

**Toward A Global Indicator of Early Child Development:  
Summary Report**

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Prepared for:

**UNICEF ECD UNIT**

August 13, 2007

This report summarizes our recommendations for developing a global indicator of early child development (ECD) based on periodic sample surveys of the child population in different countries around the globe. The full report is available from the UNICEF ECD unit and include a comprehensive review of current literature on early childhood indicators, focusing on literature on (a) preschool children's expected capabilities and skills, (b) children's early life experiences as they relate to the development of these skills; (c) parents' role in, and knowledge of, the development of these skills; and, (d) existing child developmental outcome domains, indicators, and items as used in multiple surveys and for which some reliability and validity data could be presented. In addition, the full report also presents the rationale behind our proposed approach for the early childhood development indicator. There, we review the challenges in creating such an indicator, present discussion on the possible methodologies that can be used, the age span that can be examined, and the constructs that can be covered.

The report includes reviews of international survey efforts such as the EDI (Hertzman et al., 2006; Janus, 2006; Hertzman & Janus, 2007); ELDS (Kagan & Britto, 2005, 2007); and the DHS (Breinbauer, 2006; Solari, Breinbauer, & Molina, 2006; Saucedo, Breinbauer, Solari, & Ochoa, 2006); local efforts in developing countries such as those in the Philippines (Ledesma, 2007), Zambia (CDAZ, 2007), and Uganda (CARE-HACI, 2007); and national US surveys such as the National Health Interview Survey on Disability (Simpson, Colpe & Greenspan, 2003), the Head Start Family and Child Experiences Survey (FACES) and Impact Study (ACF, 2003, 2005, 2006), the Early Childhood Longitudinal Survey of a Kindergarten Cohort (Zill & West, 2001; Rock & Pollack, 2002) and a Birth Cohort (Andreassen & Fletcher, 2007), and the National Household Education Survey (Zill, Collins, West, & Germino Hausken, 1995). Most of the items selected for the ECD indicator have been used and found to be reliable in these surveys.

In this summary report, we present the core of the full report which includes our concrete recommendations for the construction of the global early childhood development indicator.

### **Purpose and Uses of Global Early Child Development Indicators**

The primary purpose of ECD indicators, as defined here, is to inform public policy regarding the collective wellbeing of children within a given nation, and of subgroups of the child population, such as those defined by race, ethnicity, language, religion, gender, economic class or poverty status. ECD indicators enable government officials and concerned citizens to monitor the progress (or lack thereof) of efforts to improve the health, happiness and achievement of young people over time and across successive birth cohorts. They can help build public understanding of child development issues and increase advocacy for policies and programs aimed at improving children's lives. However, they are not intended to evaluate particular policies or programs or provide operational information useful to specific intervention efforts.

Indicators have more power to serve these purposes if one can use them to make comparisons across nations and among subgroups within a given country's child population. Political leaders and the press and public tend to pay more attention to statistics when they show that their nation ranks unfavorably compared to other nations, some of which may have less national wealth and fewer natural resources than their own.

Likewise, legislators tend to vote money for intervention programs when statistics show that the wellbeing and life prospects of some groups within a society are much worse than those of other groups. In order to make such comparisons, indicator constructs must be defined and measured in the same ways in different countries and sub-populations.

Arguing against this rationale for global consistency are those who contend that national cultures differ in their demands and expectations for young children. These critics of global indicators point out that parents may have different strategies for investing in their children, depending on their goals and the child's role in the society. The position sometimes taken is that, in order to be in accord with local norms, values, and customs, child development indicators can and should differ from country to country or even from area to area or group to group within countries. Taken far enough, this argument would make inter-country or inter-group comparisons of ECD indicators virtually impossible.

Without denying the reality of cultural variation, and the need to take it into account, those who strive to construct a global system of comparable ECD indicators can build on the fact that human beings are all members of one biological species. Because of this, there are similarities in child development processes and timetables that cut across national boundaries, and universal needs that all developing children have in order to grow and flourish. Moreover, there is growing global acceptance of a rights-based approach to children, as shown by the adoption of the Convention for the Rights of the Child. In spite of the fact that there are multiple articles that speak about rights related to child development in this Convention, no specific goal or indicator for child development has been developed. The relatively sparse investment into the improvement of early childhood development, in contrast to the investments for child health and nutrition, may be partly attributed to the inability of countries to monitor their progress in this area. In addition, primary school completion has become a key outcome indicator in the Millennium Development Goals. This indicates widespread acceptance of the principle that all children should not only have access to formal schooling, but should persist and achieve when they are in school. This implies that all children should receive early intellectual stimulation and emotional support that will help prepare them to learn in structured school settings (UNICEF Programme Division, ECD Unit, 2006).

**Going beyond death and disease.** Another function that global ECD indicators serve is to give policymakers and child advocates a picture of child wellbeing that goes beyond what is provided by traditional indicators like the infant mortality rate, child death rates, and the incidence of diseases like malaria and polio. As useful as mortality- and morbidity-based indicators have been and continue to be, they tell us little about the life prospects or quality of life experienced by the vast numbers of children who do not die in infancy or contract life-impairing diseases. Even in nations with relatively dire circumstances for children, most young people do not die in childhood. But the fact that they will survive into adulthood does not mean that they have the same chances of developing into healthy, moral, productive, and self-supporting adults as children who grow up in nations with more favorable economic and social conditions. The movement to develop ECD indicators parallels efforts in the adult public health field to go beyond simple life

expectancy tables and come up with more sophisticated and telling indicators like expected years of disability-free life.

