Approaches: Development and Initial Testing of an Early Childhood Education Intervention', Journal of Applied Social Science

Melhuish E, Ereky-Stevens K, Petrogiannis K, Ariescu A, Penderi E, Rentzou K, Tawell A, Slot P, Broekhuizen M, Leseman P (2015), 'A review of research on the effects of Early Childhood Education and Care (ECEC) upon child development', European Commission

Melhuish E, Gardiner J (2021), ‘Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age seven years’, Department for Education

Tool

EARLY DEVELOPMENT INSTRUMENT

Source(s)

Tinajero A R, Loizillon A (2012), ‘The Review of Care, Education and Child Development Indicators in Early Childhood’, Environmental Research and Public Health

Tool

EARLY SCREENING INVENTORY-REVISED (ESI-R)

Source(s)

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

ECLS-B MATHEMATICS

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

EMERGING ACADEMIC SNAPSHOT (EAS)

Source(s)

Ishimine K, Tayler C (2014), ‘Assessing quality in early childhood education and care’, European Journal of Education, 49(2), pages 272 to 290

Tool

EXPRESSIVE ONE WORD PICTURE VOCABULARY TEST

Source(s)

Dowdall N, Melendez-Torres J, Hartford L, Gardner F, Cooper P (2019), ‘Shared Picture Book Reading Interventions for Child Language Development: A Systematic Review and Meta-Analysis’, Child Development

Peacock S, Konrad S, Watson E, Nickel D, Muhajarine N (2013), ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health

Tool

EYFSP

Source(s)

Parvin A (2025), ‘Comparative analysis of Child Development Approaches Across Different Education Systems Globally’, Journal of Humanities and Social Sciences Studies

Tool

FAMILY AND CHILD EXPERIENCES (FACES)

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

FAMILY RITUALS QUESTIONNAIRE (FRQ)

Source(s)

Selman S, Dilworth-Bart J (2023), ‘Routines and child development: A systematic review’, Journal of Family Theory and Review

Tool

FAMILY ROUTINES INVENTORY (FRI)

Source(s)

Selman S, Dilworth-Bart J (2023), ‘Routines and child development: A systematic review’, Journal of Family Theory and Review

Tool

FAMILY TIME AND ROUTINES INDEX (FTRI)

Source(s)

Selman S, Dilworth-Bart J (2023), ‘Routines and child development: A systematic review’, Journal of Family Theory and Review

Tool

FITNESS INDICATORS: CARDIORESPIRATORY FITNESS (E.G., CRF AND VO_2 MAX), MUSCULAR STRENGTH (PUSH UP, CURL UP, SLJ)

Source(s)

van Ekris E, Altenburg T M, Singh A S, Proper K I, Heymans M W, Chinapaw M J (2016), ‘An evidence-update on the prospective relationship between childhood sedentary behaviour and biomedical health indicators: a systematic review and meta-analysis’, Obesity reviews, 17(9), pages 833 to 849

Tool

FREE-RECALL AND CUED RECALL TESTS

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

GALILEO PRE-K ONLINE SYSTEM FOR THE ELECTRONIC MANAGEMENT OF LEARNING

Source(s)

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

GLOBAL ADJUSTMENT INTERVIEWS

Source(s)

Causadias J, Salvatore J, Sroufe L (2015), ‘Early patterns of self-regulation as risk and promotive factors in development: A longitudinal study from childhood to adulthood in a high-risk sample’, International Journal of Behavioral Development

Tool

GLOBAL SCALES FOR EARLY DEVELOPMENT (GSED)

Source(s)

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), ‘Measuring child development at the 2-2½ year health and development review’, National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

GREENSPAN SOCIAL-EMOTIONAL GROWTH CHART (GREENSPAN)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Tool

GRIFFITHS MENTAL DEVELOPMENT SCALES

Source(s)

Bedford H, Walton S, Ahn J (2013), ‘Measures of Child Development: A review’, UCL Institute of Child Health

