

The Evidence Base on Early Childhood Care and Education in Global Contexts

Hirokazu Yoshikawa and Sarah Kabay

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New York University, Steinhardt School of Culture, Education and Human Development¹

Abstract

Over the past 15 years, research on early childhood care and education (ECCE) has both expanded and deepened our understanding of this critical period in life and learning. Substantial advances have been made in research on the development of the brain, the importance of early relationships and experience, and the effects of ECCE programs and policies on children’s developmental potential. The current evidence base has become extensive in low and middle income countries, with growing attention to issues of quality improvement, implementation and scale. This review synthesizes the global evidence on ECCE with discussion of future directions for research, policy and practice.

Introduction: Early Childhood Development and the Role of Early Childhood Care and Education

The foundations of brain architecture and functioning, and subsequent lifelong developmental potential, are laid down in the early years in a process that is exquisitely sensitive to external influence. Early experiences in the home, in other care settings, and in communities interact with genes to shape the developing nature and quality of the brain’s architecture. The growth and then environmentally-based pruning of neuronal systems in the first years support a range of early skills, including cognitive (early language, literacy, math), social (theory of mind, or perspective taking, empathy, prosocial behaviors), persistence, attention, self-regulation and executive function skills (the voluntary control of attention and behavior) [1]. Each of these areas of learning and development, measured in early childhood, are predictive of school success and completion; higher earnings; active participation in communities and society; and reduced odds of delinquency, crime, and chronic and non-communicable disease [2-5].

Later skills – in schooling; in employment; in family life; and ultimately in parenting and the passing on of human capital to the next generation -- build cumulatively upon these early skills. Therefore investment in early learning and development results in greater cost savings than investment later in the life cycle [6-10].

Early childhood development (ECD) has been defined as a comprehensive approach to policies and programs for children from the prenatal period to eight years of age, their parents, their caregivers and their communities. Its purpose is to uphold the child’s rights to develop his or her full cognitive, emotional, social and physical potential [11]. The case for investment in ECD is powerfully made by data

¹ Contact: hiro.yoshikawa@nyu.edu or sbk373@nyu.edu

showing that approximately one-third of children under the age of 5 – 218 million children - fail to meet basic indicators of developmental potential (stunting or exposure to absolute poverty) [12]. The cost of decreased health, productivity and well-being solely from lack of access to preprimary education in low-income countries has been estimated at US \$33 billion [13-14].

Early childhood care and education (ECCE), the focus of this review, is defined as the range of out-of-home care and educational settings that children can experience between birth and school entry. This definition acknowledges that primary education begins at different ages in different countries (i.e., we do not define ECCE for example as strictly for those under age 5). It is a specific sector of services within the larger universe of ECD policies and programs, which encompass health, nutrition, child protection, social protection and water, sanitation and hygiene policies [15]. At the same time, ECCE programs and policies can either integrate such services from other sectors, or coordinate with them, at the community, subnational or national levels. Though these are vital cornerstones of any comprehensive approach to ECD [16], this review excludes review of interventions that are entirely home-based. We do review evidence on the integration of supports for parents and family in ECCE programs.

Historical background of ECCE. Over the course of the 20th century, the concept of early childhood education as a lever to combat educational and societal inequality emerged in a variety of countries around the world. We do not have the space here to review these developments in detail; we refer readers to prior syntheses and only note the most important points from this literature here. Although some countries have longer histories of large-scale provision (for example, France established the *école maternelle* as a voluntary, public institution in 1881, and rapid expansion beyond a low-income population began in the 1950's), several trends spurred a much more widespread growth of such provision in the 1960's. These included the rise of maternal employment outside the home for mothers of young children; the rise of social protection policies in Europe and North America; and the transitions to independence of many African countries [17].

Large-scale, public preprimary education programs were launched in countries such as India, the United States and several European countries, most often with the express intent to combat disparities in children's learning between more and less disadvantaged children. Some of these programs integrated perspectives and services from health, child protection and social protection with core education services [18]. In addition, the provision of center- or home-based child care also increased, most often with the purpose of supporting maternal work as out-of-home employment increased. Some of these initiatives integrated some form of private provision with public provision (e.g., through public subsidies or the hiring of private contracted services (cf. Netherlands; Colombia)). Core tensions in ECCE between child care to support working parents and early education for children's learning thus became prominent in many countries in these decades. A common pattern has been that programs with a primary emphasis on education and learning have shorter hours (at least initially), more intensive training, caregivers defined as teachers, and are more likely to include formal curricula for children's learning. Child care programs, on the other hand, have tracked more closely with maternal work hours and patterns; been more likely to integrate private provision; more likely to have caregivers not identified as teachers; and have been less likely to include formal curricula [19]. In general, child care systems, whether public or private, generally responded to labor market needs, rather than to advance the purpose of education and children's learning [20-21].

In several decades of relevant research, early childhood care and education of good quality has shown consistent and positive short-term and long-term effects on children's development in low-, middle-, and high-income countries. Most of these studies have compared ECCE to care at home, with a common focus on disadvantaged populations within countries. An important theme in all of this research is the issue of quality. It might seem obvious that a high-quality program could be shown to have a positive impact, while a similar but poor quality intervention might not. Often it is not so straightforward. Quality in ECCE is a complicated, context-dependent issue that is not yet measured with cultural and predictive validity (that is, predicting children's learning and development), let alone integrated effectively into monitoring, training and support systems in many countries [22]. Current research is working to investigate and hopefully identify the critical determinants of high quality interventions.

In the short run, early cognitive skills, including reading and math skills, are positively affected by preprimary education [23-25]. In low- and middle-income countries, on-time primary school entry is increased through quality preprimary education. Some high-quality programs have been followed up in the long term, with positive effects observed on years of completed schooling, secondary school completion, reduced crime, reduced early pregnancy, and increased earnings. These results encompass both small-scale demonstrations and large-scale programs. Preprimary education benefits all children, no matter their economic background, yet as with many other ECD services, those from the most disadvantaged backgrounds benefit the most [26]. Earlier than the preprimary year, exposure to child care settings outside the home can also lead to benefits for young children, as long as these settings incorporate emphases on quality – *structural quality* features such as safety, attention to health, nutrition, water and sanitation, caregiver training and qualifications as well as *process quality* characteristics such as stimulation and responsive interactions between caregivers and children. These positive impacts of quality child care, as with preprimary education, are stronger for more disadvantaged children [30 -32].

Knowledge gaps about early childhood education around 2000

The evidence base on early childhood care and education has consisted of two strands of research – basic research on environmental influences in the first years of life, and evaluation research examining the effects on children of ECCE programs. Research on plasticity and environmental influences stretches back to the 1950's, and had strong influence on the development of large-scale ECCE in the U.S. and in other countries [33]. Even then, studies reflective of the second strand of research were influential. A series of randomized experiments examining the effects of ECCE on children's skills in the United States and a few other countries were implemented between 1960 and the 1980's [34-35]. Evidence of long-term impacts on grade retention, high school graduation, and reduced crime emerged from a few of the experiments in the 1980's, and became increasingly prominent thereafter [36-37].

The global evidence base by 1990 played an important role in the rationale for Goal 1 (expansion and improvement of early childhood education) in the Jomtien Declaration of Education For All, signed by 160 nations [38]. However, guidance for the implementation of Goal 1 was not fully developed (this was further addressed in the Dakar Framework of 2000) [39]. Given the complexity of ECCE but lack of specific indicators, implementation of Goal 1 in effect focused almost entirely on preprimary education.

During the 1990s the evidence base for ECCE grew on several fronts. Advances in the first strand of basic research came from neuroscience, providing a better understanding of brain architecture and its development in the first years of life. Until the 1990's, neuroscientific evidence on early development was quite limited. The field was galvanized during this decade with new data on the notion of critical or sensitive periods of development. Scientists, practitioners, and policy makers seized upon neuroscience findings to advocate for the field of ECE. Education policies in an increasing number of countries began to emphasize the importance of preprimary education, using the neuroscientific evidence as a rationale [40-41].

The neuroscience findings, however, contained few links to specific early childhood program approaches. General environmental enrichment was understood to combat early adversity and stress and promote early brain development, but as much of the neuroscientific evidence came from other species, the relevance to ECD programs and policies was unclear. The 2000 report *From Neurons to Neighborhoods* proved to be influential in this regard, linking the neuroscience evidence to implications for programs and policies [42]. ECCE evaluation research had by this time begun to point towards potential mechanisms for short- and long-term effects of ECCE on children's learning and skills, such as growth in early language skills, social and emotional skills, school motivation, self-regulation, and family factors such as parenting quality [43].

The literature on ECCE evaluation also broadened beyond the U.S. in the 1990s to encompass evaluations of parenting education in Turkey, early childhood services in Jamaica and Brazil, and others [44-46]. Myers' landmark volume *The Twelve Who Survive* cogently put forward the rationale for an emphasis on thriving, not just surviving, early childhood as a focus for policies and programs in LAMI countries [47]. In addition to providing a review of current research and synthesizing the various frameworks for understanding child development, Myers presented a thorough analysis of programmatic approaches to ECCE. Most impressively, this analysis included examples from around the world. Myers discussed models of day care centers from Colombia, India and Brazil, non-formal day care from Venezuela, Colombia and Ecuador, nutrition and health centers from Jamaica, Kenya and Peru, workplace childcare from Senegal, India, Ethiopia and Ghana, and preschool in Kenya, Peru and Brazil. Discussion was also included of non-center based approaches, and integrated programming. All of these topics contributed to the growing knowledge base for early childhood education.