In order to fulfill this potential, one would like to see ECD indicators tap aspects of children's development that have strong predictive validity. The indicators should contain measures of skills, behaviors, and health statuses that have been shown to bode well or ill for the child's future achievement, educational and occupational attainment, earnings and life adjustment.

**Issues to be resolved.** Among the issues that arise when one begins thinking about constructing global ECD indicators is how to represent children's status across different developmental domains, such as cognitive, motor, and social-emotional development. What kind of items should be used to collect information about these different aspects of children and how does one combine the information into some sort of composite or summative indicator? Another question to be resolved is on which age range or ranges should the indicator focus? And how narrow or broad should the covered age range be? A third issue is the method of child assessment to be used in making determinations about the development and wellbeing of the individual children in a survey sample. Does one attempt direct assessment or observation of children's skills and behavior, or rely on parental report about these matters? What role should be given to reports of teachers or substitute caregivers, and how many young children have teachers or substitute care providers who know something about their development and could provide such reports? The advantages and disadvantages of these differing approaches to indicator construction are discussed in the full version of our paper. Here we describe the age coverage, contents, and methods we recommend and give rationales for recommending them.

### **Description of Proposed Early Childhood Development Indicator**

The proposed Global Early Child Development Indicator would cover children from birth through five years of age and would be based on information obtained through a combination of parent or primary caregiver report and limited assessment and observation of the child during the survey visit to the household or residential institution. Different assessment modules and parent questionnaires would be used for children in different age bands. (A summary of the items contained in each age-band module is presented in Table 1.) For children aged three and above, the direct assessment would be extended to include measures of fine motor, cognitive, and language development that relate to school readiness.

The modules are designed to determine which of a series of developmental accomplishments each sample child has achieved by the time of the household visit. The accomplishments range across five developmental domains that closely resemble those that make up the widely used "whole child" approach to school readiness (Goal One Technical Planning Group, 1991). They are:

- Language and emergent literacy;
- Cognitive development;
- Approaches to learning;
- Social-emotional development; and
- Motor development, with subdivisions of:

- Gross motor development; and
- Fine motor development.

Within each age band and developmental domain, the assessment modules specify one to four benchmark accomplishments that the majority of children in that age range would be expected to have achieved in all nations, if they are developing normally within a reasonably nurturing family and social environment. The benchmark accomplishments have been selected because of their face validity, universality (i.e., were found to be reliable in multiple countries, including developing countries), their significance as stepping-stones to more mature functioning and academic achievement, their relatively objective character, and their ease of being ascertained within a comparatively short home visit with the child and family.

If a child has accomplished all of the benchmark skills or behaviors within a developmental domain, he or she receives a score of 20 points. If the child has accomplished none of them, he or she receives a score of zero. If the child has accomplished some but not all of the skills or behaviors, he or she receives a lesser score ranging between zero and 20, depending on how many benchmarks are in the domain and how many the child has achieved. The number of points scored in each domain are summed across the five domains to produce an overall developmental score that can range between zero and 100, but is typically expected to have values between 75 and 100 for the vast majority of normally developing children. The point system has the effect of giving each of the five developmental domains approximately equal weighting (20 points each) in the summative composite index.

The developmental score that each sample child in the survey receives is added to those of all the other sample children, and a mean index score is calculated. That mean index score constitutes the Global ECD Indicator for the country, region, or population group in question. Inasmuch as mean scores are affected by a higher than expected concentration of children with high or low values, a median index score should also be calculated and used as a supplementary indicator. If scores are distributed approximately normally, the mean and median should be close in value. If they are not, then the median index value tends to be more representative of the developmental status of a “typical” child within a nation, area, or population group. The proportion of children with exceptionally low index scores (for example, more than two standard deviations below the mean) should also be computed and used as a supplementary indicator. It would represent the proportion of the nation’s child population that is “vulnerable” or “at risk,” based on their current developmental status. Sub-indicators could also be calculated for particular age groups (for example, children aged 0-2 years versus those aged 3-5 years) or specific developmental domains.

The developmental index score for a particular sample child in the indicator survey is not intended as a screening score and is not designed to be used for that purpose. It is only meant to contribute to the composite description of the average developmental status of young children *as a group*. A true screening assessment and interview would have to be more lengthy and comprehensive, and would ideally be carried out by clinically trained and experienced child assessors. By contrast, the indicator developmental assessment is designed to be carried out by regular survey interviewers who receive some special training,

practice, and certification, but nowhere near that required for a clinical degree or license. The assessment is also designed to be carried out within a relatively brief household or institutional visit. This is permissible because the greater situational variability that occurs with brief assessment periods is balanced by the large number of assessments that are done across the survey sample. Random variations in positive and negative directions tend to cancel out and lead to a stable average value. But care must be taken to ensure that the individual child assessments are carried out in a reasonably valid and reliable fashion, even at the individual child assessments are carried out in a consistent and unbiased fashion, and that measure reliability is good (i.e., reliability coefficients of .80 or better; Nunnally, 1978) at the child level. This is so even though the individual child index scores will *not* be used for any high stakes diagnostic or placement decisions.