Peacock S, Konrad S, Watson E, Nickel D, Muhajarine N (2013), ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health

Tool

GROSS MOTOR FUNCTION MEASURE

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

GUIDE FOR MONITORING CHILD DEVELOPMENT

Source(s)

Tinajero A R, Loizillon A (2012), ‘The Review of Care, Education and Child Development Indicators in Early Childhood’, Environmental Research and Public Health

Tool

HIGH/SCOPE PRESCHOOL CHILD OBSERVATION RECORD (COR)

Source(s)

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT (HOME)

Source(s)

Farah M, Hackman D (2012), ‘Social Economic Status, Childhood Experience, and the Neural Bases of Cognition’, The Oxford Handbook of Poverty and Child Development

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

HOME-IT

Source(s)

Jeong J, Franchett E E, Oliveira C, Rehmani K, Yousafzai A (2021), ‘Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis’, PLOS Medicine

Tool

IDENTIFYING LETTERS

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

IMMUNISATION STATUS.

Source(s)

Peacock S, Konrad S, Watson E, Nickel D Muhajarine N (2013, ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health

Tool

INDICATORS OF INFANT AND YOUNG CHILD DEVELOPMENT (IYCD)

Source(s)

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), ‘Measuring child development at the 2-2½ year health and development review’, National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

INDIVIDUAL GROWTH AND DEVELOPMENT INDICATORS

Source(s)

McConnell S, Wackerle-Hollman K, Roloff T, Rodriguez M (2015), ‘Designing a Measurement Framework for Response to Intervention in Early Childhood Programs’, Journal of Early Intervention

Bradfield T, Besner A, Wackerle-Hollman A, Albano A, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Oral Language, Assessment for Effective Intervention’

Tool

INFANT AND TODDLER ENVIRONMENT RATING SCALE (ITERS-R)

Source(s)

Marshall N, Robeson W, Roberts J (2020), ‘Integrating Intervention Approaches: Development and Initial Testing of an Early Childhood Education Intervention’, Journal of Applied Social Science

Melhuish E, Gardiner J (2021), ‘Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age seven years’, Department for Education

Tool

INFANT TODDLER SOCIAL-EMOTIONAL ASSESSMENT (ITSEA)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee, C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Tool

INTELLIGENCE AND DEVELOPMENT SCALES

Source(s)

Zeng N, Ayyub M, Sun, H, Wen, X, Xiang, P and Gao, Z (2017) ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’. BioMed Research International

Tool

KAUFMAN ASSESSMENT BATTERY

Source(s)

Sastry, N (2012) ‘Neighbourhood Effects on Children's Achievement: A Review of Recent Research’. The Oxford Handbook of Poverty and Child Development

Tool

KEY STAGE 1 ASSESSMENTS

Source(s)

Bonin, E, Matosevic, T and Beecham, J (2016) ‘Developing an early years Outcomes Framework using area-level routine data’. Big Lottery funded

Melhuish, E, and Gardiner, J (2021) ‘Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age seven years’ Department for Education.

Tool

KNOWLEDGE OF CHILD DEVELOPMENT INVENTORY (KCDI)

Source(s)

Beisly, A and Lake, V (2020) ‘Knowledge of child development: Associations among pre-service teachers’ level of education and work experience’. Journal of Early Childhood Research

Tool

KONZENTRATIONS-HANDLUNGSVERFAHREN FÜR VORSCHULKINDER

Source(s)

Zeng, N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

LEARNING ACCOMPLISHMENT PROFILE-3RD EDITION (LAP-3)

Source(s)

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, Retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

LEARNING ACCOMPLISHMENT PROFILE-DIAGNOSTIC SCREENS (LAP-D SCREENS)

Source(s)

Halle T, Zaslow M, Wessel, J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, Retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

LEUVEN INVOLVEMENT SCALE FOR YOUNG CHILDREN (LIS-YC)

Source(s)