The central gaps in the field of ECCE research by the year 2000 were bifurcated, concerning the spread of programs, and their impact. In general, preprimary enrollment increased throughout the 1990's, to 34.1% of the world's preprimary age children (112 million) by 2000 [48]. Progress was the most substantial in Latin America and East Asia, but lagged in most African states and the Middle East and decreased in the countries that comprised the former Soviet Union [49]. Variation in enrollment rates was dramatic, ranging from almost zero to more than 100%. Out-of-home care programs including 0-3 year olds emerged in some countries as large-scale public programs (e.g., the Madres Comunitarias program in Colombia), but in most countries was uncoordinated.

Much of implementation was defined by inequality: children in urban areas were more likely to enroll in services than those in rural areas, and children from more affluent households were much more likely to be enrolled than children from poorer households. ECCE efforts were also limited in scope even when implemented widely, focusing on "pre-schooling" and a single year just before entry into primary school. Coverage for programs targeting younger children, particularly those under 3, was very

low, except for some rich countries (France, e.g., and the Nordic countries). Though these concerns illustrate some of the many challenges facing the field of ECCE, the 1990s was a period of great progress in relation to awareness. The Jomtien Declaration and Framework drew international attention to early childhood development, defining it as a priority within a global education agenda. Such recognition has been a critical driver for progress [50].

Although the research base grew steadily, much was still unknown about the basic impacts of ECCE in LAMI countries, whether considered in experimental studies, or in studies of policy expansion. In rich countries, debates regarding the evidence centered around the range of child outcomes that could be expected as positive short-term impacts of ECCE; how these short-term impacts translate into long-term effects; the role of contexts such as family influences; and how to conceptualize, measure, monitor and improve quality. Important studies began to emerge regarding quality and concerns about quality in expanding ECCE programs in LAMI countries. For example, though India's ICDS program was noted to be much more successful at reaching disadvantaged populations than previous national policies [51], reaching more than 70 million children through pre-primary programs [52], studies also discussed instances of relatively low quality implementation [53]. While the rationale for ECCE was optimistic and relied on the notion of critical periods and brain development, the idea that positive impacts might depend on the quality of ECCE began to take hold. Quality standards, which had focused primarily on structural features such as safety, group size, or adult-child ratio, began to consider aspects of process quality, such as quality of instruction and interactions between teachers or caregivers and children [54].

ECCE, in addition, lacked specific indicators, whether for children's development, across cognitive, language, physical, and socio-emotional areas. Data on basic inputs such as preprimary enrollment did not typically measure important concerns such as age appropriate enrollment. Outcomes for children were limited to small-scale studies, with few national efforts to measure young children's early learning and development aside from basic health and nutrition indicators such as height, weight, and morbidity and mortality. Finally, longitudinal and economic approaches were still scarce in the research. Theories of human capital development did not distinguish different periods of its development during childhood. Longitudinal studies that could track impacts of expansion of ECCE were not yet mined for this purpose, and such data were limited to OECD countries. Additionally, significant knowledge gaps concerned issues of quality, equity and implementation. Similarly, though it was recognized that particularly poor and disadvantaged children were in a position to benefit the most, research was needed to determine whether and how to target interventions to best reduce disparities in health, learning and development.

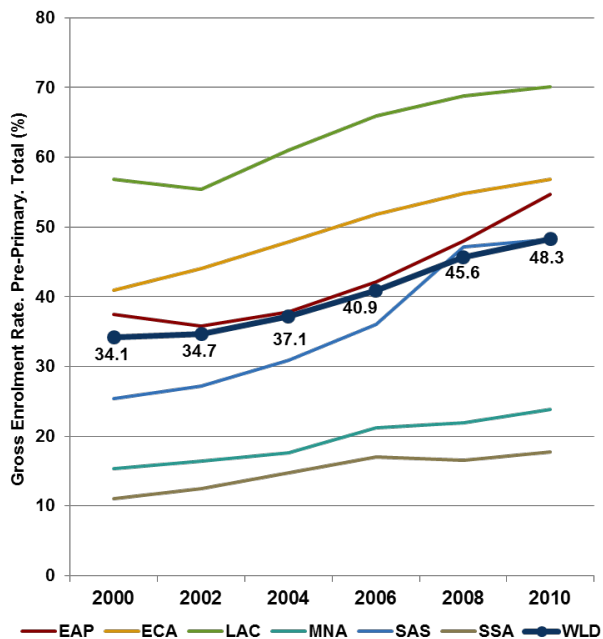
Though many important research developments were yet to come, by the year 2000 policies and strategic plans were already acting on the ECCE evidence base. The Caribbean Community, for example, convened in 1997 and adopted an Early Childhood Care, Education and Development Plan of Action for 1997 – 2002. The plan explicitly stated that appropriate "ECED philosophy, policies and practices must be informed by scientific evidence" [55]. Several countries in Latin America made one or more years of early education legally obligatory. New policies and policy statements were issued in India and at least ten African countries. Global policy and goal setting was also influential. Ghana's Education Strategic Plan for 2003 – 2015, for example, cites the 2000 Education for All proposal as an influence, listing each of the six goals from Dakar [56]. A couple critiques from this period concerned the lack of comprehensive policies for children under three years of age and the absence of laws or regulations for the growing private sector [57].

Key evidence since 2000

Pre-primary enrollment [58]

In 2010, 48.3% of the world's pre-primary age students were enrolled in pre-primary education (which translates into around 164 million children worldwide). This reflects a rise from 134 million children enrolled in 2005. Since 1990, then, the global GER for preprimary education rose from roughly one-third to nearly one-half. Despite this substantial progress, rates in Sub-Saharan Africa and the Middle East and North Africa lag far behind other regions, with less than 1/4 of pre-primary age children attending pre-primary education in those regions. Furthermore, over half of the world's children of pre-primary age are out of school. In 2010, over 50% of enrolled students were in either South Asia (48 million) or East Asia and Pacific (40 million). South Asia almost doubled its pre-primary gross enrollment ratio (GER) between 2000 (25.4%) and 2010 (48.3%). Latin American and the Caribbean's (GERs) are consistently the highest among regions ranging from 56.8% to 70.1%. Net enrollment ratios reveal great differences with some countries having less than 9% NERs and others >78% NERs (Figure-2). Countries like Ghana (120%), Sao Thomas & Principe (133%), Mongolia (102%) and Moldova (101%) have seen great improvement in pre-primary NERs over the past decade (table-1).

Figure-1 Pre-primary GERs among world regions



Source: UNESCO Institute for Statistics in EdStats, November 2012

Figure 2. Net enrollment rates, pre-primary.

The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of the World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries. The maps are for reference only.

- Source: UNESCO Institute for Statistics in EdStats, 2012
- Note: Data displayed is for the latest available year (2008-2011)

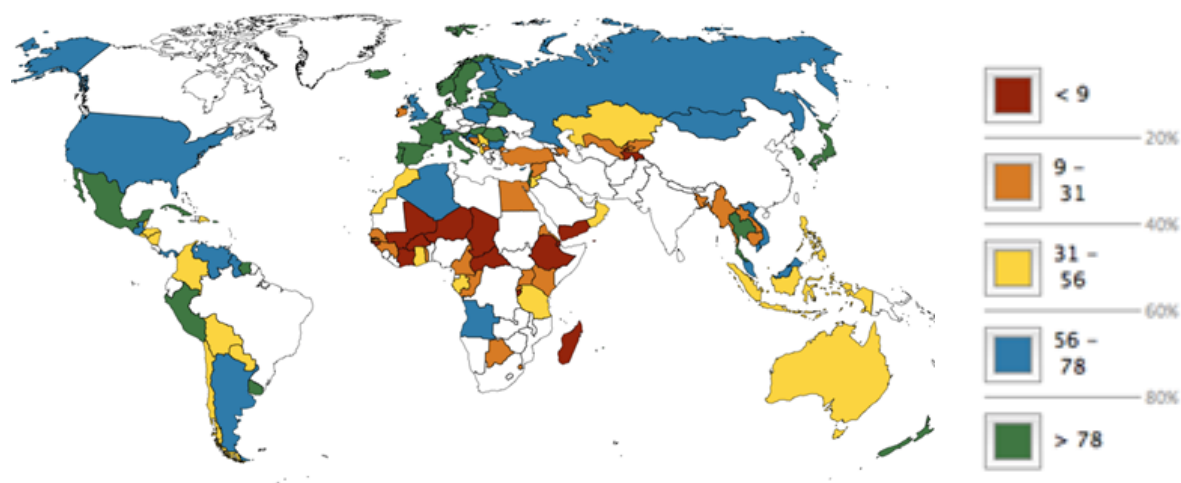


Table 1.

