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THE STATUS OF EARLY CHILDHOOD HEALTH AND DEVELOPMENT IN NORTHERN LAO PDR

BASELINE RESULTS FROM THE EARLY CHILDHOOD EDUCATION PROJECT

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ABBREVIATIONS

CAC	Community Awareness Campaign
CCDG	Community Child Development Group
ECE	Early Childhood Education
EFO	Externally Financed Output
EHCI	Early Human Capability Index
IDA	International Development Association
Lao PDR	Lao People's Democratic Republic
LEARN	Lao Educational Access, Research and Networking
MAT	Multi-Age Teaching
MELQO	Measuring Early Learning Quality Outcomes
MODEL	Measurement of Development and Early Learning
VEDC	Village Education Development Committee

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EXECUTIVE SUMMARY

This report presents baseline data from 7,520 children in 7,355 households, across five provinces, 14 districts and 376 villages in northern Lao PDR. These results are the starting point for the impact evaluation of the Early Childhood Education (ECE) Project which seeks to support the expansion of quality ECE services in order to improve the overall development and school readiness of children aged three to five years in disadvantaged communities across Lao PDR. The data provides a comprehensive picture of the current status of children's health and development, of the social, demographic and economic contexts in which children in northern Lao PDR are growing up, and of how all these factors are having an impact on children's early developmental outcomes.

Overall, children in northern Lao PDR are developing poorly, with disparities in child development across different ethnic groups and family backgrounds. In particular, Lao-Tai children are developing better than Khmu and Hmong children, and children of parents with some education have better development than the children of parents who have never gone to school.

Limited parental knowledge of what is required for optimal child health, coupled with inadequate coverage of healthcare services is leading to poor health outcomes for children in northern Lao PDR. Children are not receiving the basic services and nutrition they need for good health. In particular, the level of stunting is of high public health significance, and this is having a substantial negative impact on children's development and ability to learn. Despite significant improvements in education services, Early Childhood Education (ECE) coverage in northern Lao is insufficient. However, where cover exists, ECE attendance is associated with better verbal communication skills, approaches to learning, early literacy and numeracy skills, perseverance, knowledge of culture, and social and emotional skills. This is consistent with international literature around the positive impacts of ECE on children's early development.

Finally, children are receiving very low levels of stimulation and support for their development in their home environments, and this is having a significant negative impact on their learning and development. Parent-child interactions are of great importance. According to the data collected for this study, the increase in children's development associated with parent-child interactions was almost equal to the increases associated with ECE attendance. The ECE Project has the potential to support improvements in child health and development in Lao PDR through a range of interventions, namely:

- the increased coverage and quality of existing ECE services and the establishment of Community Child Development Groups (CCDGs);

- the delivery of a community awareness campaign in order to increase the knowledge and understanding of parents and the wider community about the importance of early child development, appropriate parenting skills and early stimulation required for children's learning, good health and nutrition, hygiene, immunization, and childhood disability awareness;

- the implementation of complementary support services such as disability screening and the provision of school meals in primary schools (and kindergartens, if on the same campus) in order to encourage attendance and provide children with nutritious meals nutritious meals.

In 2018, after the project has been implemented for two years, endline data will be collected in order to re-assess how well children in target villages have developed in comparison to children in villages without the ECE project interventions. Learnings from the impact evaluation will help inform future ECE policy and program decisions, so that resources are used effectively and have the maximum positive impact on children's outcomes in Lao PDR.

PART ONE
INTRODUCTION AND BACKGROUND

Country Context

The Lao People's Democratic Republic (PDR) has experienced sustained robust economic growth over the past decade; indeed, it is one of the fastest growing economies in East Asia-Pacific. As a reflection of such progress, the country was recently changed classification from low income country to lower-middle income country, and is on track to achieve its long-term goal of graduating from Least Developed Country status by 2020. Such growth has helped alleviate poverty, which has declined from 34% to 23% in the last decade, lifting half a million people out of poverty (World Bank, 2015).

Despite these achievements, significant economic disparities persist across Lao PDR, particularly among the country's diverse ethnic groups and between different geographical areas. The country has 49 officially recognized ethnic groups, with four main linguistic families: Lao-Tai, Mong-Khmer, Hmong-Mien, and Sino-Tibetan. The Lao-Tai experience much lower poverty rates than other groups: in 2012, 25% of Lao-Tai were living in poverty compared to 42% or more for the other three groups (World Bank, 2014b). This stands in contrast with the fact that the three non-Lao-Tai groups make up approximately two thirds of the total population. Although government support has targeted these ethnic groups and the regions they inhabit, lack of access to infrastructure and markets in rural and remote regions remains a barrier to growth and poverty reduction. In this way, the pattern of poverty also has a geographical dimension. In rural areas - where nearly three-quarters of the country's almost seven million people live - the poverty rate of 32% is almost double that of urban areas (World Bank, 2014b). Further support is needed to reduce such disparities and promote growth across Lao PDR.

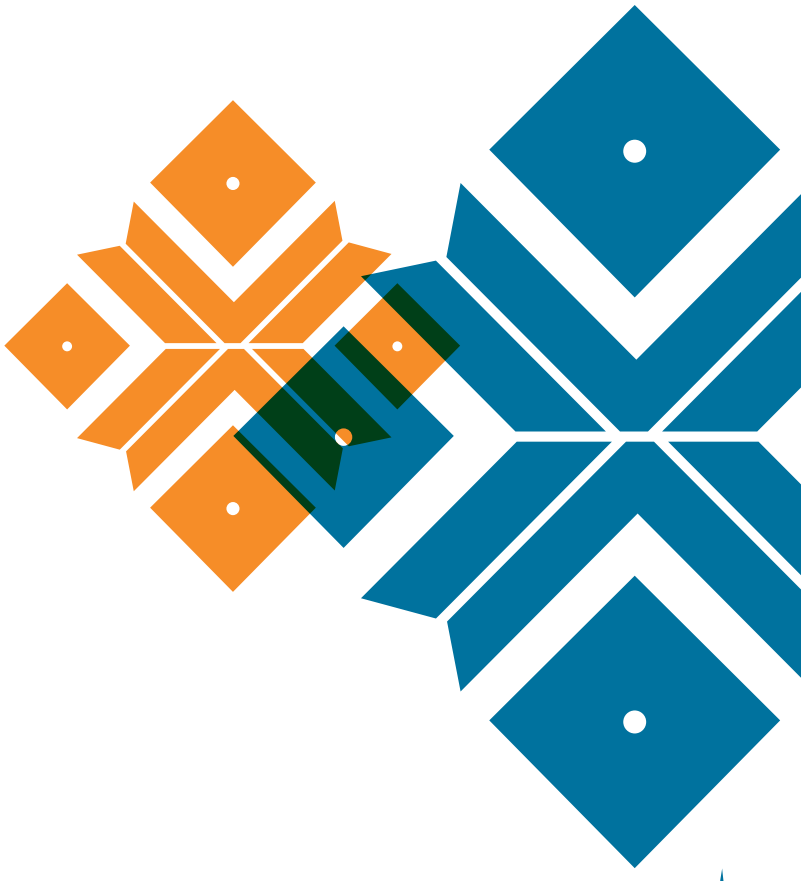
In conjunction with countries across the world, Lao PDR committed to adopt the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, ensure inclusive and quality education and tackle climate change by 2030. Education(including ECE) is a particular priority for the Government of Lao PDR. Expanding the coverage of and access to ECE for all children is an important goal and strategy of the government. Towards this goal, the Government of Lao PDR adopted specific steps as part of its Education for All National Plan of Action 2003-2015, in order to: (i) promote coordination between the Government, community and private sector; (ii) mobilize communities in favour of pre-primary education, and promote the development of community pre-primary education; and (iii) promote access to pre-primary education for 5-year-olds by establishing a pre-primary class or community-based school