**Gauging progress in the “state of the child.”** Obviously, a mark of progress in bettering the “state of the child” would be an increase over time in the average ECD index score for a nation’s young children and a decrease in the percentage who fall into the “Vulnerable” or “At Risk” range of index values. Reductions in disparities across population subgroups in mean ECD scores or the percentage of “Vulnerable” children would be another sign of improving conditions for children. Supplementary survey or administrative data that showed that more of the “Vulnerable” children were receiving needed resources or services, especially ones whose efficacy had been established, would be a further favorable signal for government agencies and private charities working to better children’s lives.

The “Vulnerable” sub-population would be defined as children who appear to be significantly below the expected level for their age band in one or more domains or whose assessment scores fall below the average range. By “significantly below,” we refer to approximately 3-6 months in the first year of life; 6 months in the second year, and 12 months or more in the third, fourth, fifth, or sixth year of life. This would typically put the child below the 3<sup>rd</sup> percentile in terms of developmental norms or test score distributions for children of the same age.

The cutoff values for “Vulnerable” (or “at risk”) children presented above assume approximately normal distributions of ages at which young children attain developmental milestones and of scores on developmental assessments, distributions similar to those found in developed nations. It is to be expected that the distributions of child developmental scores found in less prosperous and economically developed nations may be somewhat different or even very different. Indeed, one of the purposes of constructing ECD indicators is to reveal the negative impacts that economic hardship, war, domestic turmoil, and lack of resources and services may be having on children’s development. Thus, we propose that a composite set of developmental norm distributions from developed nations be used in all countries to determine whether a given child’s attainment of a given milestone is within the average range, advanced, vulnerable, or at-risk. In that way, the relative frequency of vulnerability in different countries and subgroups would all be determined against a common global standard.

**Combining information across domains.** The proposed ECD indicator deals with the issue of how to combine information across developmental domains by giving domains equal weight. A significant

vulnerability or skill deficit *in any one domain* would serve to reduce a child's overall index score. On the other hand, if the child achieves expected benchmark skills and behaviors in most domains, he or she would receive a moderate score. The child's index score would be dramatically lower only if there is a lack of accomplishment across several domains.

As longitudinal data are accumulated on the longer-term predictive importance of ECD scores within specific domains, it may be advisable to revisit and rethink this combinatorial procedure. For example, if delays in some domains prove to have more profound consequences for children's later careers and family lives, that would suggest that those domains should receive greater weight in determining the child's overall developmental score, and whether the child is to be classified in the "Vulnerable" or "At Risk" indicator category.

### **Rationale for Assessment Approach and Selection of Benchmark Tasks**

In this section we present our rationale for recommending the proposed child assessment approach and specific benchmark tasks we have selected as the basis for the Global ECD Indicator.

**Why a combination of direct observation and parent report?** We have recommended the use of direct child observation or assessment combined with parent report because we believe this approach will give the ECD Indicator the greatest validity, credibility and impact. Extensive child survey experience has shown that objective observation or assessment of children's skills and behavior, when properly conducted, produces the most reliable and valid measures of child development, and the measures that are most predictive of future achievement. As was noted in an earlier meeting of the ECD Working Group, parent report is an essential source of information about children's development and wellbeing. But parents have a general tendency to over-report what their children have accomplished, and to provide ratings that are less internally consistent, more skewed and less normally distributed than ratings provided by teachers or substitute caregivers who know the child well. Thus, it is vital that parent reports as to child accomplishments be validated by direct observation or assessment of what the child knows and can do.

However, some aspects of children's development cannot be meaningfully observed or assessed within the context of a relatively short home visit. In these areas, we recommend the use of parent report to provide the required information, using question wordings and response alternatives designed to minimize over-reporting bias.

The use of reports and ratings by teachers or other substitute caregivers has much to recommend it, and has been used in a number of large-scale national ECD studies. Unfortunately, this method has the fatal limitation that many young children do not attend school or preschool programs or receive any form of substitute care on a regular, extended basis. Thus, these young children have no "natural rater" available to provide the required reports on their development. And among the children with no knowledgeable non-parent rater are typically some of the most "at risk" and vulnerable children in a national child population.

We recommend that parent report combined with direct observation or assessment of the child be the primary source of data for child indicator surveys. We understand that a major limitation of a direct

assessment/observational approach is its cost in terms of materials, training, and time. This limitation was taken into account in our proposal and all suggested assessments or observations require no unusual materials and training and are very short to administer.

**How will young children be observed or assessed?** The survey interviewers who are trained to act as observers and assessors of young children would follow a prescribed protocol to determine whether a given sample child has or has not attained each of the developmental accomplishments specified for his or her age group. Protocols would differ according to the age band in which the child falls. For three of the developmental domains (Motor, Language, Cognitive), the determination of the child's accomplishments would rely primarily on direct observation or assessment. For two of the developmental domains (Social-Emotional, Approaches to Learning), the determination would rely primarily on parent report. This is because of the impracticality of observing the child over varied situations and extended periods of time, as would be required to make an assessment of the child's typical social interaction patterns and behavior in learning and task-oriented situations. Parent reports on social emotional development and approaches to learning were found to be reasonably reliable in studies such as NHES and FACES (ACF, 2006; NHES 2005, Special Tabulations).