10 Countries with the Most Improvement in Pre-Primary Net Enrollment Rates					
		Percentage Points Improved	1999-2001 NER	2009-2011 NER	% Improved
1	Algeria	66.1	3.4	69.5	1927.9
2	Korea, Rep.	41.0	44.0	85.0	93.0
3	Moldova	37.3	36.8	74.0	101.4
4	Barbados	33.6	62.1	95.7	54.0
5	Sao Tome & Principe	32.4	24.2	56.5	133.8
6	Maldives	30.8	61.4	92.2	50.1
7	Mongolia	29.1	28.4	57.5	102.5
8	Nicaragua	26.7	28.6	55.4	93.5
9	Ghana	26.0	21.5	47.5	120.7
10	Uruguay	25.4	52.9	78.3	48.0

*Source: UNESCO Institute for Statistics in EdStats, November 2012;
Note: Data were not available for 118 of 213 countries.*

Globally, the gender parity index has been increasing from .98 in 2000 to (1.0) in 2010. Only the Middle East and North Africa region lags behind. Data from Demographic and Health Surveys and Multiple Indicator Cluster Surveys suggest that rural/urban disparities exist in pre-primary attendance rates in Europe and Central Asia, with disparities being more pronounced in some countries (e.g. Montenegro and Serbia) than others (e.g. Bosnia and Herzegovina) [59]. Data also suggests income disparities exist in pre-primary attendance rates in many countries in all regions of the world. For example, in Sub-Saharan Africa, disparities are more pronounced in some countries (e.g. Sierra Leone, Gambia) than others (e.g. Burkina Faso, Somalia) [59].

Pre-primary pupil-teacher ratios (PTRs) have remained steady since 1999 at around 20 pupils per teacher globally. Europe and Central Asia is the region with fewest students per teacher ranging from 1:8 to 1:10 over time. In 2007, South Asia, had the highest PTRs (1:40 students per teacher) followed by Sub-Saharan Africa (around 1:17 students per teacher in 2011).

Advances in the Evidence Base on ECCE

In the past fourteen years, several advances in both strands of ECCE-related research – basic research on early environmental influences and evaluation research – have further illuminated the rationale for ECCE, as well as promising directions for implementation and improvement of quality, equity and access in ECCE.

Biological and neuroscientific evidence base. Turning first to the basic science of early childhood development, the biological, neuroscientific and genetic sciences made several advances, with an increasing number of studies conducted with human populations. First, data on biological stress processes as mechanisms for early enrichment programs emerged from randomized evaluations, thus integrating the evaluation science and basic science for the first time. HPA (hypothalamic-pituitary-adrenal) axis processes such as diurnal cortisol patterns, long investigated as key in stress processes in childhood, began to be assessed as mechanisms of child impacts in ECD program evaluations [60]. Quality in ECCE settings has been found to be related to stress patterns as measured by diurnal cortisol [61]. Second, developmental epigenetic research showed that aspects of genes themselves are shaped by experience early in life. Gene expression is influenced, for example, by the balance between adversity and enrichment in the developing child's environment [62]. Third, further advances in biological and genetic research produced powerful evidence of plasticity and biological sensitivity in development. A landmark study of infants raised in severe adversity in Romanian orphanages showed the power of early parental enrichment in reversing cognitive effects of severe adversity, but that the timing of such enrichment mattered, with placement later than 18 months associated with much lower probability of cognitive skills in the normal range by preschool age [63]. And a new set of studies showed how some children may be particularly sensitive to both "good" and "bad" environmental influences in their development [64]. Finally, advances were made in the understanding of self-regulation and executive function skills in development, with early childhood a period of particularly rapid development in these skills due to growth in the prefrontal cortex [65, 66]. These skills became the focus of some research in LAMI countries as well [67, 68].

Economic theory and evidence base. Expansions of human capital theory in economics further advanced the evidence base for ECCE. Specifically, theories of how skills develop across different periods of childhood were developed. The economist James Heckman's theoretical and empirical advances in the 2000's focused on how foundational skills in early childhood serve as the basis for acquisition for

further skills. His theory of the technology of skill formation across the life span, coupled with analysis of economic evaluations of education interventions between birth and adulthood, explained why investment in early childhood might have uniquely strong impacts on life-course skill acquisition and productivity, as well as be the most cost-effective [69]. Cost-benefit analysis of preschool programs from the United States, for example, indicated that investment in ECE can pay off, with ratios ranging from 3 to 7 in small-scale as well as (for the first time) large-scale evaluations across entire cities [70-72]. Research in Turkey [73] and Bolivia [74] provided two more examples of sizeable cost-benefit estimates for early childhood interventions. Due to these studies, the development of preschool aged children, their cognitive abilities, socio-emotional skills and physical health are now increasingly seen as critical determinants for later school attainment, health and socio-economic well-being [75].

Jere Behrman and colleagues estimated that expanding preprimary enrollment to 50% in low-income countries would produce benefits of US\$33 billion, with benefit-cost ratios ranging between 8 and 18, depending on assumptions [76]. Calculating economic benefits and costs for ECCE, however, presents a number of challenges. Defining total resource costs and obtaining data on actual expenditure plus opportunity costs is difficult and complex in ECCE. Capital costs, for example, have been difficult to identify in many LAMI countries. Additional variation in market, resource and cultural contexts, can significantly inhibit any extrapolation or generalization from the limited number of studies currently available. The economic rationale for ECCE cannot yet be confidently justified for universal application without further data on how to define and implement levels of quality sufficient to produce economic impacts [77].

Impact evaluations of ECCE. Non-economic evaluation studies of ECCE have expanded greatly in LAMI countries. As synthesized in two series in the *Lancet* journal, in 2007 and 2011, these studies showed consistent, positive impacts on indicators of children's learning, for the first time with examples covering most major regions of the world. We summarize these evaluations and more recent ones in Table 1.

Basic impact evaluations comparing ECCE to no ECCE have continued to show a positive pattern of results. Rigorous studies from high income countries such as the United States [78-80] and the United Kingdom [81], and LAMI countries such as Argentina [82], Bangladesh [83], Indonesia [84], Vietnam [85] and Mozambique [86] show that children who attend preschools have better developmental outcomes than children who do not attend. The most consistent pattern in these studies are the positive benefits of preprimary education exposure on cognitive skills, including language, numeracy and psychomotor development. Fewer studies have focused on social and behavioral development, with a couple reporting positive effects. Recent research has also expanded in scope to investigate issues of program enhancement.

This growing body of research is a significant advance for the field of ECCE. However, it is important to contextualize such findings and investigate issues of implementation to better understand why certain interventions might work in various settings and under certain conditions and when they might be ineffective or detrimental. For example, research on informal preschools is mixed. Research from Ecuador on the evaluation of child care centers found negative impacts on both mothers and children [87]. This study highlights the possible tension between labor market participation, mothers' psychological well-being and child outcomes. A study from Colombia also found some evidence of negative impact for community childcare centers, though within the treatment group children who had

attended for more than 16 months scored higher on cognitive tests than those who had attended for 2 months or less [88]. Although community preschools, with teachers volunteering or receiving stipends, showed positive effects relative to no preschool in Cambodia, higher-resourced preschools with fully salaried teachers with much more extensive training resulted in larger impacts on cognitive outcomes [89].

A new generation of evaluations comparing ECCE quality improvement to ECCE “business as usual” provides important directions for how to improve systems at scale. Important considerations include the provider of services, the caretakers and their training, curriculum and setting. Table 1 includes a section, building on the 2011 Lancet review by Engle and colleagues, that highlights studies comparing outcomes for quality-improvement interventions compared to “business as usual” ECE programs. In general, this set of studies shows that quality improvement efforts show better learning outcomes when compared to standard programs [90]. Such interventions, evaluated using controlled designs, have proven successful targeting a range of particular quality dimensions in Latin America (Jamaica, Costa Rica and Chile) [91-93]; South Asia (Bangladesh and Pakistan) [94, 95]; East Asia (Cambodia) [96]; Africa (Kenya, Uganda, and Tanzania) [97]; and the United States [98-102]. Several show positive impacts on observed quality measures.

Some of the lessons emerging from this important recent set of studies include the following. First, approaches to professional development for teachers and caregivers seem to be key, with particular promise from approaches that incorporate on-site observation and feedback. This principle is supported by adult learning models that suggest the importance of modeling and practice in the settings of daily work. Second, the duration of training in ECCE seems to matter for children. Comparison of 3 forms of preprimary education in Cambodia, for example, showed a linear relationship between effect sizes on learning and the intensity and duration of pre-service training (however, resources in ongoing implementation of these 3 systems paralleled the intensity of training) [103]. An impact evaluation of an 18-month training and professional development program in Colombia showed positive impacts on observed quality in the Hogares Comunitarios home-based child care program, and positive impacts on children’s health and behavior [104].

Comprehensiveness and duration of services. The holistic nature of child development in the early years, across health, learning and behavior, is supported by a range of health, education, social protection, and child protection interventions. These also require attention to facilitating very different stages of growth and parent needs across this development period (e.g., before birth; during the perinatal period; during infancy and toddlerhood; and preprimary age). Whether comprehensive services across sectors are literally provided in a single program, or coordinated across sector-specific programs, varies a great deal across countries [105]. There are relatively few controlled studies of ECCE with and without added services to permit conclusions regarding the added impact of specific non-education services in areas of health, nutrition and social protection. In LAMI country contexts, there is a mixed pattern of results in combining nutrition services with broader child development services, particularly when this is done at scale; however, the number of evaluation to inform this is limited (one recent review identified 13) [106]. In the area of social protection, trials in Mexico and in Nicaragua showed positive impacts on young children’s learning in conditional cash transfer programs that included educational components for primary school children [107, 108]. It may be that the educational focus had some impact on general household investments in learning including for young children.