Ishimine K, Tayler C (2014), Assessing quality in early childhood education and care. European Journal of Education, 49(2), pages 272 to 290

Tool

MACARTHUR–BATES COMMUNICATIVE DEVELOPMENT INVENTORIES CDI

Source(s)

Dowdall N, Melendez-Torres J, Hartford L, Gardner F, Cooper P (2019), ‘Shared Picture Book Reading Interventions for Child Language Development: A Systematic Review and Meta-Analysis’, Child Development

Jeong J, Franchett E E, Oliveira C, Rehmani K, Yousafzai A (2021), ‘Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis’, PLOS Medicine

Masso S, Campell E, Faulkner H, Britton A (2022), ‘Evaluating resources required to evaluate child outcomes following indirect services in early childhood education centres: A scoping review’, Health Promotion Journal of Australia

Yang S, Said M, Peyre H, Ramus F Taine M, Law E, Dufourg M, Heude B, Charles M, Bernard J (2023), ‘Associations of screen use with cognitive development in early childhood: the ELFE birth cohort’, Journal of Child Psychology and Psychiatry

Tool

MOTOR FITNESS TESTS

Source(s)

Dankiw K, Tsiros M, Baldock K, Kumar S (2020), ‘The impacts of unstructured nature play on health in early child development: A systematic review’, PLOs One

Tool

MOTOR INSTRUCTIONS (MI)

Source(s)

Bradfield T, Besner A, Wackerle-Hollman A, Albano A, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Oral Language, Assessment for Effective Intervention’

Tool

MOVEMENT ASSESSMENT BATTERY FOR CHILDREN AND THE TEST OF GROSS MOTOR DEVELOPMENT

Source(s)

Kuzik N, Poitras V, Tremblay M, Lee E, Hunter S, Carson V (2017), ‘Systematic review of the relationships between combinations of movement behaviours and health indicators in the early years (0-4 years)’, BMC Public Health

Tool

MULLEN SCALES OF EARLY LEARNING (MSEL)

Source(s)

Bedford, H, Walton, S and Ahn, J (2013) ‘Measures of Child Development: A review’. UCL Institute of Child Health

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), ‘Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures’, Retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

NURSING CHILD ASSESSMENT TEACHING SCALE (NCATS)

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

OBSERVATION RECORD OF THE CAREGIVING ENVIRONMENT (ORCE)

Source(s)

Ishimine K, Tayler C (2014), ‘Assessing quality in early childhood education and care’, European Journal of Education, 49(2), pages 272 to 290

Tool

OBSERVATIONAL ASSESSMENTS

Source(s)

Jeong J, Franchett E E, Oliveira C, Rehmani K, Yousafzai A (2021), ‘Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis’, PLOS Medicine

Shonkoff J (2010), ‘Building a New Biodevelopmental Framework to Guide the Future of Early Childhood Policy’, Child Development

Tool

ORAL EXPRESSION ON SCALE

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the

classroom assessment scoring system) in early childhood education and care settings and child outcomes', PLOS One, 11(12), Article e0167660

Tool

ORAL HEALTH SURVEY

Source(s)

Bonin E, Matosevic T, Beecham J (2016), 'Developing an early years Outcomes Framework using area-level routine data', Big Lottery funded

Tool

ORAL LANGUAGE DEVELOPMENT (PICTURE NAMING)

Source(s)

McConnell S, Wackerle-Hollman K, Roloff T, Rodriguez M (2015), 'Designing a Measurement Framework for Response to Intervention in Early Childhood Programs', Journal of Early Intervention

Tool

PARENT-REPORT QUESTIONNAIRES

Source(s)

Kuzik N, Poitras V, Tremblay M, Lee E, Hunter S, Carson V (2017), 'Systematic review of the relationships between combinations of movement behaviours and health indicators in the early years (0-4 years)', BMC Public Health

Tool

PARENTS' EVALUATION OF DEVELOPMENTAL STATUS- DEVELOPMENTAL MILESTONES (PEDS:DM)