If the child is not fully awake during the initial home visit, or is indisposed or uncooperative for other reasons, such as illness, the interviewer/assessor would be instructed not to conduct the child observation during that visit, but to make an appointment with the family to return at another and (one hopes) more propitious time. This approach is preferable to relying solely on parent report in these circumstances, although it would, of course, increase survey costs and durations.

**What are the cognitive tasks that would be used in assessing children and why were they selected?** The tasks used to assess the cognitive development of children in the indicator survey would vary across age bands. For the youngest groups (3-6 months, 7-11 months), the tasks would be simple observations of neurosensory functioning: moving a red ball or other bright object across the child's visual field to observe how the child tracks it with his or her eyes; and, shaking a rattle or ringing a bell on each side of the child's head to see whether the child moves his head or eyes to orient toward the source of the noise. These tasks are part of an infant neurological examination designed for administration by paramedical staff members who have had no medical training and may have limited literacy skills. The assessment procedures have been used extensively in developing countries and have shown good sensitivity to developmental problems related to malnutrition and residential displacement (Dubowitz, Dubowitz, & Mercuri, 1999).

For older infants and toddlers (ages 7-11 months, 12-17 months, and 18-23 months), the cognitive assessment tasks would involve seeing whether the child reaches for a candy or other attractive object that the child observes being hidden under a cup. The task becomes progressively harder for the older age groups, with a delay being imposed before the child can reach and the candy being moved from under a familiar

hiding place to an unfamiliar one. These are Piagetian tasks that gauge the child's developing sense of object permanence (Piaget and Inhelder, 1969). They have been used by child psychologists in many different countries and in a variety of laboratory and field settings.

For children aged two years and older (24-35 months, 36-47 months, 48-59 months, and 60-71 months), the cognitive assessment tasks are measures that have been extensively used to gauge the development of what neuropsychologists call *executive functioning* (Carlson, 2005). "Executive functioning refers to higher order, self-regulatory, cognitive processes that aid in the monitoring and control of thought and action. These skills include inhibitory control, planning, attentional flexibility, error correction and detection, and resistance to interference" (*ibid.*, p. 595; Welsh, Pennington, & Groisser, 1991; Zelazo, Carter, Reznick, & Frye, 1997). The development of these executive capabilities in young children has been found to be associated with brain development in the prefrontal cortex (Welsh, Pennington, & Groisser, 1991; Diamond, Prevor, Callender, & Druin, 1997), with school readiness (Blair, 2002), and with the development of the ability to see another's point of view, conscience, and empathy (Carlson & Moses, 2001).

For two year olds (24-35 months), the executive functioning task requires the child to differentiate between small pictures of fruits embedded inside larger pictures of different fruits and to point to the one requested by the assessor. This is the so-called "Shape Stroop" task (Kochanska et al., 2000), which nearly 60 percent of two-year-olds in the US can perform correctly (Carlson, 2005, p. 609). These children will also be assessed with the "Multilocation Search" task (Zelazo, Reznick, & Spinazolla, 1998), which is a more complex version of the hidden candy task given to younger children. This task can be performed by 85 percent of two-year olds in the US (*ibid.*).

Children of ages 3-, 4-, and 5-years-old would receive different versions of the Dimensional Change Card Sort task (Frye, Zelazo, & Palfai, 1995; Zelazo et al., 2003; Zelazo, 2006). This involves sorting cards with pictures that vary by shape and color into two piles according to one dimension (e.g., by shape), and then switching to sorting them by the other dimension (e.g., by color). Most three year olds can sort the cards according to one dimension, and that is the accomplishment that would be scored for them. But only about 19 percent of three's can switch to sorting by the other dimension (Carlson, 2005, p. 610), even when they are instructed to do so before each trial. Most four year olds (about 60 percent; *ibid.*, p. 610) can successfully make the dimensional shift, and that is the accomplishment that would be scored for them. Five year olds would receive an advanced version of the task, in which some of the cards have borders and other do not. If the border is present, the child must sort by one dimension. If it is not present, the child must sort by the other dimension. About half of five's can do this successfully (*ibid.*, p. 611). Similar age trends have been observed with the Dimensional Change Card Sort task with preschoolers in China and the U.S. (Sabbagh, Xu, Carlson, Moses, & Lee, 2006).

Three year olds would also receive a simpler Reverse Categorization task (Carlson, Mandell, & Williams, 2004), which involves switching from sorting objects in a logical way (e.g., large objects in "large" bin) to opposite way (e.g., large objects in "small" bin). About 80 percent of three year olds can

perform this task correctly (Carlson, 2005, p. 610). Four and five year olds would receive a Backward Letters and Backward Digit Span task (Davis & Pratt, 1996; Blair, 2007), which taps the development of a child's "working memory," another component of executive functioning. Fours would be expected to repeat 3 or 4 letters or digits in forward order and 2 in reverse order, whereas five's would be expected to 3 or 4 letters or digits in reverse order to the one in which they are presented to the child (Carlson, 2005, pp. 608, 610-611).

As previously mentioned, all of the proposed cognitive tasks share the attributes of being short in duration, easy to administer, enjoyable and game-like for young children to carry out, and involving cognitive processes like object permanence and categorization that have cross-cultural applicability. They are also tasks in which strong age trends are observed in the infant-toddler or preschool age ranges.