Future work in social protection should test the addition of ECCE conditions, in combination with the more common health, nutrition and immunization conditions in infancy and early childhood.

ECCE programs appear to benefit children in particular non-educational domains when services are provided that are focused in those domains. For example, facilitating immunizations and primary health care in ECCE programs has been shown to improve health outcomes [109]. Socio-emotional outcomes such as reduced behavior problems are facilitated when programs have an explicit emphasis (e.g., in their training or curricula) on this area of development [110]. Parenting supports in ECCE are effective when they incorporate chances for direct observation, feedback and support [111,112]. Thus, what may be as important as the principle of comprehensiveness is that the focus and quality of additional (that is, non-educational) services be considered in ECCE program design and implementation.

A challenging aspect of this integration concerns differential outcomes across both outcome domains and subgroups within populations. For instance, a recent evaluation of community preschools in Mozambique found strong positive effects on a number of important dimensions of child development [113]. However, children who attended preschool were more likely to report being sick, probably a simple result of being in close proximity to other children. More consequential, however, was the fact that 40% of the children were stunted at baseline. As growth potential is largely determined by age three and difficult to address later in life, the fact that the program had no effect upon rates of stunting and wasting is unsurprising as the entire sample at baseline was older than three. As ministries coordinate across sectors such as health, child protection and education, it will be necessary to prioritize certain populations, programs and outcomes. On the other hand, better integration will enable more efficient allocating of resources and more timely targeting of services.

Finally, duration of ECCE services is an important topic for research. Unfortunately, there are relatively few studies of duration in the LAMI country literature. A classic study on ECE in Colombia showed that greater duration was associated with larger impacts [114]. A second year of preschool appears to add substantial gains in cognitive outcomes, although not clearly double the impact of the first year. This may be because the impact of one compared to none is simply larger than that of two compared to one (those with no preschool being especially disadvantaged) [115,116]. Another reason is that the sequence of 2 years of preprimary education may not often be implemented such that the second year builds on the learning of the first. It may be more common that mixed-age classrooms exist so that children in the second year experience largely the same instruction that they receive in the first year.

Scale and reaching remote and/or most disadvantaged populations. Transitioning from small-scale interventions to large-scale and national programming draws attention to the issue of equity in quality. Research consistently shows that the effects of early childhood interventions are largest for higher-risk or more disadvantaged children [117]. For example, a recent village-level approach to expanding ECCE with quality supports in Indonesia produced positive impacts on language and cognitive outcomes, with effects concentrated on the most disadvantaged [118]. Throughout the world, young children experience extreme poverty, undernutrition, physical and/or emotional abuse, chronic neglect, maternal depression, violence and other severe crisis situations. In some cases, the resulting toxic stress response directly alters the architecture and chemistry of the young brain, leading to long term impairments in learning, behavior, and emotional and physical health [119]. This evidence suggests an

argument that interventions target the most disadvantaged groups, as early as possible in development [120]. Much of the promise of early childhood interventions lies in the opportunity to address these early manifestations of social inequity. Indeed, a few ECE evaluations have actually examined effects on inequality, finding reductions in disparities in early learning outcomes at the village level (across SES) [121] or across more vs. less disadvantaged groups [122]. Therefore, although more advantaged populations also benefit from high-quality ECCE, less advantaged populations simply benefit more.

Reaching the most disadvantaged populations can be extremely challenging and especially so when implementing at scale. Even in high resource contexts, providing access to comprehensive ECCE services to the poorest or most marginalized families can be difficult. Some groups are systematically excluded from ECCE in many countries. For example, children with disabilities show lower rates of access to ECCE, with this pattern partly explaining lower rates of entry into primary education [123, 124]. Children from language-minority backgrounds also show lower rates of enrollment [125]. Gender presents a complex picture, as girls are less likely to be enrolled in ECCE in many countries, but boys are less likely in about as many other countries [126.] Children exposed to conflict or disaster and children of immigrants (particularly those without legal status or full rights) may be less likely to be enrolled in ECCE [127,128]. Finally, rural and remote populations show consistently lower levels of access. In addition to being challenging, providing ECCE to these particularly vulnerable and hard to access populations comes at a cost. In the Philippines, for example, projections estimate that reaching the most vulnerable populations would be significantly more expensive than current programming costs. A recent cost calculation of the scaling up of nutrition services estimated that unit costs would be constant for 80% of the population, but would be 3-4 times higher for the next 10% [129,130].

Scaling implementation can run the risk of exacerbating preexisting inequality. The rapid expansion of ECCE's private sector, for example, could further entrench current social exclusion and marginalization [131]. Public or community interventions also have the potential to amplify current disparities. An ECCE quality improvement program in Mexico, for example, used a competitive process to distribute funding to schools for quality enhancement. In practice, the largest and most resourced preschools were most successful in receiving additional funding [132]. Inequity is also not limited to issues of resources, and takes many forms.

Cultural perspectives in ECCE programming and evaluation. Research in ECCE tends to be defined by a singular, Western perspective. There is a significant amount of work to be done to enhance our understanding of the development of young children by incorporating more diverse views of human development and learning. Super and Harkness have put forth the “developmental niche” as a theoretical framework for understanding the development of children in cultural context [133], describing how culturally-determined aspects of a child's environment interact with a child's own disposition to affect learning and development. Understanding the variation in sociocultural settings of human development, and particularly how such variation relates to children's experience and relationships, is key in conceptualizing and implementing ECCE programs and policies.

Extensive research in the Louga District of Senegal has illustrated how local ethnotheories and practices define children's development [134]. This work focused on the integration of child development strategies. Researchers promoted certain competencies, such as vocabulary building, through traditional practices, such as errand running. All child-rearing contexts have strengths and weaknesses, but are built on differing value systems and priorities. Recognizing diverse definitions of

development and multiple paths to growth will make it easier to first identify successful strategies and then determine how best to promote them in different contexts.

This approach is also important when approaching diverse contexts, such as cities. Research in Amsterdam, for example, compared ethnic Dutch caregivers to Caribbean-Dutch caregivers, finding that the former believed in a more “individualistic” approach to socialization, while the latter had a more “collectivist” emphasis [135]. When observing the same settings, researchers found that Caribbean-Dutch caregivers more actively encouraged collaborative group processes among children, which was associated with greater cognitive complexity in play and activities. The basic science of early childhood development must incorporate much more knowledge of the culturally-based norms and practices in families and communities across the world, and in particular LAMI countries [136,137].

Approaches to ECCE that take into account culture along with quality appear to show positive effects on children. For example, developmental expectations for young children within the religious and cultural context of Muslim East Africa informed the Islamic Preschool Curriculum of the Madrasa Early Childhood Development Program. This program showed positive impacts on the African Child Intelligence Scale and the British Ability Scale in a controlled evaluation across Kenya, Uganda and Tanzania [138]. Similarly, the recent large-scale Indonesian early childhood development program incorporated attention to both Muslim and non-Muslim values and communities in that country [139]. Work to integrate local beliefs and practices into ECCE programming has also been found to be effective in Turkey [140] and Colombia [141,142]. Conversely, inability to relate programming to local contexts has also been used as a theory to explain why certain interventions are ineffective [143].

Measurement and monitoring: Child assessments. An important part of the ECCE field is the development of multiple and diverse methods of assessment. Until fairly recently, the definition and measurement of child development has primarily been formed by a Western perspective. Though certain indicators and milestones can be seen as universal, others are critically influenced by a child’s culture and environment. The timing and emergence of certain skills can be relative. When researching infant development in several different ethnic groups in Kenya, for example, researchers found that sitting and walking occurred earlier than in Euro-American samples, but crawling did not, probably related to differing cultural and ecological importance of such skills [144].

This issue of measurement and assessment highlights one of the most challenging aspects of the field of ECCE, its breadth. Developmental potential in early childhood encompasses dimensions of physical, cognitive, language / literacy, social, and emotional development. Obtaining accurate data is a difficult task for most fields, but in early childhood is particularly challenging both because of this variety of developing outcomes, but also because of the rapidity of their development from birth to school entry. Though cross-national and within country comparisons can be very useful, it is important to recognize how limited a picture available data present. As is common with later learning assessment, there has been an emphasis on cognitive, language and physical aspects of learning and development, rather than the social or emotional. Improvements in child development include a multiplicity of outcomes. Some indicators appear to be more straightforward and receive more attention, such as enrollment in preprimary education. However, even this variable is deceptively simple, as the definition of age group varies between countries, as does what constitutes an early childhood program and the reliability of the data itself. The distinction, for example, between net and gross enrollment rates is not as well established in preprimary education as it is in primary.