Source(s)

Bedford H, Walton S, Ahn J (2013), 'Measures of Child Development: A review', UCL Institute of Child Health

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), 'Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures', Retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), 'Measuring child development at the 2-2½ year health and development review', National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

PARENTS' EVALUATION OF DEVELOPMENTAL STATUS – REVISED (PEDS-R)

Source(s)

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), 'Measuring child development at the 2-2½ year health and development review', National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

PARENTS' EVALUATION OF DEVELOPMENTAL STATUS (PEDS)

Source(s)

Bedford H, Walton S, Ahn J (2013), 'Measures of Child Development: A review', UCL Institute of Child Health

Halle T, Zaslow M, Wessel J, Moodie S, Darling-Churchill K (2011), 'Understanding and choosing assessments and developmental screeners for young children: Profiles of selected measures,' Retrieved from Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services

Tool

PEABODY DEVELOPMENTAL MOTOR SCALES – SECOND EDITION

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), 'Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review', BioMed Research International

Tool

PEABODY PICTURE VOCABULARY TEST

Source(s)

Black M, Barnes A, Strong M, Brook A, Ray A, Holden B, Foster C, Taylor-Robinson D (2021), 'Early patterns of self-regulation as risk and promotive factors in development: A longitudinal study from childhood to adulthood in a high-risk sample', Environmental Research and Public Health

Dowdall N, Melendez-Torres J, Hartford L, Gardner F, Cooper P (2019), 'Shared Picture Book Reading Interventions for Child Language Development: A Systematic Review and Meta-Analysis', Child Development

Gordon R A, Fujimoto K, Kaestner R, Korenman S, Abner K (2013), 'An assessment of the validity of the ECERS-R with implications for measures of child care quality and relations to child development', Developmental Psychology, 49(1), page146

Masso S, Campell E, Faulkner H, Britton A (2022), ‘Evaluating resources required to evaluate child outcomes following indirect services in early childhood education centres: A scoping review’, Health Promotion Journal of Australia

Peacock S, Konrad S, Watson E, Nickel D, Muhajarine N (2013), ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes,’ PLOS One, 11(12), Article e0167660

Tool

PENCIL TAP TASK

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes,’ PLOS One, 11(12), Article e0167660

Tool

PHONICS SCREENING CHECK (YEAR 1)

Source(s)

Melhuish E, Gardiner J (2021), ‘Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age seven years’, Department for Education

Tool

PHONOLOGICAL AWARENESS (RHYMING AND ALLITERATION

Source(s)

McConnell S, Wackerle-Hollman K, Roloff T, Rodriguez M (2015), ‘Designing a Measurement Framework for Response to Intervention in Early Childhood Programs’, Journal of Early Intervention

Tool

PICTURE NAMING (PN)

Source(s)

Bradfield T, Besner A, Wackerle-Hollman A, Albano A, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Oral Language, Assessment for Effective Intervention’

Tool

PICTURE SIMILARITIES SUBTEST

Source(s)

Yang S, Said M, Peyre H, Ramus F Taine M, Law E, Dufourg M, Heude B, Charles M, Bernard J (2023), ‘Associations of screen use with cognitive development in early childhood: the ELFE birth cohort’, Journal of Child Psychology and Psychiatry

Tool

POINT-TO-PICTURE (PTP)

Source(s)

Bradfield T, Besner A, Wackerle-Hollman A, Albano A, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Oral Language, Assessment for Effective Intervention’

Tool

PREFIT BATTERY

Source(s)

Kuzik N, Poitras V, Tremblay M, Lee E, Hunter S, Carson V (2017), ‘Systematic review of the relationships between combinations of movement behaviours and health indicators in the early years (0-4 years)’, BMC Public Health

Tool

PRESCHOOL AND KINDERGARTEN BEHAVIOUR SCALES (PKBS-2).