**What are the language tasks that would be used in assessing children and why were they selected?** The language behavior to be observed or assessed in the indicator survey would vary across age bands. For the infant and toddler groups (3-6 months, 7-11 months, 12-17 months, 18-23 months), the tasks would be simple observations of oral language developmental benchmarks drawn from widely used instruments like the Bayley Scales of Infant Development. (See Table 1 for details.) For the older groups (24-35 months, 36-47 months, 48-59 months, and 60-71 months), the focus would shift to direct assessment of children's vocabulary knowledge. Vocabulary measures are included in nearly all batteries of general cognitive functioning, intelligence, and language development, such as the Wechsler, Stanford-Binet, McCarthy, Kaufman, and Woodcock-Johnson Scales (Strauss, Sherman, & Spreen, 2006, pp. 98 - 400). Both receptive and expressive vocabulary measures are predictive of later achievement, particularly in the later grades of elementary school and beyond, when the emphasis shifts from "learning to read" to "reading to learn" (Biemiller, 2006, p. 41; Chall, 1983). For example, Cunningham and Stanovich (1997) showed a substantial relationship between oral receptive vocabulary in first grade and reading comprehension in 11<sup>th</sup> grade ( $r = .55$ , or 30% of variance).

The difficulty with vocabulary tasks in a cross-national application is that children's familiarity with many classes of words varies across different national, cultural, regional, and urban-rural settings. The solution to this dilemma for the Global ECD Indicator survey is to focus on two classes of vocabulary words that have universal applicability, namely, names of body parts, such as sense organs, and their functions, and names for colors. A graded series of tasks would be used, depending on the child's age band. These would range from naming the most basic body parts and a few primary colors (for two year olds) to naming more difficult body parts like elbow, chin, knee, and brain and naming not only all the primary colors but several additional colors as well (for five year olds). Of course, the specific words tested would be couched in the locally appropriate language. Four and five year olds would also be asked to count sets of objects with one-to-one correspondence. Although this is nominally an early math skills task, it has been shown to relate to emergent literacy as well (Administration for Children and Families, 2003).

**What aspects of social-emotional development would be assessed?** The questions posed to parents concerning children's social-emotional development vary across the age bands. For infants and toddlers, the focus is on the development of strong bonds or attachments to parents and other "favorite

people.” One of the key questions used here has been previously used in studies like the Quality of Life and Health Survey done in 2006 in Chile and the U.S. National Health Interview Survey on Disability. Other questions deal with the emergence of fear of strangers, the child’s expressions of joy when the mother or other attachment figure returns home after an absence, and whether the child engages in imaginative or pretend play with the parent or siblings. (See Table 1 for details.)

For three- through five-year-olds, the focus shifts to social behavior that has been found to relate to later school adjustment (ACF, 2003). This includes cooperative behavior with parents and older siblings, learning to take turns and follow rules, and accepting other children’s ideas for sharing and playing. It also includes forming and maintaining friendships with age peers, the recognition of a range of feelings in other children, and the development of empathy and helping behavior. Items tapping these aspects of children’s social behavior have been drawn from a variety of sources, including the Social Skills Rating Scale, a Cooperative Classroom Behavior and Relations with Other Children scale developed by Westat for the Head Start National Reporting System (Zill, Kim & Sorongon, 2007), the Offord group’s EDI, and other sources.

**What aspects of approaches to learning would be assessed?** The questions posed to parents concerning children’s approaches to learning tasks vary across the age bands. For infants, a single item asks about the child showing an interest in things around him or her by looking at sights and turning toward sounds. This item has been previously used in the Quality of Life and Health Survey done in 2006 in Chile and the U.S. National Health Interview Survey on Disability, as well as other studies. For toddlers, the items deal with showing an interest in the sounds of words (as in nursery rhymes) and becoming involved in picture books and looking at them for long periods of time. These items are drawn from the Rothbart scales of children’s temperament and social behavior (Rothbart, Ahadi, Hershey, & Fisher, 2001; Putnam & Rothbart, 2007), where they are part of a cluster of items labeled “effortful control.” One of the items is also similar to an item that was used in the Chile QLHS and the NHIS-D.

The Rothbart scales were also the source of items for two year olds. These items also deal with attentional focusing (becoming involved in building or putting something together, planning for trips or outings), as well as inhibitory control (stopping an activity when parents tell the child, “No!”).

For three-, four-, and five-year-olds, the approaches to learning items deal with behavioral orientations that have been found to be associated with good adjustment in early elementary school and later academic achievement. These items concern paying attention well, showing eagerness to learn new things, persisting in completing tasks, easily adapting to changes in routines, working independently, and keeping belongings organized. These items were drawn from an Approaches to Learning scale developed for the U.S. Head Start National Reporting System (Zill, Kim, & Sorongon, 2007), but similar items appear in the U.S. Early Childhood Longitudinal Study of a Kindergarten cohort and the Offord group’s EDI.