readiness program to prepare them for Grade 1, particularly targeting ethnic groups, girls and children from the poorest families. Moreover, the Government's commitment to equitable and healthy development of all children is reflected in the draft National Policy on Holistic Early Child Development (2010), which was guided under the supervision and coordination of the National Commission for Mothers and Children.

However, although significant investments have been made in education, coverage and resources devoted to ECE remain insufficient. The proportion of 3 to 5 year old children enrolled in ECE programs increased from 23% to 33% between 2011 and 2013, and the enrolment rate for 5 year old children rose from 32% in 2008/09 to 52% in 2012/13 (World Bank, 2014b). Despite these increases, enrolment rates remain low compared to other countries with similar income levels. Moreover, existing ECE programs in Lao PDR predominantly cater for 5 year olds, w and offer pre-primary classes attached to primary schools. Subsequently, children of 3 and 4 years of age have especially limited access to ECE services. Coverage of ECE services also varies significantly across geographic, socioeconomic and ethnic dimensions. While almost 60% of 3 and 4 year olds attended Kindergarten in Vientiane Capital in 2011/12, just 15% of the same age group attended in Saravan province in Southern Lao PDR. Of all children enrolled in ECE, 90% are Lao-Tai while the remaining 10% are from other ethnic groups. Less than 8% of children from the lowest income quintile, from rural areas without roads or from non Lao-Tai communities, have access to ECE services (World Bank, 2014b). Lack of access, combined with poor child nutrition due to food insecurity and malnutrition, is detrimental to children's development and their readiness to learn at school. Overall this translates into long term negative implications for the human development of Lao PDR.

The Early Childhood Education Project

Against this background, World Bank Group has provided funding of USD 28 million through an International Development Association (IDA) Grant (USD 14 million) and IDA credit (USD 14 million) to the Government of Lao PDR for the Early Childhood Education Project. The ECE Project seeks to support the expansion of quality ECE services, with the objective of improving the overall development and school readiness of children aged three to five years in disadvantaged communities across the country. Research conducted in both developed and developing countries demonstrates that ECE is one of the most cost-effective and equitable interventions in human development. Investment in ECE has been shown to reduce school dropout and grade repetition rates (Davoudzadeh, McTernan, & Grimm, 2015; Nores & Barnett, 2010)



(Davoudzadeh, McTernan, & Grimm, 2015; Nores & Barnett, 2010), increase graduation rates in post-secondary education, and improve labor force productivity and wages (Gertler et al., 2014; Supplee & Meyer, 2015). More specifically, programs that combine children's education, parenting education and nutrition interventions have been shown to have the largest positive impacts, particularly for children from low socioeconomic backgrounds (World Bank, 2014b). By intervening in the early years of children's learning and development, the project seeks to strengthen the foundations for the healthy physical, cognitive, emotional and social development of children.

To achieve its objective, the ECE project supports the three key components listed below. For an in-depth description of each component and sub-component, please see World Bank (2014b).

Component 1 focuses on increasing the coverage of ECE through (i) the provision of construction grants and training for target villages, for the construction of pre-primary classrooms using community-based contracting; and (ii) the establishment of Community Child Development Groups (CCDGs). Currently, while pre-primary classrooms are intended for 5-year-old children, children who attend often bring their younger siblings along to class with them. CCDGs aim to provide a separate, more informal learning environment for 3 and 4-year-old children before they enter kindergarten or a pre-primary classroom. While CCDGs are the focus of the program, technical support is also being provided to develop teaching and learning materials for multi-age teaching for 3 to 5-year-olds, to support Multi-Age Teaching (MAT) existing primary schools.

Component 2 focuses on improving the quality of ECE services through (i) a supporting services package, technical assistance and training; and (ii) teacher and education officer training. The supporting services package will provide a package of services to targeted communities to improve the quality of ECE, and increase the demand for ECE services, by delivering:

(i) a community awareness campaign to engage parents in parental education, and increase the knowledge and understanding of community members about the importance of early child development and the first 1,000 days of a child's life, appropriate parenting skills and early stimulation, nutrition, health, hygiene and childhood disability awareness;

(ii) childhood disability screening and the provision of any necessary treatment or a referral for follow up with a specialized service provider; and

(iii) the provision of school meals to children at CCDGs, pre-primary and primary school to encourage the attendance of boys and girls in remote rural communities, and to provide children with nutritious meals in order to facilitate concentration.

Target districts have a shortage of qualified pre-primary school teachers, and in addition, teachers are not qualified to manage the multi-age classes that are a result of 5-year-old children bringing their younger siblings to class with them. The second component of the ECE project will support pre-service training of pre-primary school teachers, as well as in-service training on multi-age techniques for pre-primary teachers in target areas.

Component 3 focuses on strengthening project management, capacity development, and monitoring and evaluation at all levels of the early childhood education sector. The component's main activities will include (i) capacity development and support for financial management, procurement, environmental and social safeguards and internal audits; and (ii) support for monitoring and evaluation activities including a results framework and monitoring system. Also included in this component is an independent evaluation of the project's impact on a range of child outcomes.

The investments that this project offers are expected to contribute to reducing poverty in project target areas by improving children's educational attainment; higher educational attainment is associated with higher income both in urban and rural areas (World Bank, 2014a). Research around the world has also demonstrated (see for example Burger, 2010; Elango, Garcia, Heckman, & Hojman, 2015; Engle et al., 2011) that disadvantaged children (i.e. those who have larger developmental deficits) gain more benefit from ECE participation when compared to their more advantaged peers. In this way, the project is also expected to reduce the large disparities in educational attainment of children across income groups, ethno-linguistic groups and gender, and therefore contribute to shared prosperity and educational equity. Early childhood development is the greatest enabler of human capability, allowing children to grow up to participate fully in economic, social and civic life.