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development,’ Infant and Child Development, 30(6), Article e2267

Tool

PRESCHOOL EARLY LITERACY INDICATORS (PELI)

Source(s)

Kaminski R, Abbott M, Aguayo K, Latimer R, Good, R (2014), ‘The Preschool Early Literacy Indicators: Validity and Benchmark Goals’, Topics in Early Childhood Special Education

Tool

PRESCHOOL LANGUAGE ASSESSMENT SCALES

Source(s)

Gordon R A, Fujimoto K, Kaestner R, Korenman S, Abner K (2013), ‘An assessment of the validity of the ECERS-R with implications for measures of child care quality and relations to child development,’ Developmental Psychology, 49(1), page 146

Tool

PROGRAM QUALITY ASSESSMENT (PQA PRESCHOOL VERSION)

Source(s)

Ishimine K, Tayler, C (2014), ‘Assessing quality in early childhood education and care,’ European Journal of Education, 49(2), pages 272 to 290

Tool

RASCH MODELLING

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

RECEPTIVE/EXPRESSIVE EMERGENT LANGUAGE SCALE

Source(s)

Peacock S, Konrad S, Watson E, Nickel D, Muhajarine, N (2013), ‘Effectiveness of home visiting programs on child outcomes: a systematic review’, BMC Public Health.

Tool

RHYMING 2.0

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

SCALES OF INDEPENDENT BEHAVIOR–REVISED (SIB-R)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Tool

SCHEDULE OF GROWING SKILLS (SOGS-II)

Source(s)

Bedford H, Walton S, Ahn J (2013), ‘Measures of Child Development: A review’, UCL Institute of Child Health

Tool

SOCIAL SKILLS AND POSITIVE APPROACHES TO LEARNING SCALE

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

SOCIAL SKILLS RATING SYSTEM (SSRS)

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

SOUND BLENDING

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

SSRS/SSIS

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcome’, PLOS One, 11(12), Article e0167660

Tool

STRANGE SITUATION

Source(s)

Jeong J, Franchett E E, Oliveira C, Rehmani K, Yousafzai A (2021), ‘Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis’, PLOS Medicine

Tool

STRENGTHS AND DIFFICULTIES QUESTIONNAIRE

Source(s)

Black M, Barnes A, Strong M, Brook A, Ray A, Holden B, Foster C, Taylor-Robinson D (2021), ‘Early patterns of self-regulation as risk and promotive factors in development: A longitudinal study from childhood to adulthood in a high-risk sample’, Environmental Research and Public Health

Tool

STRUCTURAL MRI, FUNCTIONAL MRI, EEG, AND ERP RECORDINGS

Source(s)

Farah M, Hackman D (2012), ‘Social Economic Status, Childhood Experience, and the Neural Bases of Cognition’, The Oxford Handbook of Poverty and Child Development

Tool

SUSTAINED SHARED THINKING AND EMOTIONAL WELL-BEING

Source(s)

Melhuish E, Gardiner J (2021), ‘Study of Early Education and Development (SEED): Impact Study on Early Education Use and Child Outcomes up to age seven years’, Department for Education

Tool

SYLLABLE SEGMENTATION

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

TCRS

Source(s)

Perlman M, Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

TEACHER INTERACTION AND LANGUAGE RATING SCALE

Source(s)

Scarinci N, Rose T, Pee J, Webb K (2014), ‘Impacts of an in-service education program on promoting language development in young children: A pilot study with early childhood educators’, Child Language Teaching and Therapy

Tool

TEST OF GROSS MOTOR DEVELOPMENT – SECOND EDITION

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

TOPEL PHONOLOGICAL AWARENESS

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

TWO BAGS TASK (TBT)

Source(s)

Ramanathan S, Balasubramanian N, Faraone S V (2021), ‘Association between transient financial stress during early childhood and pre-school cognitive and socioemotional development’, Infant and Child Development, 30(6), Article e2267

Tool

VINELAND ADAPTIVE BEHAVIOR SCALES–SECOND EDITION (VINELAND-II)

Source(s)