### **Steps Toward Construction of ECD Indicator**

These are the steps to be followed in constructing the Global ECD Indicator for a given country or other geopolitical area:

- 1) Draw an area probability sample of dwelling quarters, group quarters, and institutions such as orphanages, hospitals, or refugee camps that may contain young children (eligible age range 0-5);
- 2) Contact the sampled units and ascertain which contain families with young children or young children living apart from their parents;
- 3) Contact units with children and randomly select one or two focus children from each family unit, and a larger sub-sample from each group quarters or institution, depending on the total number of young children residing there;
- 4) Interview parent, primary care giver, or person responsible for sample child(ren), using the interview module appropriate to child's current age;
- 5) Conduct limited assessment and observation of sample child(ren) to verify and extend parent reports on child's development and well-being;
- 6) Determine the child's attainment of developmental milestones and performance on cognitive and fine motor assessments;
- 7) Calculate the summary developmental score for each sample child and the mean and median ECD index scores for all children in the sample, as well as the proportion of children who fall into the "Vulnerable" ECD Indicator category;
- 8) Adjust the resulting mean and median ECD scores and "Vulnerable" percentage for group differences in probability of selection and non-response rates;
- 9) Compare the average ECD index scores and percentage of "Vulnerable" children with those for other relevant countries or areas, and across different subgroups of child population within the country or area;
- 10) Repeat the indicator survey periodically to monitor changes over time or impact of UNICEF intervention efforts.

**Size of the survey sample.** The size of the area probability sample should be such as to produce data for approximately 200 children (100 females and 100 males) for each of the six age groups from birth through five years and 11 months of age. Assuming a response rate of 80 percent, this would mean a target sample of about 1,500 children or more.

**Building in a longitudinal follow-up component.** We recommend that consideration be given to building in a longitudinal component to the survey program by revisiting some of the same sampling areas or designating subsets of the survey sample as groups to be recontacted in the subsequent survey wave. In this way, valuable data could be obtained on the predictive power of developmental measures taken in one wave of the survey to forecast children's later achievement, behavior, and health.

If the indicator surveys were done on a once every three years basis, for example, the children in the longitudinal subsample who were 0-2 years of age in the initial survey would be 3-5 years old in the subsequent survey. Likewise, the children who were 3-5 years in the initial survey would be 6-8 years old at the time of the subsequent survey. These children might be followed up by means of mailed questionnaires to their elementary-school teachers, so that the developmental measures in the initial survey could be correlated with measures of academic achievement and classroom behavior in early elementary school.

**Validation sub-study.** We also recommend that 20 to 25 percent of the children in the main sample be chosen at random for a validation sub-study. In these cases, attempts would be made to spend more time with the family and conduct more extensive observations and assessments of the children's accomplishments and behavior.

The purpose of the validation sub-study would be to examine the correlation at the individual child level between the developmental index score as determined by extended direct assessment versus parent report with limited direct assessment. If the correlation is relatively high, it would serve to validate the parent report plus limited assessment method and suggest that countries should continue to conduct indicator surveys using the method. The validation sub-study could also provide valuable psychometric information about survey items

If there are discrepancies in developmental index scores depending on the method used, it may still be possible to use the validation sub-study to "calibrate" estimates based on the parent report method. The validation sub-study could provide a "correction factor," meaning that if parent-report survey results provide an estimate of *X* index score, we would expect that the child would get a score of *Y* if we used more intensive direct-assessment methods. The validation sub-study should take place in at least three countries with very different sociodemographic characteristics.

### **Indicators That Address Conditions in Children's Families and Social Environment**

The Global ECD Indicator we have proposed in this paper is based on measures of the developmental status and well-being of the child. We close this paper by noting that it would be feasible to define and construct a complementary survey-based indicator that deals with conditions in the child's family and social environment, conditions that pose a threat to the child's healthy development. Among these conditions would be the following:

1. The lack of a parent or parent substitute with whom the child has a close emotional bond;
2. A family environment that provides inadequate levels of intellectual stimulation or emotional support to the young child;
3. A family environment in which there are frequent arguments between parents or other family members or in which family violence occurs;
4. Lack of health care: children with health problems that require medical attention, but none is available or none has been received for reasons of cost, distance, waiting time, cultural barriers, etc.;
5. Lack of psychological care: children with levels of emotional distress or problem behavior that call for clinical attention, but none is available or none has been received for reasons of cost, distance, waiting time, cultural barriers, etc.; and,
6. Lack of educational opportunity: children whose future educational attainment is likely to be limited because schools are not available or access to schools is barred due to racial, ethnic, religious, gender, or class discrimination.

There are examples of existing survey-based measures that address some of these environmental conditions for children. For example, the HOME scale developed by Caldwell and Bradley (2001) is a widely used instrument for assessing the intellectual stimulation and emotional support children receive in

their families. An abbreviated version of it was developed and used in large scale nationally representative surveys in the US and has been included in international surveys. Questions tapping a lack of needed health care for children; marital conflict and family violence; parental aspirations and expectations appear routinely in many US national Surveys.