Two kinds of children's assessments, distinguished by their purposes, can inform and be integrated with ECD programs and policies [145]. The first can achieve the goal of population-wide assessment of children's progress across different areas of development, capturing a "snapshot" – whether national or subnational / regional – of children's development. These measures should encompass attention to the physical, cognitive, and socio-emotional domains of children's development, in keeping with a comprehensive definition of developmental potential. Ideally, information should consider the perspectives of caregiver or teacher, parent, and independent assessor (each has their strengths and weaknesses). UNICEF's MICS (Multiple Indicator Cluster Surveys) includes an early childhood development module that asks caregivers and parents about their children's physical, cognitive (language / pre-literacy, numeracy), and socio-emotional development (approaches to learning such as engagement and curiosity) and thus reaches over 60 countries capturing multiple domains of young children's development. However, the measure is limited to 3 to 5 year olds and does not incorporate any direct child assessment. Other measures of caregiver- or parent-reported young child development exist or are under development, including the Early Development Instrument and the Index of Early Human Capability, which incorporate items representing each of these domains and are being used across high-, middle-, and low-income countries [146]. Important supplements to this type of measure are those assessments that can capture developmental growth in specific areas over time (e.g., growth in language or emotional skills). Some regional efforts are moving towards direct child assessment (e.g., one in the East and Southeast Asia regions coordinated by Nirmala Rao and colleagues), a major advance beyond existing multi-country assessments.

The second form of child assessment is the screening tool, which can serve to identify delays or difficulties in development. Available evidence suggests that children with moderate delays or disabilities can benefit substantially from quality early childhood care and education. In many countries children with disabilities are excluded from such programs. Although data from screening tools can also be summarized across entire populations, these have the added function of enabling individual-level identification of need for further diagnostic tests and intervention. Among recent instruments of this type is the Guide for Monitoring Child Development (GMCD) [147].

The next challenge in measuring the development of young children for both of these purposes is to supplement adult-reported measures with locally developed direct child assessments, covering a range of domains of development that are short and feasible to implement. Several regional and global efforts are proceeding currently to conceptualize, develop and implement such child assessments. Current efforts, by the WHO and UNESCO, are building on recent initiatives such as the Brookings Institution Learning Metrics Task Force, to advance this area of child assessment. Advances should be incorporated in coming years to monitor progress on global ECD indicators [148]. Measures of social and emotional development, self-regulation, and executive function skills, in particular, are lacking, reflecting the lack of emphasis in the field on these domains of skills with important life-course consequences.

Measurement and monitoring: Program quality and policy implementation. The development of early learning and program standards has been an important indicator of progress in monitoring systems in ECD services. These have been successful in countries and in regions (for example, the International Step by Step Association's pedagogical standards, which have spread throughout the region of Central Europe and more recently on other continents. However, measures of service quality, ranging from those for center-based early education programs to the wider variety of services settings in home-based and informal child care, are urgently needed [149]. Without better monitoring of such contexts with measures of quality that show adequate prediction to children's learning, health and behavior,

investments in ECCE will fail to deliver promised results. Center-based measures of quality have been developed in specific nations as well as regionally, with some applied in multiple countries. A good example of locally derived quality measure is one for Mexican early childhood education programs, developed with extensive stakeholder input and pilot measurement in a variety of settings across the country [150,151].

However, most ECCE systems still do not use measures of service quality that have been shown to predict children's learning and development within that country. Metrics for short-term program improvement that can be gathered and tracked by service providers in order to improve their practice have been incorporated into large-scale systems in health care; this approach has just begun to be applied in the field of early childhood education. Opportunities for networks of teachers, caregivers, directors and supervisors to work together on such locally relevant short-term assessments of program quality were successful in building stakeholder motivation, reducing isolation, as well as bringing about concrete improvements in preschool quality in a peri-urban and rural region of Chile [152].

Beyond the level of services, the regular collection and sharing of systematic information on governance and policy approaches in ECCE is beginning. For example, the World Bank's SABER project provides comparative data on the policy elements of ECCE and broader ECD programs and policies across countries. Over the past ten years, many countries have instituted national ECCE policies and attendant action plans, with the total approaching 50 [153]. These documents usually explicitly reference research advances, and in particular research on early brain development. India's 2013 National Early Childhood Care and Education Policy states that "Growing scientific evidence confirms that there are critical stages in the development of the brain during this period which influence the pathways of physical and mental health, and behaviour throughout the life cycle" [154]. Similar references are found in Kenya's 2006 National Early Childhood Development Policy Framework and Jamaica's 2008 – 2013 National Strategic Plan for Early Childhood Development [155,156]. Such developments demonstrate ECCE research's ability to inspire and influence.

Finally, there is a great need to improve data system capacity in ECCE. For example, birth registration systems are the foundation on which population-based estimates of children's health, progress and supports for ECCE can be ascertained. Yet more than 100 countries do not have fully functioning civil registration systems. Sub-Saharan Africa and Southeast Asia are at particular risk, with 75% of unaccounted births and deaths in the world from these regions [157].

Country case studies where the evidence base on ECCE has been incorporated in early childhood education policies

Cambodia

In the Southeast Asia region, Cambodia ranks behind several other countries, including Thailand and Vietnam, in human development indicators as well as those specific to ECD. Preprimary enrollment also lagged, with 19% of 3-5 year olds enrolled in 2011. Increases in preprimary enrollment have been quite slow.

Cambodia passed its first national ECD policy in 2002, after ratification of the U.N. Convention on the Rights of the Child in the 1990's and following the Dakar framework of 2000. Public investment in ECCE programs began with a primarily sectoral approach, with three main ministry actors: The Ministry

of Education, Youth and Sport (MoEYS), the Ministry of Health, and the Ministry of Women's Affairs. The MoEYS is primarily responsible for ECCE. In 2010, after a national process bringing together 11 ministries and many stakeholder groups, a new national ECD policy with much more emphasis on intersectoral coordination was passed and signed by the Prime Minister. The policy relied in part on the growing international research evidence supporting ECCE, as well as evaluations in Cambodia such as those by Nirmala Rao and colleagues [158]. The national action plan following this policy is only as of this report's writing beginning to be implemented. The policy is explicitly multi-sectoral, involving 11 ministries. This may help address the intersectoral challenges observed in a recent governance case study [159,160]. Health services, in particular, were not well integrated into local governance and suffered from under-resourced and volunteer health workers. At the local level there appeared to be inconsistent or weak links between the 3 preschool programs, for example, and health education services for families. In addition, at the district and provincial levels, there was little coordination between health and education.

Cambodia has three principal ECCE programs at scale: the state preschool program, community preschools, and a home-based program. The state preschool program, offered 3 hours a day, 5 days a week, for 38 weeks a year, is based solely in public-school classrooms, and has the most intensive training (with preschool teachers trained for 2 years at the national ECCE teacher training program, in Phnom Penh). However, its reach is quite limited and expansion requires devoting new or existing public-school classrooms to preprimary education. In order to supplement this program, the community preschool and home-based models have expanded, with support from UNICEF, the World Bank, and other NGO's. The Community Preschools, often in rural areas, operated in spaces such as under the elevated houses of teachers, provides a two-hour program, five days a week, for 24 to 36 weeks a year. Community Preschools are integrated into local governance: teachers are selected by local commune councils, the chief mechanisms for decentralized governance in Cambodia. The teachers are monitored by the village / community Women and Children focal point. Depending on funding support, these teachers were either volunteer or paid nominal stipends. Community Preschool teachers receive 8-10 days of pre-service training and in-service training for 5-8 days per year. Finally, the home-based program serves families with children from birth to 5. Mothers and village volunteers form mothers' groups who then voluntarily lead the home-based programs in the absence of formal, paid teachers. These mothers' groups are facilitated by a core mother who receives two days of training on using HBP materials to support nutrition, child well-being, and developmental stages. These groups typically meet on a monthly basis. Core mothers can also oversee multiple groups, each led by a MTL (Mother Team Leader). The core mother meets every month with the MTLs to provide guidelines, share new information, and discuss issues related to developmental milestones.

The supplementation of a school-based preschool program with more informal models such as community preschools and home-based programming has proven successful in low-income countries such as Mozambique. In Cambodia, the evaluation by Rao and colleagues showed that children exposed to ECCE services performed better on cognitive measures than those not enrolled in any. Positive effects were strongest for the state preschool program, followed by the community preschool and home-based programs. Thus, the degree and intensity of both offered services and training of caregivers may matter. The disparities in training between the 3 systems are quite large, and should be addressed in future efforts to expand ECCE quality and access in Cambodia. In addition, observations of the monitoring system indicated a reliance on checklists of structural quality, with little attention to process quality (the

quality of teacher-child interactions). Here too there appear to be disparities, with state preschools showing substantially higher observed quality than community preschools. On some other dimensions, however, the more informal programs were quite strong. Notably, the home-based preschool program was responsive to local cultural variation in materials, language, and norms, providing a flexibility and attention to culture in its logic model.

Governance of ECCE in Cambodia is now integrated at the local level. The national decentralization policy provided attention to building local capacity for governance through the mechanism of Commune Councils (first elected in 2002). The Community Preschool program was explicitly included as a line item in Commune Council social spending budgets, with monitoring and budgeting functions therefore provided a mechanism for village-wide attention. Guidance from the Ministry of the Interior to the Councils was disseminated recently to guide social spending decisions in the ECCE as well as other areas. However small, this level of local investment can make a difference. However, the Women and Children Focal Point, responsible for monitoring ECCE, was a non-voting member in many Commune Councils.