Gokiert R, Georgis R, Tremblay M, Krishnan V, Vandenberghe C, Lee C (2014), ‘Evaluating the Adequacy of Social-Emotional Measures in Early Childhood’, Journal of Psychoeducational Assessment

Tool

WARNER INITIAL DEVELOPMENTAL EVALUATION OF ADAPTIVE & FUNCTIONAL SKILLS (WIDEA-FS)

Source(s)

Lysons J, Pineda R M, Alarcon G, Aquino M R J, Cann H, Fearon P, Kendall S, Kirman J, Woodman J (2024), ‘Measuring child development at the 2-2½ year health and development review’, National Institute for Health and Care Research (NIHR) Child and Family Policy Research Unit

Tool

WILSON’S CONSTRUCT-MAPPING

Source(s)

Wackerle-Hollman A, Schmitt B, Bradfield T, Rodriguez M, McConnell S (2013), ‘Redefining Individual Growth and Development Indicators: Phonological Awareness’, Journal of Learning Disabilities

Tool

WISC-IV VOCABULARY SUBTEST

Source(s)

Johnson G M (2010), ‘Internet use and child development: Validation of the ecological techno-subsystem’, Journal of Educational Technology & Society, 13(1), pages 176 to185

Tool

WJ- APPLIED PROBLEMS

Source(s)

Perlman M., Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

WJ LETTER WORD ID

Source(s)

Perlman M., Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

WJ RHYMING

Source(s)

Perlman M., Falenchuk O, Fletcher B, McMullen E, Beyene J, Shah P S (2016), ‘A systematic review and meta-analysis of a measure of staff/child interaction quality (the classroom assessment scoring system) in early childhood education and care settings and child outcomes’, PLOS One, 11(12), Article e0167660

Tool

WOODCOCK-JOHNSON ASSESSMENTS

Source(s)

Sastry N (2012), ‘Neighbourhood Effects on Children's Achievement: A Review of Recent Research’, The Oxford Handbook of Poverty and Child Development

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Tool

ZURICH NEUROMOTOR ASSESSMENT; KÖRPERKOORDINATIONSTEST FÜR KINDER

Source(s)

Zeng N, Ayyub M, Sun H, Wen X, Xiang P, Gao Z (2017), ‘Effects of Physical Activity on Motor Skills and Cognitive Development in Early Childhood: A Systematic Review’, BioMed Research International

Annex B. Interview schedule: Scoping review of child development indicators and measures used for 2–11-year-olds

Notes for the Interviewer

Interviews will, for example, be used to identify relevant policy documents to be included in the desk-based review (rather than relying just upon searches to identify policy documents). The interviews and desk-based review will be used to:

- identify indicators and measures used in public services and public policy in Wales and how they are used (including 'unintended consequences')
- identify and document:
  - (a) definitions of child development used in Wales (including the components that make up child development
  - (b) instruments, measures and indicators used to assess child development of 2- to 11-year-olds
- gather data on these child development indicators uses (for example, for evaluation), validity and reliability, costs, challenges, potential biases, risks and constraints (including unintended consequences)

Introduction

The Welsh Government have commissioned People and Work to undertake a scoping review of child development indicators and measures used for 2- to 11-year-olds. As part of this research we are very keen to speak to you to develop and expand our understanding of child development and child development measures and indicators in relation to your policy area.

We will use the interviews to help us write reports for the Welsh Government, which will be published as Government Social Research reports. The reports will not identify you by name. If there is anything particularly sensitive that you want us to treat as 'off the record' which informs our understanding, but which will not be included in reports, please let me know.

[Provide plain language information sheet if not already provided]

Are you happy to take part in the review?

Do you have any questions?

[Ensure that they understand that participation is voluntary, that they can ask questions and they consent to take part]

Opening

To start, please could you tell me a little bit about your role and how it relates to child development?

Defining Child Development (CD)

There are different definitions of child development. It can for example include the 'sequence of physical, sensory, language, cognitive, emotional and behavioural changes that occur in a child' from conception to adulthood. In your own words, please could you describe what 'child development' means in your policy area?