**TABLE 1.**  
**DIRECT OBSERVATION/ASSESSMENT OF CHILDREN, BY AGE GROUP<sup>1</sup>**

<u>Age Band</u>	<u>Domain</u>	<u>Accomplishment</u>	
<u>3-6 Months</u>	Gross Motor	<ul style="list-style-type: none"> <li>■ Child lifts head when placed on stomach</li> <li>■ Child holds head up with some wobbles</li> <li>■ Child rolls over</li> <li>■ Child sits with support at hips or propped on arms</li> </ul>	
	Fine Motor	<ul style="list-style-type: none"> <li>■ Child brings hand to mouth</li> <li>■ Child reaches toward interesting objects</li> <li>■ Child grasps feet with hand</li> <li>■ Child holds toy with whole hand or finger and thumb</li> </ul>	
	Language	<ul style="list-style-type: none"> <li>■ Child makes vocal sounds like coos or chuckles</li> <li>■ Child vocalizes attitudes of pleasure or displeasure</li> </ul>	
	Cognitive	<ul style="list-style-type: none"> <li>■ Child visually tracks colorful object held before face</li> <li>■ Child turns toward new sounds on either side of head</li> </ul>	
	Social-Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child seems happy or pleased when he/she sees favorite people</li> </ul>	
	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ Child shows an interest in things around him/her by looking at sights or by turning around toward sounds</li> </ul>	
	<u>7-11 Months</u>	Gross Motor	<ul style="list-style-type: none"> <li>■ Child sits up without support</li> <li>■ Child supports weight when placed in standing position</li> <li>■ Child crawls either on abdomen or hands and knees</li> </ul>
		Fine Motor	<ul style="list-style-type: none"> <li>■ Child holds toy with finger and thumb in pincer grasp</li> <li>■ Child lets go of object he/she has in his/her grasp</li> </ul>
		Language	<ul style="list-style-type: none"> <li>■ Child vocalizes different vowel sounds and combinations of consonants and vowels</li> <li>■ Child responds to parental questions with gestures</li> </ul>
		Cognitive	<ul style="list-style-type: none"> <li>■ Child visually tracks colorful object held before face</li> <li>■ Child reaches for place where candy is hidden after seeing it being hidden (object permanence)</li> </ul>

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<sup>1</sup> What is provided here is a relatively extensive list for purposes of discussion. We understand that simplification is of great importance and keeping a smaller number of items will help to ensure cross-country consistency and comparability. We expect the list to be narrowed down through expert consensus in the forthcoming round table.

**TABLE 1.**  
**DIRECT OBSERVATION/ASSESSMENT OF CHILDREN, BY AGE GROUP**  
**(continued)**

<u>Age Band</u>	<u>Domain</u>	<u>Accomplishment</u>
<u>7-11 Months (continued)</u>		
	Social Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child plays social games like “peek-a-boo,” “pat-a-cake,” or “bye-bye” with parent</li> <li>■ Child seems happy or pleased when he/she sees favorite people</li> <li>■ Child shows apprehension in presence of strangers</li> </ul>
	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ Child shows an interest in things around him/her by looking at sights or by turning around toward sounds</li> </ul>
<u>12-17 Months</u>		
	Gross Motor	<ul style="list-style-type: none"> <li>■ Child stands aided or unaided</li> <li>■ Child walks with support</li> </ul>
	Fine Motor	<ul style="list-style-type: none"> <li>■ Child makes a stack of two or more blocks by self</li> </ul>
	Language	<ul style="list-style-type: none"> <li>■ Child points to familiar things at parent’s request</li> <li>■ Child says at least some simple words, either for names of family members or to express wants</li> </ul>
	Cognitive	<ul style="list-style-type: none"> <li>■ Child reaches for place where a candy is hidden after seeing it being hidden (object permanence)</li> <li>■ Child maintains interest in activities during observation period</li> </ul>
	Social Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child shows pleasure when mother or other primary caregiver returns</li> <li>■ Child shows apprehension in presence of strangers</li> <li>■ Child enjoys snuggling up to parent or sitting on parent’s lap</li> </ul>
	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ Child likes the sound of words, as in nursery rhymes</li> <li>■ Child becomes absorbed in picture book and looks at it for long time</li> </ul>

**TABLE 1.**  
**DIRECT OBSERVATION/ASSESSMENT OF CHILDREN, BY AGE GROUP**  
**(continued)**

<u>Age Band</u>	<u>Domain</u>	<u>Accomplishment</u>
<u>18-23 Months</u>		
	Gross Motor	<ul style="list-style-type: none"> <li>■ Child stands unaided</li> <li>■ Child walks independently</li> </ul>
	Fine Motor	<ul style="list-style-type: none"> <li>■ Child holds a pencil or crayon and scribbles</li> </ul>
	Language	<ul style="list-style-type: none"> <li>■ Child points to familiar things at parent's request</li> <li>■ Child says at least some simple words, either for names of family members or to express wants</li> </ul>
	Cognitive	<ul style="list-style-type: none"> <li>■ Child reaches for place where a candy is hidden after seeing it being moved to different place</li> <li>■ Child maintains interest in activities during observation period</li> </ul>
	Social Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child shows pleasure when mother or other primary caregiver returns</li> <li>■ Child enjoys snuggling up to parent or sitting on parent's lap</li> </ul>
	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ Child likes the sound of words, as in nursery rhymes</li> <li>■ Child becomes absorbed in picture book and looks at it for long time</li> </ul>
<u>24-35 Months</u>		
	Gross Motor	<ul style="list-style-type: none"> <li>■ Child jumps off floor</li> <li>■ Child goes up steps one foot at a time</li> <li>■ Child jumps forward 4 inches or more</li> </ul>
	Fine Motor	<ul style="list-style-type: none"> <li>■ Child builds tower of four or more blocks by self</li> <li>■ Child draws lines and circular arcs under control</li> </ul>
	Cognitive	<ul style="list-style-type: none"> <li>■ Child differentiates between small pictures of fruits embedded inside larger pictures of different fruits and points to one requested by assessor (Shape Stroop task)</li> <li>■ Child finds a candy after seeing it moved to a different hiding place than usual (Multilocation Search task)</li> </ul>