At the national level, the capacity for budgeting and planning in ECCE varied across ministries. The rate of expansion has been slow, with a substantial portion of the funding for ECCE carried by multilateral NGO's. With the national ECD policy, however, it appears that the pace of national investment, as well as budgeting and planning capacity in ECCE along with health and social protection services, may increase.

Colombia

Colombia has a long history of public investment in ECCE, beginning in 1962 with the opening of 7 public preschools. However, early expansion viewed ECCE as primarily a support for working mothers in urban areas, as maternal employment increased (as it did in these years in cities across Latin America) [160]. In the 1970's, the Instituto Colombiano de Bienestar Familiar (ICBF) took on its mission of addressing the needs of vulnerable children and families specifically in early childhood through family-based child care, preschools; and center-based care. The first national curriculum of preschool education was disseminated in 1987. By 1994, the Ministry of Education had begun to invest in preschool education on a wider scale, with the eventual establishment of Pre-jardin for 4 year olds, Jardin for 5 year olds, and Transición (to primary school) for 6-year olds.

In the area of early child care, Colombia was an early innovator in defining home- and community-based child care as an early learning program. In 1986, ICBF established Hogares Comunitarios de Bienestar, building on the prior Hogares Infantiles care programs, the single most prominent ECD program in the country. This primarily home-based care program was staffed by volunteer community mothers, and had strong emphases on community empowerment, women's leadership. ICBF provided materials and training, but the Madres Comunitarias were unpaid. By the early 1990's, HCB served over 1.5 million children, and Colombia had signed onto both the U.N. CRC and the Jomtien declaration. In addition, Colombia's 1991 Constitution set the legal framework for decentralization, an important theme in ECCE in the country in the decades since.

By 2006 Colombia had instituted the rights perspective in its *Código por Infancia y Adolescencia*, with local governance and participation ensuing. For example, the *Código* established departmental and

local (municipal) Mesas de Infancia y Adolescencia – intersectoral, interagency committees responsible for children and families).

A tension in the governance of Colombian ECCE is the role of the departmental (subnational) level. Policy reforms in the 2000's led to expanded financing of ECCE through national-to-local (national to municipality) mechanisms. Because funding is primarily national or national to local, there is an unclear role of the department in governance and finance of ECCE. Another lies in the capacity of institutions to span national to departmental and local levels. Here the ICBF is somewhat unique in having its own national to local structure within the government, separate from the implementation of other (Smaller) ECCE programs.

In 2006, Colombia began making major steps towards greater intersectoral coordination, through an intensified partnership between ICBF (which resides in a social protection ministry) and the Ministry of Education. This was strengthened by the National Development Plan for 2010-2014, which set up a national coordinating body for early childhood development across ministries and stakeholders.

The coordinating committee, beginning in 2011, established a new and integrative early childhood policy for the country called De Cero a Siempre. After an extensive national stakeholder process, a conceptual framework of DCAS was established with standards. The framework links multiple domains of early childhood development outcomes with what are called “atenciones,” – the concept of supports for each domain, which reside in between traditional levels of services and sectors. Every child is conceptualized to have a right to all 7 primary atenciones. The call for intersectoral integration, not just coordination, begins with the establishment of Mesas de Primera Infancia at the departmental and municipal levels. National, departmental and municipal trainings are provided in the Ruta Integral de Atenciones framework and its implementation.

The implementation of De Cero a Siempre has begun with investments for the 2.1 million most vulnerable children in the country, intended to assure access to all 7 atenciones to this group. Implementation began in 2012. In practice a substantial proportion of this new investment consisted of construction of new Centros de Desarrollo Infantil, which transformed many of the Hogares Comunitarios programs into large centers (with hundreds of children each).

Strengths of the DCAS policy identified in recent case-study-based evaluations [161-163] include most importantly its intersectoral integration, which ties a comprehensive approach to child development outcomes to how programs and policies are structured and implemented. The national framework is accompanied by a comprehensive set of national standards. Second, the policy, following national decentralization policies, provides autonomy to the local territories of Colombia (for example, in the cultural focus of local programming, respect for home languages other than Spanish; and implementation by local providers subcontracted by the government; and attention to local governance mechanisms like the Mesas de Infancia y Adolescencia and Primera Infancia). Third, the notion of intersectoral integration has been formalized in the interdisciplinary teams that staff each new Centro de Desarrollo Infantil (including social workers, psychologists, and teachers).

Several challenges remain. First, decentralization creates challenges as well as opportunities. For example, despite a national communication and social mobilization campaign, it has been difficult to achieve buy-in from governors of departments and mayors of municipalities. This has resulted in unevenness in the establishment of Mesas de Primera Infancia or integration of early childhood into the

more general Mesas de Infancia y Adolescencia. In addition, quality instruments have not been developed beyond monitoring checklists, in part due to sensitivities regarding local control and culture. And, as is common in most decentralized systems, allowing for municipal planning, budgeting and implementation requires intensive capacity-building in all three areas, which presents challenges given the diversity of the country. Second, mechanisms for improving quality are a challenge. Many of the services, as is typical of ECCE in Colombia, are subcontracted to non-profit local providers. Selection of providers is left up to municipal authorities in most cases. This makes consistent monitoring of quality and implementation quite difficult. Strengthening of the links between national standards and quality of local implementation is only just beginning through extensive technical assistance. Finally, data systems are currently being built upon and integrated across sectors, but again here enormous challenges exist regarding local variation in software, extent of data collection, and minimal linkages to practice and implementation. The sector with the strongest household-level database (social protection, through the extreme poverty reduction agency Agencia Nacional para la Superación de la Pobreza Extrema or ANSPE) only has data for the most disadvantaged, and provides no direct services, but referrals to services.

In sum, the Colombian case provides a strong recent example moving towards increased integration, with common tensions among decentralization and the need for nationally consistent quality and outcome monitoring. Attention to public-private partnerships and a national communication and social mobilization campaign build on a comprehensive and sophisticated national framework.

India

India boasts one of the oldest and the largest national early childhood development programs in the world. The Integrated Child Development Services (ICDS) program reaches over 8 million expectant and nursing mothers and over 76 million children, in 1.26 million community-based Anganwadi centers [164]. India's work in ECCE is also notable for a number of other factors. Launched in 1975, the ICDS program was created because previous national programs had failed to reach more than a small minority of children. Though initially inspired by health concerns and malnutrition, ICDS is particularly remarkable as an integrated system. From its inception, one of the program's goals was "to coordinate the work of various departments concerned with child development" [165].

The Anganwadi center is village based and community focused, named after the Hindi word for courtyard. Activities and resources are managed by an Anganwadi worker and an assistant. The centers provide supplementary nutrition, immunizations, health check-ups, referral services, nutritional and health education for mothers and pre-school education for children ages 3 to 6. ICDS is a model for large-scale multisectoral integration. ICDS's effort to incorporate health care, nutrition and preschool education into community based child development centers is exemplary. In this way, India represents a different approach from Cambodia and Colombia, in that ECCE services and sectors are integrated into a single national program.

Like most large scale and expansive interventions, the ICDS program has not been universally successful. As early as 1985, assessments found centers that were ill equipped and in unsatisfactory environments [166]. Nearly 30 years later, these concerns continue to undermine the impact of the program in some areas [167, 168]. Another critique is that the program has remained focused on nutrition and health, while the preschool component has been neglected or poorly delivered. And

despite this emphasis, the impacts of the program on nutrition continue to be weak, with rates of underweight for children under 5 at 43 percent [169].

Additionally, though program placement within states seems to have targeted poorer and larger villages, the program has the lowest coverage and lowest budgetary allocations in Northern states such as Uttar Pradesh, which have the highest levels of child malnutrition and nearly half of the country's population [170]. Admirably, there is open recognition of the quality and equity concerns facing ECCE provision in India. An "eyewitness account" published by the ICDS program offers realistic "snapshots" of ICDS centers throughout the country, concluding that "the picture that emerges from these snapshots is a grim one" [171].

Continuous research and assessment have highlighted these concerns and some initiatives have responded in various and innovative ways to improve the program's quality. In Maharashtra state, for example, the Centre for Learning Resources has developed a training curriculum for ECCE caregivers. An impressive training system provides mentorship, coaching, accompaniment and observation not only for the caregivers but for the mentors as well. The curriculum also works to apply national guidelines while investigating local cultural contexts.

In response to the persistent problems with implementation and quality, a national restructuring plan for ICDS was passed in 2011 [172]. The report illustrates Indian policy makers' attention to research and program evaluation. It states, "Recognizing that there are both program design and program implementation gaps in the ICDS- the Report of the Inter Ministerial Group on ICDS Restructuring creates new paradigms both for "What" would be different and "How" could things be done differently." The strategic shift and vision for the future is described as "adopting a life cycle approach to early childhood care and development, Anganwadis would be transformed as vibrant, child friendly ECD centers which will ultimately be owned by women in the community." The report includes plans for more intensive training of Anganwadi workers for home visits for families with children 0-3, with a focus on nutrition and stimulation. It also includes strengthening of the program's monitoring system, including a management information system with mobile phone-based uploading of data; and closer integration of the program with local governance mechanisms.