When children do not have a healthy start to life they fail to reach their full potential as adults, and this is associated with a range of social and financial costs that place a considerable burden on a country's resources. Evidence from around the world demonstrates that the opportunities for preventing such this burden lie in children's earliest years, and require significant investment throughout this period of life. By aiming to improve children's early health, development, and educational outcomes, the ECE project is not only working towards reducing poverty (and several of the SDGs), it is also working towards improving the overall human capability of the country.

Project Impact Evaluation

Included within the scope of the third component of the ECE project is an independent evaluation of the project's impact on a range of child development outcomes. The aim of the impact evaluation is to determine the success (or failure) of the project to improve early childhood development, by comparing the key outcomes for children living in villages where the project has been implemented with those of children living in comparable villages where the project has not been implemented. It is expected that after the project has been implemented for two years, children living in target villages will have improved their health and development status, skills and knowledge.

In order to determine impact, a clustered randomized controlled design has been employed. A randomized controlled trial is the most rigorous methodology for determining whether interventions cause improvements in child development and school readiness. Additionally, assessing the cost effectiveness of the program can only be achieved through a randomized evaluation design.

The impact evaluation will focus on three interventions implemented as part of the ECE project:

- CCDG (Community Child Development Groups): delivery of community-based playgroups, including training of locally recruited "teachers", construction of a purpose-built hut and grants provided to communities to sustain implementation;
- MAT (Multi-age Teaching): local pre-primary teachers trained in the delivery of a purpose-designed curriculum for children aged 3-5, in one class; and
- CAC (Community Awareness Campaign): a 12-module ECD training course provided to the Village Education Development Committees, which in turn enables the Committees to undertake community awareness training of parents in their village.

Lessons learnt from the impact evaluation regarding the ability of ECE interventions to support children's health and development will help inform future ECE policy and program decisions, so that resources are used effectively and have the maximum positive impact on children's outcomes in Lao PDR. This report presents results from the baseline data collection, which will subsequently be used as the starting point for the evaluation of the ECE project. It provides information - prior to the project's implementation - at the village, household and child level, detailing where and how children are living, their health, nutrition and development status, their home environments, and their access to and use of health care and ECE services. In 2018 (after the project has been implemented for two years), endline data will be collected in order to re-assess how well children in target villages have developed in comparison to children in villages without the ECE project interventions. The section below, describes the steps that were undertaken in the lead-up to baseline data collection, and details the data collection process including instruments used and procedures employed.

Research Design

The evaluation of the ECE project will essentially be conducted through three pragmatic cluster randomised controlled trials. The trials are pragmatic in that the program is being implemented by the government within the existing service systems. A clustered approach was required as the program is implemented at the community level, and therefore individual recruitment was not sensible due to likely contamination (e.g., one individual's change in behavior may influence another individual to do so). This pragmatic clustered design also allows for the evaluation of how communities implement the program, from a process point of view. This information will help to inform the system/ governance predictors of successful implementation. Both MAT training and the establishment of CCDGs require a pre-primary school to exist, so that after children go through either program, they can then continue straight into pre-primary school with no gap. However, as there are not enough pre-primary schools in Lao PDR, it is not possible to independently evaluate the MAT and CCDG programs. Instead, they must be compared against each other. As such, the randomisation occurs separately in three separate trials:

- **Study 1:** For communities with an existing pre-primary school, villages were randomised to receive either the CCDG (community playgroups) or the MAT (multi-age teaching) interventions. In both interventions, the local VEDC will be trained (as in study 2 and 3).

- **Study 2:** For communities with an existing kindergarten, villages were randomised to either receive community awareness training (through the local VEDC) or not.

- **Study 3:** For communities with no existing early childhood services (No ECE), were randomised to either receive community awareness training (through the local VEDC) or not.

For the evaluation, comparison across the three different studies will also be possible, albeit under observational study conditions (i.e. not experimental). These analyses will control for any residual confounding by utilising data collected through this baseline study.

Sample

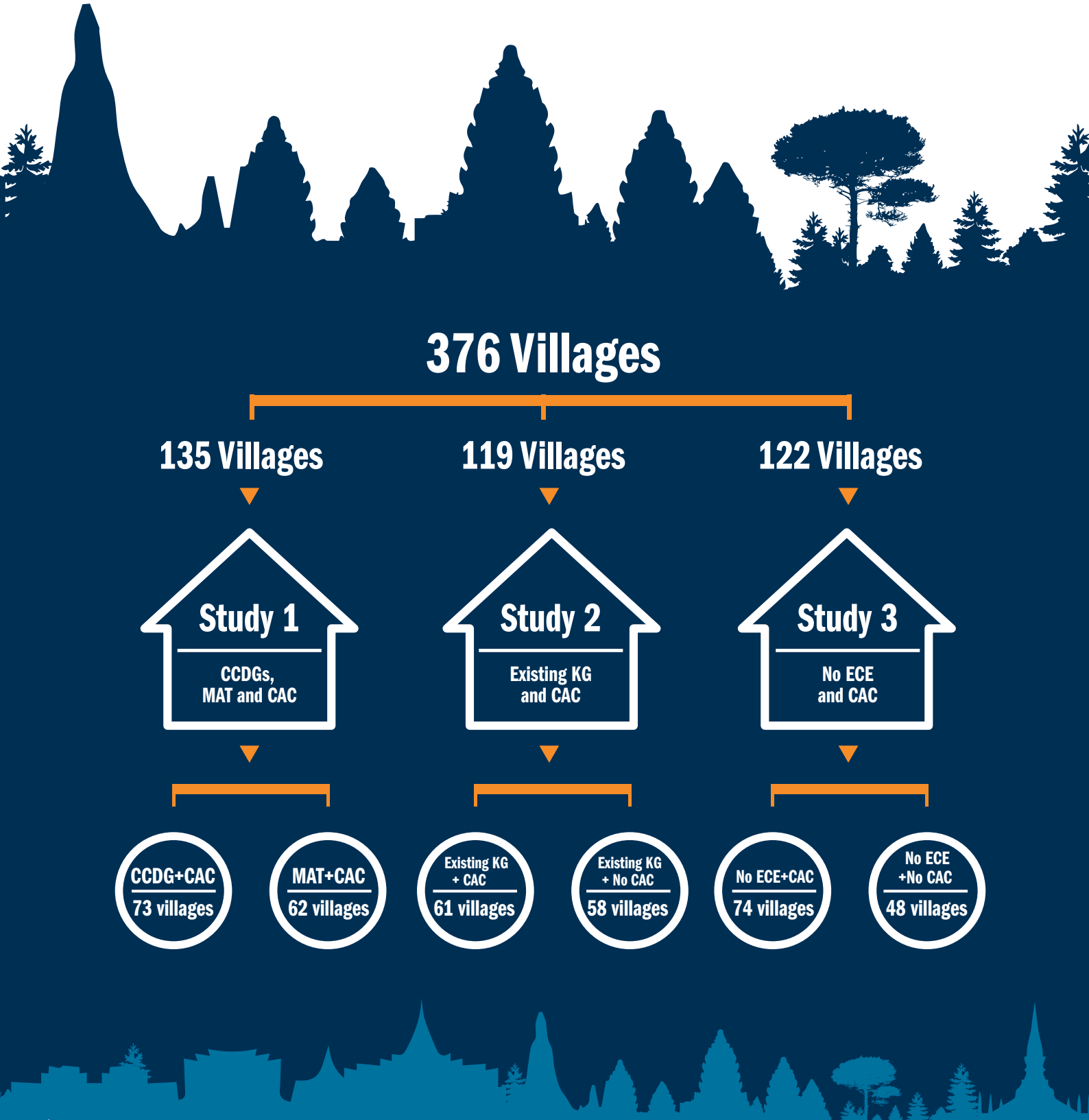
The ECE project is to be implemented in northern Lao PDR due to the high poverty levels and lack of existing services, and to avoid contamination with other programs being implemented in southern Lao PDR. The selection of the provinces and the districts within these provinces was determined by the Ministry of Education (and, it is understood, on the basis of poverty levels and the existence of a functioning district level education office). The sample of villages was calculated on the basis of population data provided by the Educational Management Information System (EMIS), sourced in 2015, matched with immunisation data sourced from the Ministry of Health.