What are the most important domains of child development, such as physical, sensory, language, cognitive, emotional and behavioural changes, in relation to your policy area?

What are the least important domains in relation to your policy area?

Is there a definition or definitions of child development that is used in your policy area, for example, in policy documents or evaluations of policy?

[If yes and not specified] can you please provide details [Name/title etc]
[If yes] has this definition changed at all in the last 10 years? why?

Policy and child development

Which child development domains (for example, physical, cognitive, language, social, and emotional), do the policies or programmes in the area you work in contribute to?

(a) [If time] how?
(b) Are there any policy documents, research, reviews etc, that explore this?
(c) Has this changed at all in the last 10 years? if so, why?

Are there any other child development domains (for example, physical, cognitive, language, social and emotional) that are important to, or of interest to, your policy area? For example, where your policy depends upon the contribution other policy areas make to different domains of child development.

Measuring child development and evaluating CDM and CDIs

We've talked about the child development domains that are important to you, that your policy area is interested in and/or contributes to. Can you please describe if and how these different domains of child development are measured? I'm interested in both the measures and the indicators used, and also which age group(s) they cover [footnote [46]].

[If examples are given, please ensure you get details of the measures and the indicators used – and how we can view them and ask:

(a) How is the data collected? How regularly?
(b) How are these measures and indicators used? To what purpose?

[46] In this context, an indicator represents the outcomes children are expected to achieve. A measure refers to the way(s) to measure and monitor progress against these given indicators.

(c) Have there been any unexpected impacts as a result of collecting and/or using this data?
(d) Are there examples of policy documents, research, reviews etc, that use these measures and indicators, that you would recommend we look at?

[If child development is not being measured / blank drawn by participant, ask]: If the domains of child development which are important to your policy area are not being measured currently, what data would it be ideal to collect?

How robust, relevant and useful is this data? [Consider exploring validity and reliability – does it measure what it's supposed to, and does it give similar results if we use it more than once? if interviewees are confident exploring this:

(a) What impact, if any, has this data had upon policy development or delivery?
(b) Do you know how costly it is to collect this data?
(c) Do you think the data collection is cost-effective?
(d) Has this changed at all in the last 10 years? If so, why?
(e) What are the biggest challenges or difficulties in measuring children's development in your policy area?
(f) Are there any risks to using child development measures and indicators? [footnote [47]]
(g) Are there examples of policy documents, research, reviews etc, that evaluate these measures and indicators, that you would recommend we look at?
(h) Is there practice in (relation to child development measures or indicators) in particular countries, that you would recommend we look at?

It is felt that there are robust measures of development available for children between 0 to 2 years and once they reach secondary school age at 11, however there is a potential data gap for children aged 2 to 11 years. Do you agree with this assessment? Why? For example, what measures are available or young people aged 0 to 2 and 11+ that are not available for young people aged 2 to 11?

[If there is gap] What impact, if any, does this have upon your area of policy?
Looking beyond your policy area, what are the main child development measures or indicators that you are aware of? (specific names if possible)

Would they be relevant to your policy area? For example, do they cover age groups and domains of interest to your policy responsibilities?
Why aren't they used?

Are there any limits on what information can be collected using existing child development measures or indicators and/or how they can be used?

[47] For example (if asked for an example): measuring linguistic development in children whose first language was Welsh, using tools translated from English, might cause problems?

Are there any significant risks associated with measuring child development?

Are there any other specific knowledge gaps in Wales that we have not discussed? For example, areas of child development that are not adequately measured?

Close

This has been really helpful. Thank you. Are there any questions that you expected me to ask, or you think I should have asked, but did not?

Is there anything else you think I should know about how your policy area and/or the Welsh Government looks at child development for this age group?
Are there any other people or teams you think I should speak to as part of this project?
Do you have any questions for me?

Thank you so much for your time and your helpful insights.