India has also recently developed the first national policy for early childhood development, setting universal access to ECCE for 0-3 and 3-6 year olds as an explicit goal [173]. The policy situates national ECCE policy in the Ministry of Women and Child Development. It provides for both structural and process quality standards, and the establishment of national curriculum standards. It also reiterates a more outcomes-focused approach for the ICDS. The policy's vision is "to achieve holistic development and active learning capacity of all children below 6 years of age by promoting free, universal, inclusive, equitable, joyful and contextualized opportunities for laying foundation and attaining full potential." As of this report's writing, the National ECCE Council for the ECD policy was being constituted.

Ghana and Kenya

ECCE has an impressive history in Kenya. The tradition of parent and community run preschools is particularly strong, in part inspired by the *Harambee* grassroots development spirit of President Kenyatta. 300,000 children were already enrolled in preschool by 1970, increasing to 802,000 by 1989, representing 30% of 3-5 year olds [174].

Kenya's ECCE sector has had gradual but consistent growth. More than 50% of preprimary school aged children are now enrolled in some form of preprimary education [175]. One of the strong points of Kenya's ECCE sector is its collaboration and coordination across various types of institutions. Efforts to build the capacity of community-based schools, as well as standardize quality across the private and public sectors, has long played a role in Kenya's work. The Kenya Institute of Education (KIE), for example, partnered with the Bernard van Leer Foundation in 1972 to implement the Preschool Education Project [176]. This initiative focused on teacher training and curriculum development, aiming to establish sustainable systems by which to improve the quality of preschool across Kenya's varied providers. Such work led to the establishment of the National Center for Early Childhood Education (NACECE) in 1984 [177].

KIE and the NACECE still focus on training and quality improvement. Recent projects include mobilization of parents and community members to strengthen community-based programs, training religious institutions to introduce a holistic approach to faith-based early childhood centers, and the development of a program with the Samburu community based upon local child rearing practices. Some of these experiences have been scaled to national levels, like the Islamic Integrated Education Program. Though such initiatives have worked to both address and capitalize on the diversity of Kenya's ECCE sector, the Kenyan government recognizes the need for more and better coordination. In light of "duplication, poor utilization and gaps in the provision of resources . . . There is need, therefore, to amalgamate and harmonize all policy statements to ensure better coordination in the provision of services and better utilization of resources" [179].

Kenya is also notable for its attention to research [180]. The 2006 National Early Childhood Development Policy Framework, for example, references multiple fields of child development research. It draws attention to the general importance of the early years of life, but also to the specific Kenyan context. In stating, "Research evidence documents that parents and other caregivers are not stimulating and caring for their young children as they used to do in traditional societies," it cites five different studies.

Though Kenya has an impressive history of grassroots ECCE provision and a longstanding tradition of research, early childhood is influenced by multiple and constantly changing factors. Enrollment in early childhood services decreased in Kenya in the mid-2000s, in part due to the government's new policy to provide free primary education (FPE.) Many parents kept their children home until they were able to enroll in FPE [181]. This recent development illustrates how early childhood needs to be situated with greater educational and other contexts.

Ghana's ECCE experience provides an interesting comparison. In 1971, preprimary enrollment in Ghana was at about 3%. By 1990 it had increased to 35%. In 2012, preprimary enrollment was over 113% [182]. This dramatic increase is due in large part to the inclusion of two years of kindergarten in Ghana's universal basic education. The Ghanaian government has identified ECCE as a national priority, and has followed through with both policy and, importantly, financing, providing capitation grants for the kindergarten classes.

Ghana's policy is commendable. It emphasizes integrated and coordinated services for children from birth to eight years of age. In practice, kindergarten services have received the most attention, accompanied by major efforts to increase the accessibility and quality of pre-primary education. Actual

enrollment has far surpassed the national goal of 75% by 2015, placing Ghana among the highest gross enrollment ratios in the world.

Policy is an important advance, particularly for a field such as ECCE that has a history of underrepresentation. However, it is just one aspect of work to promote the safe and healthy development of children. Recent changes in Ghana's ECCE field can undeniably be seen as progress, but there are also major challenges. Quality, for example, is a critical concern. Many kindergarten programs are undermined by overcrowding, poor infrastructure and an insufficient number of trained teachers. The government of Ghana recognizes and prioritizes the issue, stating in the 2003-2015 Education Sector Plan that "the nation continues to grapple with serious challenges on quality of education." The government's recent plan for early childhood, developed after extensive stakeholder involvement by the Ghana Education Services in the Ministry of Education, aims to address some of these challenges [183].

A somewhat more complicated concern is the issue of holistic programming. Though Ghana's policy calls for integrated and coordinated services, one of the possible threats of universal preprimary policy is that it could become a simple extension of primary schooling, focused almost exclusively on basic learning outcomes and not addressing the complex and unique demands of early childhood across health, social protection and child protection in addition to education.

It is also important to consider preprimary education within the greater context of early childhood. It is estimated that nearly a third of children enrolled in Ghanaian kindergartens are not of the appropriate age [184]. It is not known whether these children are older, younger or both. Ideally, work in early childhood should include a wide variety of services to address the different phases and needs of development from birth through the transition to primary school. An exclusive focus in ECD on kindergarten, both from providers and participants, could be detrimental to children and the field as a whole. In many countries, services for children from 0 to 3 years of age are insufficient. The transition from 3 years of age to preprimary programs is also a critical gap in many ECCE systems and policies. Too strong a focus on preprimary education could exacerbate both of those concerns.

The comparison of Ghana and Kenya's experiences in ECCE illustrates some of the variety of approaches to the field. Ghana has taken a recent rapid approach to expanding access, with accompanying concerns about capacity and quality of the workforce. Kenya has taken a more gradual approach with strong institutional involvement in quality improvement. Balancing issues of access, quality, institutional capacity and approaches, it is clear that there is no single way to develop ECCE at the national level.

Peru

Recent work in Peru's ECCE policy and programming has benefited from particularly close collaboration between government and civil society leaders. Like Colombia and Cambodia, decentralization has played a role in the structure of ECCE. ECCE implementation is also supported by policy initiatives in transparency of government expenditure; and results-based budgeting (sometimes referred to as outcome- or performance-based budgeting). The Peruvian government's experimentation with different methods of care and interventions has provided valuable experience and learning.

Peru's recent history of early childhood policy has involved leadership and coordination across government and civil society. After the Fujimori administration, ECD was brought into national policy

discussions as a key lever to reduce poverty and inequality. The policy development process was led through cross-sector coalitions such as the *Mesa de Concertación por La Lucha Contra La Pobreza*, which involved leaders from government as well as civil society working together to successfully advocate for a series of ECD policies across the last 15 years. ECD has had some major recent successes – it is the first social policy area in which a new national initiative of results-based budgeting (*Propuestas para Resultados*) was implemented. That ECD initiative, to reduce chronic child malnutrition, produced large decreases in rates of early childhood malnutrition between the years 2009 and 2013.

Local governance mechanisms are integrated with ECCE through the PPL local participatory budgeting policy (*Presupuesto Participativo Local*). Although this gives local municipalities autonomy over social spending, it has been observed that some municipalities have decided to emphasize infrastructure spending over ECCE [185].

One critically important aspect of Peru's approach is the recognition that in spite of long term histories of discrimination, inequity and exclusion, rural areas have powerful strengths and opportunities. Designing programs for these areas needs to include diverse perspectives and voices, encouraging intercultural dialogue, civic participation and the empowerment of indigenous people and peasants [186]. These were some of the goals of the Ministry of Education's Project on Education in Rural Areas, which began with strategy design and validation in 2004 - 2006, and was followed by general implementation in 2007.

The project employed a bilingual, bicultural approach and piloted three different models of early care interventions. "Home learning" took place in a child's everyday environment, including fathers, mothers and other caregivers. Conducted through home visits, this strategy aimed to address the problems facing particularly scattered populations. "Learning families" operated through reflection and group support, bringing families together to learn collectively. "A place where children play" identified communal areas to dedicate to children's play groups.

Launched in 2012, Peru's current flagship national program in ECCE, *Cuna Más*, builds upon previous experience of successful family service programs in both day care centers and home visits [187]. It is a single program, rather than a set of coordinated national policies and programs, and therefore more like the ICDS program than *De Cero a Siempre* in Colombia. *Cuna Más* aims to integrate the emphases of supporting parental employment while fostering positive parenting and child development. From a governance perspective the program is also novel in that it is one of the major programs of a new ministry, the Ministry of Development and Social Inclusion (MIDIS), rather than representing collaboration of traditional line ministries (e.g., nutrition programming is shared by the Ministries of Health, Women and Social Development, and Education).

The *Cuna Más* program targets areas of poverty and extreme poverty and children 0 to 3 years of age, a notably young target population. Home visits are conceptualized as "family accompaniment" or *acompañamiento* in which professional community workers conduct household visits to help parents build skills that will encourage the learning and development of their children [188]. Workers monitor children's growth and the quality of their environment, reporting cases of risk or vulnerability to child protection services. They also provide educational materials to promote play and learning.