Data provided included the number of children aged 0-5 years in each village, and the existence and type of ECE service. This data was then verified by the local Early Childhood Unit, who phoned through to local district officials to gain an "up-to-date" list of villages with the important eligibility criteria details, i.e. number of children aged 0-5 in the community, and if the community had a local pre-primary or kindergarten. On the basis of this list, all villages in the north of Lao PDR within the selected districts, and with at least 20 children residing in them, were allocated to one of the three studies and then randomised to either arm.

The fieldwork team (Indochina Research) was provided with the randomised list of villages for each study arm (and a list of substitute villages to use in case any of the communities were found not to have 20 children. Prior to starting the baseline study, this was considered to be the most problematic situation that we were going to face, which was why the replacement lists were provided.

However, during data collection it was discovered that the original eligibility criteria for many villages was not as it was supposed to be. For example, in some cases a community where there was supposed to be a pre-primary school did not actually have one, or instead had only a kindergarten. To manage this problem within the evaluation design, communities that were found not to meet the stratum criterion were placed back into the pool of the study stratum in which they should have actually been allocated, and then randomised to either arm. This then meant that there were not enough communities to meet the sample size required to be able to effectively evaluate the different aspects of the intervention. The baseline data collection was therefore extended and expanded into additional education districts (under the same randomised conditions). The final baseline sample includes 376 villages with 20 children in each village adding to a total sample of 7,520 children, however this is broken into the three different studies, with a sample of 2700 for study 1, 2380 for study 2 and 2440 for study 3.

Figure 1:
Evaluation design and community level sample size



Sampling households within the target communities In each target village, the following selection processes were employed in order to collect data at the village, household and child level. The head of each village was selected to provide village level data. If the village head was not available to participate, the deputy village head was selected, and if the deputy was also unavailable then the head of the Village Education Development Committee (VEDC) was selected. With assistance from the VEDC, fieldwork teams then compiled a list of all eligible households (i.e. those with a child aged 2-5 years) in each village, and random sampling methods were used to select 20 households for data collection. In the case that a village had less than 20 eligible households but at least 20 children aged 2 to 5 years (i.e. there were several households with more than one eligible child), all households were selected to participate. In some cases, household members were out of the village during the data collection period and the field work team were unable to make contact with them, or there had been a serious illness or death in the household. This seldom occurred (<1% of households), and when it did the household was replaced with the next randomly selected household. For households with one eligible child only, this child was selected for data collection along with their primary caretaker. For households with multiple children aged 2 to 5 years, one child was randomly selected along with their primary caretaker (except in the case of villages with less than 20 households as above).

Overall, data was collected from 7,520 children in 7,355 households across five provinces, 14 districts and 376 villages in northern Lao PDR. The five provinces in which data were collected are highlighted in **Figure 2**, and the districts, and the number of villages and children in each province are presented in **Table 1** below. The final sample was distributed across the following provinces and districts:

Figure 2:
Provinces in Lao PDR in which baseline data was collected

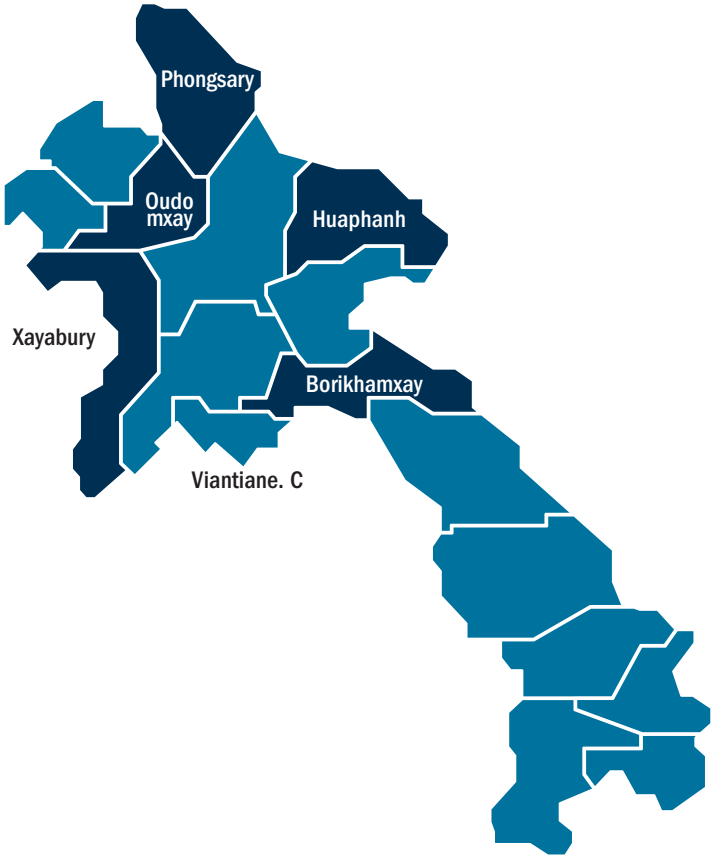


Table 1:
Sample by Province and District

PROVINCE	DISTRICT	# OF VILLAGES	# OF CHILDREN
Phongsaly	Khoua	26	500
Oudomxay	La	14	300
	Namor	40	780
	Beng	17	360
	Houn	12	240
	Parkbeng	6	120
Houaphan	Viengxay	36	720
	Houa Meoung	42	840
	Xam Tai	36	720
	Sobbao	39	780
	Meoung at	41	820
	Kouan	30	600
Xaiyabouly	Saysathan	20	400
Borlikhamxay	Saychamphone	17	340