**TABLE 1.**  
**DIRECT OBSERVATION/ASSESSMENT OF CHILDREN, BY AGE GROUP**  
**(continued)**

<u>Age Band</u>	<u>Domain</u>	<u>Accomplishment</u>
<u>24-35 Months (continued)</u>	Language	<ul style="list-style-type: none"> <li>■ Child names easiest body parts, like hand, foot, mouth, and tells at least one function of each</li> <li>■ Child identifies two or three primary colors by name</li> </ul>
	Social Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child plays pretend games with parent or siblings</li> <li>■ Child helps with simple chores like cleaning up toys or bringing something when asked</li> </ul>
	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ When building or putting something together, child becomes very involved and works for long periods</li> <li>■ Child prepares for trips and outings by planning things he/she will need</li> <li>■ Child stops an activity when he/she is told, “No!”</li> </ul>
<u>36-47 Months</u>	Gross Motor	<ul style="list-style-type: none"> <li>■ Child hops on one foot without support</li> <li>■ Child skips</li> </ul>
	Fine Motor	<ul style="list-style-type: none"> <li>■ Child holds pencil between thumb and first two fingers</li> <li>■ Child copies a complete circle</li> </ul>
	Cognitive	<ul style="list-style-type: none"> <li>■ Child sorts cards with pictures that vary by shape and color into two piles according to one dimension (e.g., shape)</li> <li>■ Child switches from sorting objects in logical way (e.g., large objects in “large” bin) to opposite way (e.g., large objects in “small” bin), when asked to do so</li> </ul>
	Language	<ul style="list-style-type: none"> <li>■ Child names body parts like neck, thumb, toe</li> <li>■ Child recognizes three or four primary colors by name</li> </ul>
	Social Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child forms and maintains friendships with other children</li> <li>■ Child helps in cleaning up house and putting toys away</li> <li>■ Child shows sympathy for others when they are hurt</li> </ul>

**TABLE 1.**  
**DIRECT OBSERVATION/ASSESSMENT OF CHILDREN, BY AGE GROUP**  
**(continued)**

<u>Age Band</u>	<u>Domain</u>	<u>Accomplishment</u>
<u>36-47 Months (continued)</u>	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ Child pays attention well</li> <li>■ Child shows eagerness to learn new things</li> <li>■ Child persists in completing tasks</li> <li>■ Child approaches places he/she has been told are dangerous slowly and cautiously</li> </ul>
<u>48-59 Months</u>	Gross Motor	<ul style="list-style-type: none"> <li>■ Child hops on one foot repeatedly</li> </ul>
	Fine Motor	<ul style="list-style-type: none"> <li>■ Child copies a cross shape</li> <li>■ Child writes one or two letters of name</li> </ul>
	Cognitive	<ul style="list-style-type: none"> <li>■ Child sorts cards with pictures that vary by shape and color into two piles according to one dimension (e.g., by shape), and then switches to sorting by other dimension (e.g., color) (DCCS task)</li> <li>■ Child able to repeat 3 or 4 letters or digits in same order as presented, and 2 in reverse order</li> </ul>
	Language	<ul style="list-style-type: none"> <li>■ Child names sense organs (ear, nose, eye) and tells senses with which they are associated (e.g., hearing, smelling, seeing)</li> <li>■ Child recognizes seven primary colors by name</li> <li>■ Child counts three or more objects with one-to-one correspondence</li> </ul>
	Social Emotional (Parent report)	<ul style="list-style-type: none"> <li>■ Child follows parents' directions</li> <li>■ Child follows rules when playing games</li> <li>■ Child waits his/her turn in games or other activities</li> </ul>
	Approaches to Learning (Parent report)	<ul style="list-style-type: none"> <li>■ Child pays attention well</li> <li>■ Child persists in completing tasks</li> <li>■ Child easily adapts to changes in routine</li> <li>■ Child approaches places he/she has been told are dangerous slowly and cautiously</li> </ul>

**TABLE 1.**  
**DIRECT OBSERVATION/ASSESSMENT OF CHILDREN, BY AGE GROUP**  
**(continued)**

<u>Age Band</u>	<u>Domain</u>	<u>Accomplishment</u>
<u>60-71 Months</u>	Gross Motor	■ Child walks heel-to-toe forward along line on floor without losing balance
		■ Child walks heel-to-toe backward along line on floor without losing balance
	Fine Motor	■ Child copies a square with good corners
		■ Child prints two or three letters of name
	Cognitive	■ Child sorts cards with pictures that vary by shape and color into two piles, switching between one dimension and the other as signaled by a border on the cards
		■ Child able to repeat 3 or 4 letters or digits in reverse order to one presented
	Language	■ Child able to name more difficult body parts like elbow, shoulder, chin, knee, brain
		■ Child recognizes ten different colors by name, including brown, black, white
		■ Child counts more than ten objects with one-to-one correspondence
	Social Emotional (Parent report)	■ Child accepts other children's ideas for sharing and playing
		■ Child offers to help other children who have difficulty with a task
		■ Child recognizes range of feelings in others
Approaches to Learning (Parent report)	■ Child pays attention well	
	■ Child works independently	
	■ Child persists in completing tasks	
	■ Child keeps belongings organized	

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