Cuna Más has also devoted a significant amount of attention to addressing issues of quality in its day care centers in marginalized urban areas. These centers are co-managed by the State and

communities and are designed to provide a wide variety of comprehensive child services, including health, nutrition, safety, protection, play and rest, as well as learning and skills development

Peru's ECCE sector is becoming increasingly integrated across health, education and protection fields. The MIDIS, with high capacity for integrating planning and budgeting with program implementation, has integrated high-profile ECD programs such as Cuna Mas. Ministries of Health, Education and Women and Vulnerable Populations have also been involved; however, it is unclear whether the initiative will result in higher capacity in those ministries for ECCE implementation. Guidelines for intersectoral and intergovernmental management are currently being developed.

At the same time, challenges remain in Peru's implementation of ECCE. Although it has achieved impressive reductions in child maltreatment through its flagship nutrition initiative, leaders in the country acknowledge that building children's early language and cognitive skills is a tougher challenge for outcomes-based budgeting, as the "recipe" of quality in ECCE in the country is not yet defined. Coaching is being introduced but at a relatively small scale, for example, in supporting preschool teachers. As in other countries, governance at the subnational level is particularly challenging; the central ministry of education was as of 2013 defining a set of competencies specific to management in education at the subnational level, and accompanying professional development models.

Conclusion: Key priorities for policies related to a post-2015 agenda

Early childhood care and education shows extraordinary promise in providing a foundation for sustainable development. This promise is clear, with the last 15 years of neuroscientific evidence on the particularly high malleability of early child development to environmental influence, as well as emerging economic evidence on the societal benefits of high-quality early care and education, providing a powerful science-based argument for investing in young children's learning and development. In addition, the existing evidence across countries suggests that the positive impacts of quality ECCE are particularly strong for more disadvantaged populations. This new wave of evidence thus links ECCE to two of the core rationales for sustainable development – economic development and social inclusion [189].

This evidence provides a strong rationale for further expansion of ECCE. However, our review has raised several critical issues and future directions for evidence-based ECCE: quality; multisectoral issues; measurement; governance; and public-private partnerships.

Quality. A focus on access can come at the expense of quality: a core lesson from expansion of primary education in low-income countries since 2000. Research in ECCE also shows that poor quality implementation can lead to either no positive effects on children's development, or even negative effects. The critical elements of quality are not just structural features like safety, group size, or adult qualifications (which are usually the focus of monitoring), but especially important process features such as the ability of teachers and caregivers to facilitate language and other cognitive skills through rich, reciprocal interactions and content-based teaching, and responsiveness in caregiving and classroom interactions. The most recent wave of evidence suggests that building teachers' and caregivers' skills on-site in the classroom or care setting through mentoring and coaching is particularly promising in improving observed quality of ECCE programs. It is therefore critical that policy implementation include sufficient investments in quality, through training, on-site support and mentoring, and reasonable monitoring that more closely links national standards in ECCE to local implementation and practice.

A focus on quality can also help to address a core tension in ECCE – that between child care as a work support and early education as a path to improve children’s learning. Integrating these two perspectives can achieve improved quality in both types of ECCE. Quality standards should incorporate attention to both structural and process quality, whether in more “child care” oriented systems or more “early education” oriented systems. The monitoring and improvement of quality through on-site supports, similarly, could be implemented in a more equitable manner across both types of systems. Finally, early education programs, with their typically short hours (2 to 4 hours a day) could be integrated more with extended-hour programs so as to align with parents’ working schedules.

Multisectoral ECCE. A second critical issue is how multisectoral ECCE programs should be [190]. The evidence we have reviewed suggests that non-education services in ECCE programs can make an added difference in terms of gains in children’s development, but only if they are focused (gains in health or nutrition outcomes only when health care, immunizations or proper nutrition is integrated explicitly; gains in socio-emotional only when there is an explicit focus in programming and training on this domain; added gains from parenting education only when there is actual observation of parent-child interaction with feedback). The quality of these services matters just as much as the quality of core educational services. Different countries have taken very different approaches to the issue of integration. Some have integrated multiple sectors of services – health, education, child protection – into a single program with a unified set of standards. Among our case studies, this is the approach of India’s ICDS program or Peru’s Cuna Mas. Other countries have attempted to coordinate services associated with different agencies and ministries. Among our case studies, this is the approach of Cambodia. No single approach to coordination or integration is clearly superior, as the perspective is so vastly different across sociopolitical contexts. One consistent pattern, however, is that social protection (e.g., in the form of conditional cash transfers or other income supplements for the poor) has been rarely integrated fully with other services. And countries differ greatly on whether child protection services are integrated with health, nutrition and education programs.

Measurement. As the field heads into the post-2015 era with a new set of goals, targets and indicators, it will be important to advance measurement in ECD. This is an area of some weakness, as the field has only just begun to gather data within and across countries on multiple domains of children’s development. Most of the existing measures, moreover, are based on parent or caregiver report, an important source of data but only one of several approaches that are needed. Most urgently direct child assessments that are culturally relevant, distinguish developmental periods (at minimum, 0-3 and preschool / preprimary age), and cover the domains of physical, language / literacy, cognitive, social, and emotional development are needed.

In attempting to assess progress in the field of ECCE it is important to consider measures from multiple fields and to recognize which measure are currently more established. For example, clearer standards exist for assessing nutritional status and immunization history than for rights to protection and participation [191]. Prioritization should not be defined by the ease of measurement. Here a critical need is the development of research methods and measures not simply of child indicators of development, but of the quality of ECCE settings and programs. Without this intermediate set of measures, there is likely to continue to be only a loose association between standards for ECCE and children’s actual growth and development.

Governance of ECCE. The country case studies presented here, along with other recent research and case studies, raise the critical issue of governance and finance of ECCE in building quality with equity at scale [192-194]. Because ECCE and ECD policies in general are multisectoral in nature, responsibility for them can rest in an array of national to local governance structures. Some countries have taken the approach of a national, multi-ministry council coordinating ECD services from prenatal to school entry. In many cases, a ministry takes the role of the lead – in some instances, the ministry of education; in others, ministries of women and children or ministries of health. Some LAMI countries have gone through processes of decentralization and, among these, the integration of ECCE into local governance structures has varied. Cambodia is an example where the local commune councils established under its national decentralization scheme have responsibility for allocating funds to ECCE community preschools. In Colombia, decentralization policies from the 1990's have informed how ECCE intersects with local governance (for example, through Mesas de Infancia y Adolescencia at the municipal level). Peru has begun to integrate ECCE into its local budgeting mechanisms. A challenge in all of these systems of decentralization is how to increase capacity for planning, budgeting and implementation of ECCE at the local levels. In many LMIC's, the concentration of capacity at the national level is a problem. Intensive professional development, when implemented, is carried out at the local level, without concomitant professional development specific to ECCE for agency staff at local or subnational levels. The development of effective leadership training models is a major future direction for the sector of ECD.

In the area of finance of ECCE, several challenges are evident [195-197]. First, few countries accurately estimate and base planning and budgeting on accurate estimates of the costs of ECCE programs and policies. In some cases, entire important categories (e.g., capital costs) are not integrated into estimates of unit costs of ECCE; in many others, it has not been possible to integrate cost data from multiple sectors and associated ministries. Second, the capacity of national ministry staff varies in their ability to plan and budget effectively in this sector, and at the subnational levels, this capacity almost invariably weakens. At the local level, despite budgeting for ECCE being integrated into local governance and planning in some countries, often very little guidance or training occurs to support budgeting capacity. Finally, data systems upon which to build budgeting are often lacking. Important relevant data (for example, household-data on economic or social vulnerability; child-level data on health) is sometimes not shared across ministries.

It is, however, rare that national leadership, local governance, and planning and budgeting come together to produce quality of implementation at scale. The critical ingredients that must come together for quality implementation of ECCE at scale must in future analysis and research be identified so that we have many more successful examples like that of Indonesia. Developments in research will be critical to address this core question. How to scale quality programs hinges on identifying the most critical aspects of interventions, and the support systems that make them possible to implement in diverse regions and populations. Research is also needed on the demand for such services, to better understand how ECCE can expand while retaining responsiveness to cultural and community characteristics and participation.

Public-private partnerships. Recent passage of legislation in India to require corporations to devote a small percentage of profits to the social sector, as well as legislation in Colombia to encourage private-public partnerships, represent innovations that show promise to influence ECCE positively. The business sector can have a positive influence on ECD policy, either through philanthropy or through individual action. The neuroscience and economic arguments for ECD investment typically are powerful in this community [198]. However, the impact of such new investments on equity and quality must be

monitored at the national, subnational and local levels. The rise of low-cost private sectors in ECCE in LMIC's is also both a matter of concern but potentially opportunity. In some areas of urban South Asia or sub-Saharan Africa, for example, enrollment in low-cost private preschools outstrips enrollment in public [199]. A broadened conception of multisectoral, beyond traditional health, education, social protection and child protection, can include innovations in work across government, NGO, the private sector, and civil society institutions.

Appendix Table 1 (matrix of ECCE evaluation studies including information on key effects) available from the authors.

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