Development and Piloting of Data Collection Instruments

Four data collection instruments were used: (i) a Village Questionnaire designed to collect data from the head of each village, including information regarding village residents, amenities, transport and services available; (ii) a Household Questionnaire, completed by the head of each selected household, collecting data regarding members living in the home and household assets; (iii) a Caretaker Questionnaire, completed by the primary caretaker of each child for whom data was collected, designed to collect information on the child's nutrition, health and development, experience of ECE and health services, as well as parenting practices; and (iiii) a Direct Child Assessment, administered to each child selected to participate, directly assessing a range of skills and abilities.

The Village Questionnaire and Household Questionnaire were primarily developed based on previous census and household questionnaires used in Lao PDR, and were adapted to suit the needs of the study. The Caretaker Questionnaire and Direct Child Assessment included several internationally recognised standard scale instruments, none of which had been utilised in the country before and so had to be translated and adapted to suit cultural and other requirements.

A series of consultations with various local stakeholders and sectors of government was conducted to ensure the content and face validity of each item across the four instruments. All questionnaires were translated and back translated a number of times, with further consultations following in order to ensure that the translations were capturing the true essence and intent of each item.

Next, instruments were piloted in order to test if the translations were working well, if village heads, household heads and caretakers understood the questions being asked of them, and how children responded to the direct assessment activities. They were also tested to ensure that the child development measures were not too easy or too hard, but instead were able to capture children's development along a continuum, discriminating by children's age, gender and caretaker's level of education. All four draft questionnaires were piloted in pen and paper format in Vientiane Province (in Meun and Sanakam districts) in June 2015, which included 200 households across 10 villages. The questionnaires were then further revised based on experiences of enumerators and data collected from the pilot. In addition, an enumerator's manual was produced to aid with data collection, and a data collection database and tablet program were developed to be used for the baseline collection.

Measures of Child Development

Child development was measured in two ways – indirectly through the reporting of children's abilities from their caretaker, and directly through an assessment (conducted by an enumerator) of children's ability to answer a range of questions and complete a number of tasks. These assessments are described in more detail below.

Early Human Capability Index (eHCI)

The tool utilised to collect information regarding children's development via the caretaker report was the Early Human Capability Index (eHCI). The eHCI is a holistic measure developed to capture the key aspects of child development in 3 to 5-year-olds. The tool was designed to capture child development across diverse cultures and contexts; it has now been used in almost 10 countries including Tonga, Tuvalu, Samoa, Brazil, Australia and China. The eHCI is simple to administer and can be completed by a child's parent, caretaker or teacher. It is not a developmental milestone test, but is a measure of where a child can be placed on a developmental spectrum. As such the eHCI can determine if a child is thriving or doing poorly in relation to various aspects of development, and can detect developmental change over time.

As detailed above, the eHCI was adapted for use in Lao PDR. This adapted version of the eHCI includes 56 dichotomous items (with either yes/no, or can/-can't response options) designed to measure seven different aspects of child development: verbal communication (six items), approaches to learning (six items), numbers and concepts (ten items), cultural knowledge (five items), literacy (reading and writing) (12 items), social and emotional skills (13 items), and perseverance (four items). Together, these aspects of development have been shown to be highly predictive of children's later learning and educational achievement.

The index provides a score for each child on these seven developmental domains. Scores for each of the domains range from 0 to 1, with1 being the best score and 0 being the worst. This score is derived from taking the average of all items in that domain. The data are not weighted or age standardised, so older children should receive higher scores in each of the domains to reflect more advanced development. From these seven domains an overall development score is derived, also ranging from 0 to 1; with 1 being the best score. This overall score is derived from taking the average of all domain scores.

Measurement of Development and Early Learning (MODEL) the instrument used to directly assess children's development was the MODEL, developed by the Measuring Early Learning Quality and Outcomes (MELQO) initiative. The primary purpose of MODEL is to aid in the measurement of child development and learning at a population level. The tool can be used for children aged 3 to 7 years, and directly measures their pre-academic skills (through asking them to undertake tasks that include early literacy and numeracy skills) as well as their executive function. To date, MODEL has been utilised in a range of developing countries include Bangladesh, Cambodia, Columbia, Kenya and Sudan. As with the eHCI, results from the MODEL can be used to present a nationally representative distribution of child development, which can then inform policy planning and budgeting, including resource allocation, curriculum design and teacher training programs, and ongoing monitoring of children's development.

The MODEL was adapted for use in Lao PDR. The adapted version included 18 tasks overall, measuring children's numeracy skills and knowledge of numerical concepts (nine activities), early literacy skills and familiarity with print (six activities) and executive function (three activities). For some tasks, such as listening comprehension, scores on each question were combined and the average was taken to give an overall score of 0-1, 1 being the best score. For other tasks, a single score was given, for example whether children could or could not write their name. Further details of scoring are provided in the results section of this report.

Direct assessments took place in households, with enumerators assessing children on a one-on-one basis. Most often the child's caretaker was present, however, enumerators requested parents not to guide or prompt children in their responses. Enumerators framed the direct assessment as a game and worked to build rapport with children in order to make them feel at ease despite the unfamiliar situation. In each team, some enumerators could speak a number of ethnic minority languages including Hmong and Khmu, so children who could not speak Lao were assessed in their mother tongue.

Enumerator Training and Data Collection

An experienced research firm based in Lao PDR, Indochina Research, was engaged to carry out data collection. The fieldwork team consisted of a field-work manager who had overall responsibility for all field work activities, a fieldwork supervisor who assisted the manager, six field team leaders who were each responsible for a team of enumerators, 30 enumerators who administered the questionnaires, and two quality control supervisors who checked the quality of the data.

Enumerator training aimed to ensure that standardised data collection procedures were employed. Training was conducted over 12 days, in two separate sessions, to ensure that class sizes were small and training was of high quality. Overall, 40 enumerators and nine team leaders participated in the training, which was conducted by the fieldwork manager. Training included the discussion of data collection objectives, the fieldwork and logistic plan, thorough discussion and explanation of the questionnaires, as well as practice trials of administering the questionnaires in both paper and tablet form. For the direct child assessment, this included mock assessments with children. After training was complete, enumerators were assessed on their understanding of the project, the questionnaires and the direct assessment, and the 30 most competent enumerators were selected to be involved in baseline data collection.

Field work took place from November 2015 to March 2016. Each field team consisted of five enumerators and one team leader. The Ministry of Education and Sports (MOES) sent authorization letters to target provinces and districts in advance, to notify them of the project and data collection activities. Senior fieldworkers coordinated with provincial education officers to ensure receipt of the letters, and worked closely with district officials to develop a logistical plan for collecting the data in all target villages. Based on this plan, district officials coordinated with village heads regarding the date of data collection in each village, who in turn notified target households. When the fieldwork team arrived in villages, the team leader conducted the village head questionnaire, and enumerators conducted the household questionnaires, caretaker questionnaires and direct child assessments. Fieldworkers reported that on average, village questionnaires took 30 minutes to complete, household questionnaires took 20 minutes to complete, caretaker questionnaires took 60 minutes and direct child assessments took ten minutes (noting that many of the children were unable or unwilling to do the tasks requested).

Together, the data collected provides a comprehensive picture of the current status of children's health and development, the social, demographic and economic contexts in which children in northern Lao PDR are growing up, and of how these environments are having an impact on children's early developmental outcomes.

Quality Control

The quality control of data was carried out by the fieldwork team as well as by World Bank staff supporting the ECE project. World Bank staff involved in the development of the questionnaires oversaw enumerator training in order to ensure that the administration of questionnaires and the direct child assessment was being taught correctly, to clarify instrument content, and to address any questions that arose regarding data collection. The same staff also visited the field during data collection in order to randomly observe and supervise the administration of questionnaires and the direct assessment, as well as to assist in addressing any issues that had arisen during collection.

Field team leaders randomly observed 10% of data collection by enumerators, and conducted random post checks of 30% of each enumerator's completed instruments. After completing each questionnaire or direct assessment, if it was not checked by the team leader, it was checked by another enumerator. Once questionnaires had been completed and uploaded to the server from the tablets, quality control staff downloaded the data and checked it for quality using logic checks. Data was downloaded from the server on a daily basis to allow for data checking to occur simultaneous to data collection, meaning that any issues identified could be corrected as soon as possible. Overall, these quality control measures employed ensured data collected was valid and reliable.

Limitations

It is important to first note a few limitations to the baseline data, so that readers are cognisant of these when interpreting results throughout the report. Firstly, all village level data was collected from village heads, of which 99% were male (two were female). It is possible that the perspectives of women in the villages differ to those reported by men, particularly around services for children, as it is likely that children's health and development is primarily the responsibility of women in this context. This is also the case for household level data - almost two thirds of responses were collected from males. As such, results reported may not be generalizable to the perspectives of women.

Secondly, it should be noted that almost all villages included in the data collection could be accessed by car in the dry season. While these villages were relatively remote, the most remote villages in Northern Lao PDR can require a combination of car, boat, motorbike and walking to be reached, and such villages were usually not captured in data collection for logistical reasons. These villages also tend to be very small, and so were also less likely to be selected for inclusion based on the fact that they did not have sufficient numbers of young children for whom data could be collected. It is likely that due to the remoteness and small size of these villages, access to services and children's health and development is poorer than the averages shown in this report, and the inclusion of these villages in the baseline sample may have led to poorer overall results.

Finally, while the baseline sample of children included a mixture of children of different ethnicities including ethnic minorities, the majority of children (60%) were from Houaphan province. This is important to consider when generalizing findings to provinces in northern Lao, as the situation in Houaphan province (e.g. service availability and provision) may differ to that of other provinces.


Lao PDR
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PART TWO
THE SOCIAL, DEMOGRAPHIC AND ECONOMIC SITUATION OF FAMILIES IN NORTHERN LAO PDR

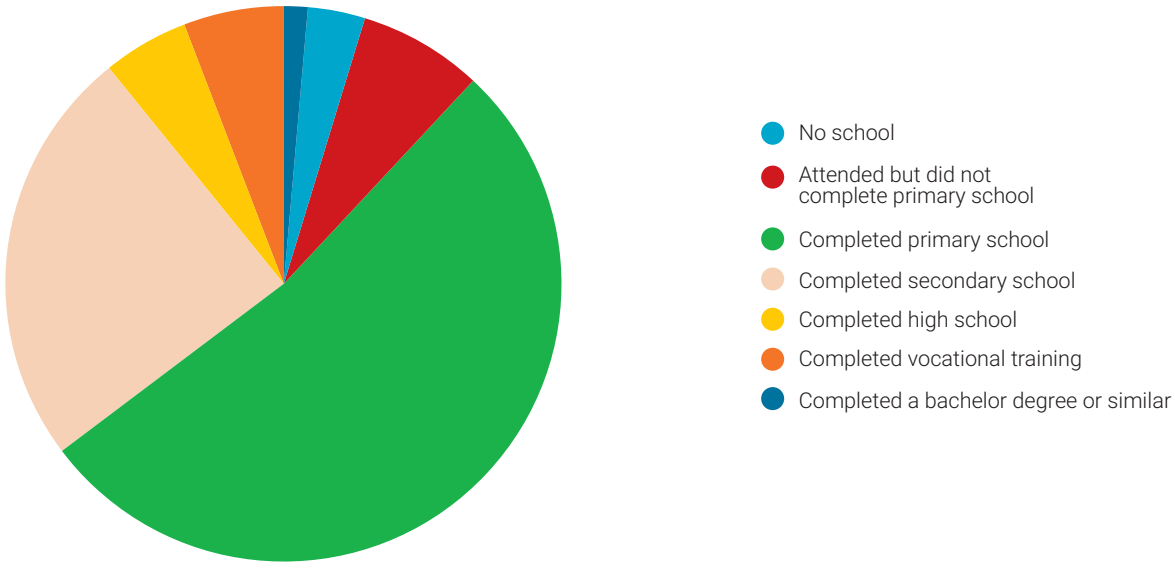
Villages

Village level data was gathered from the head of the village (80%), the deputy head of the village (17%) or the head of the Education Development Committee (2%) (hereafter all referred to as village heads) in each of the 376 villages. Village heads ranged in age from 22-65 years of age. The vast majority of village heads were male; only two were female (<1%). The majority of village heads had completed primary school (55%), a third had completed secondary school (30%), with some having completed high school (4%), vocational training (3%) or a bachelor degree or similar (<1%). Few had never attended school (2%) or attended but did not complete primary school (7%).

Population Size

Villages varied in population size considerably, from 195 to 3,260 residents. Most villages were home to less than 500 people (63%), some had 501-1000 residents (30%) and few had over 1,000 residents (7%). Villages were home to between 33 and 652 families; most villages had from 50-100 families (52%) or between 101 and 200 families (38%) and few had less than 50 families (9%) or more than 300 families (2%). The number of households in each village also varied, from 26 to 602 households. The majority of villages had between 50 and 100 households (54%), others had less than 50 (22%) or between 101 and 300 households (24%) and just one village had more than 600 households (<1%).

Figure 3:
Education level of village heads



Ethnicity

Village heads were asked to indicate the three main ethnic groups in their village; 41% reported that Lao-Tai made up one of the three main ethnicities in their village, 37% said Hmong, 34% reported Khmu, 6% Phong, 5% each said Prai and Akha, 3% Singsili, 2% Cingmoon, and 1% each said Kmer, Toum, Ilmain, or Yang made up one of the three main ethnicities in their village.

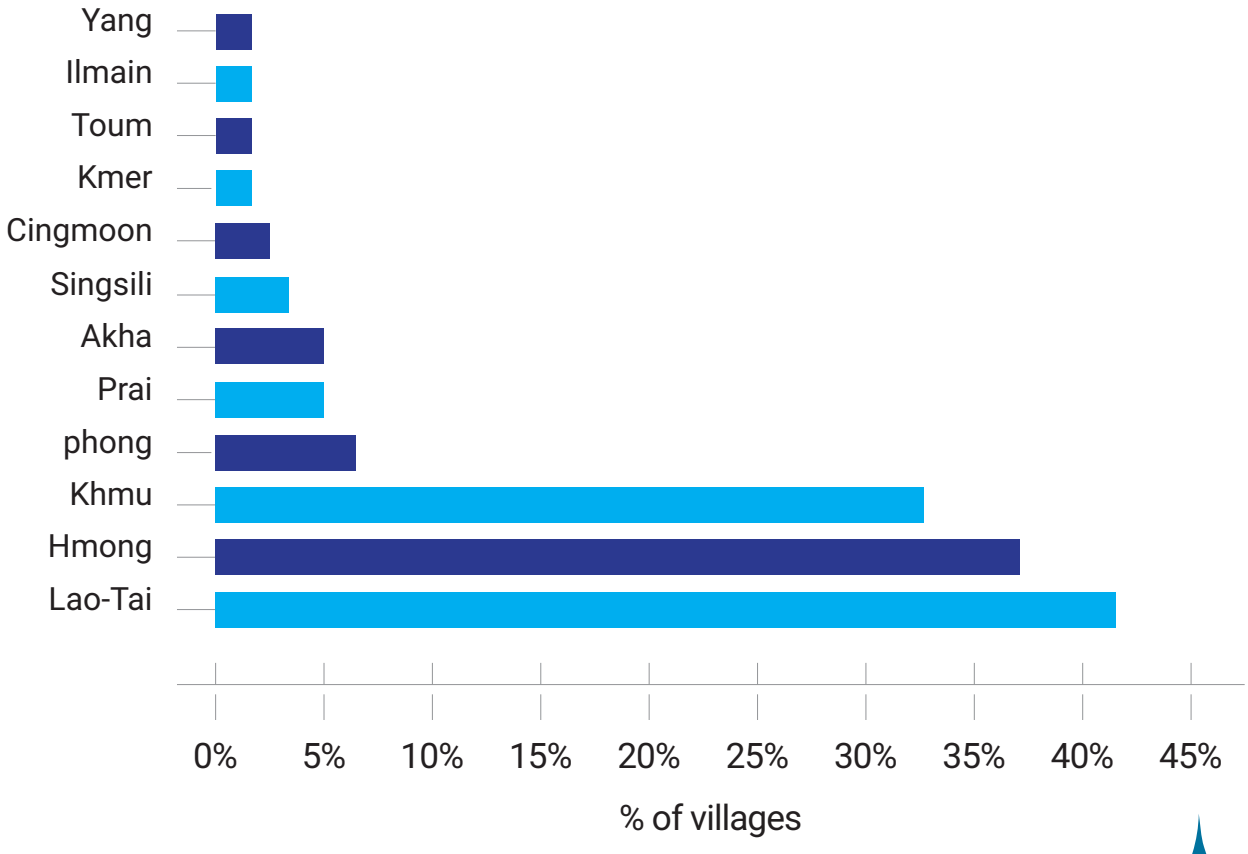
Village Access

Villages were relatively remote, and while almost all could be accessed by car in the dry season (97%), only just over half could be accessed by car in the wet season (53%).

Income

All villages reported their main source of income to be agriculture (100%). Some also reported additional main sources of income – commerce (25%), construction (8%), handicrafts (4%), and services (3%), while a few also reported mining, industrial jobs, transportation, finance, government employment, and forest products to be an additional main source of income for their village (all <1%).

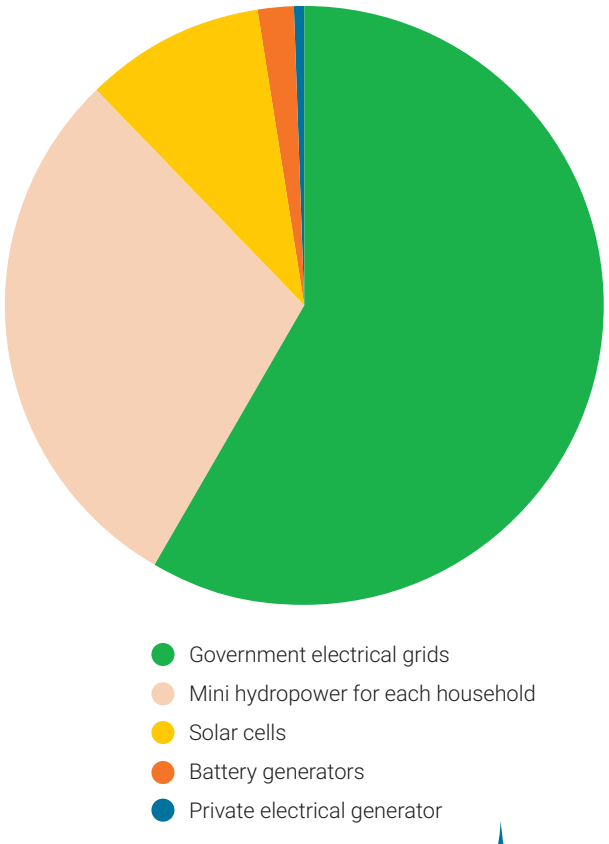
Figure 4:
Main ethnicities in villages



Electricity

As demonstrated in Figure 5, more than half of villages accessed electricity from government electrical grids (55%), 32% of villages had a mini hydropower turbine for each household, 8% used solar cells, 1% used battery generators, and less than 1% had a private electrical generator. A small number of villages did not have any access to electricity (4%). Less than half of the villages reported that all houses in their village had access to electricity (43%), while 36% reported that 1-20 households in their village were without electricity, 16% reported that 21-50 households did not have electricity, with the remaining 14% reporting that 51 or more households in their village were without electricity.

Figure 5:
Village electricity sources



Sanitation

Villages were often using a combination of water sanitation processes, with 93% of villages having some households using pit toilets with a water flush, 21% of villages having some households using a dry pit, and 68% of villages having some households that were not using toilets.

Rubbish Disposal

Villages were also using a combination of rubbish disposal methods, with 76% of villages burning rubbish, 52% dumping rubbish in the household area, 38% burying rubbish, 35% having rubbish collected by rubbish trucks, and 19% dumping rubbish in the river.

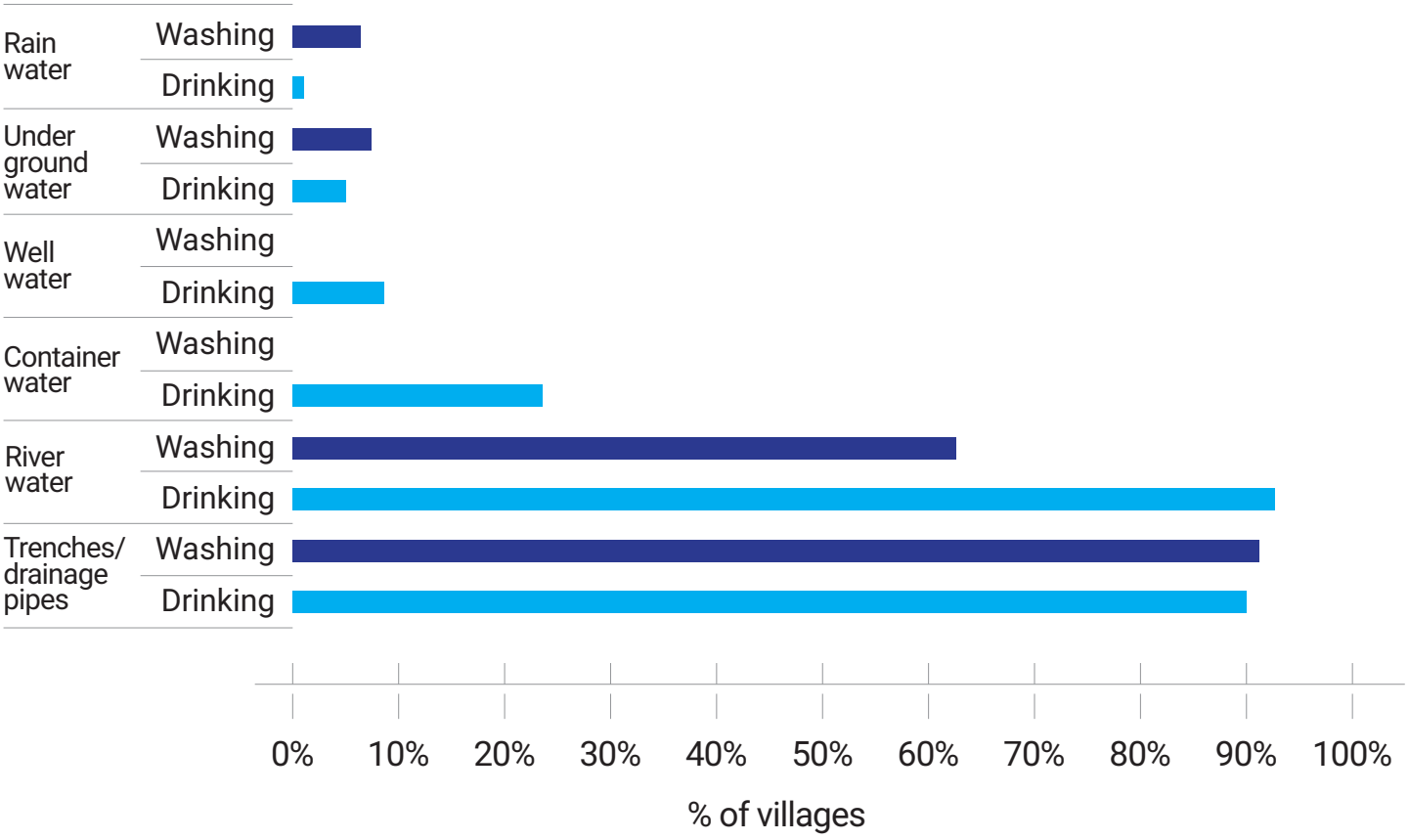
Water

The majority of villages were using drinking water from trenches/drainage pipes (90%), while 91% also used this for washing and cleaning. Villages also reported using river water for drinking (39%) and washing/-cleaning (62%), as well as container water for drinking (23%). Few villages reported using well water for drinking (9%) and washing/cleaning (11%), underground water for drinking (4%) and washing/-cleaning (5%), and rain water for drinking (1%) and washing/cleaning (5%).

Village Education Development Committees

The majority of villages were reported to have a Village Education Development Committee (VEDC) (96%). VEDCs had between 1 and 92 members, with the majority having less than 10 members (98%). The majority of VEDCs had met once (37%), twice (29%) or three times (23%) in the past three months, with few having not had met in the past three months (1%). Village heads were asked about the role of the VEDC in promoting and supporting children in their community. The majority reported that the VEDC's role was to promote safe environments and facilities for children (40%). Others said the role of the VEDC was to collect information about children including information on disabilities (29%), to provide health, sanitation and nutrition advice to the community (20%), and to encourage parents to enrol their children in school (11%), while 1% of respondents did not know what the role of the VEDC was in supporting community's children.

Figure 6:
Villages drinking and washing/cleaning water sources



Community Participation

Most villages did not have markets. Just 4% had a regular market, and 3% had temporary market fairs. Almost one quarter of villages had a village savings group (24%), 61% reported to be involved in a World Food Programme or School Feeding Program, 6% had an aid project in their village (such as the provision or repair of a school building), and 2% were involved in both a health fund and an activity similar to early child development.

Health Care Services

While the majority of villages had a village nurse (70%), fewer villages had a health center (13%), pharmacy (12%), district hospital (5%), provincial hospital (2%), private clinic (2%) or private hospital (<1%). Figure 7 below shows the spread of these services across the five provinces in which data was collected. Results suggest that there are more health services available in Houaphan than in any other province.

Figure 7:
Distribution of health care services across provinces

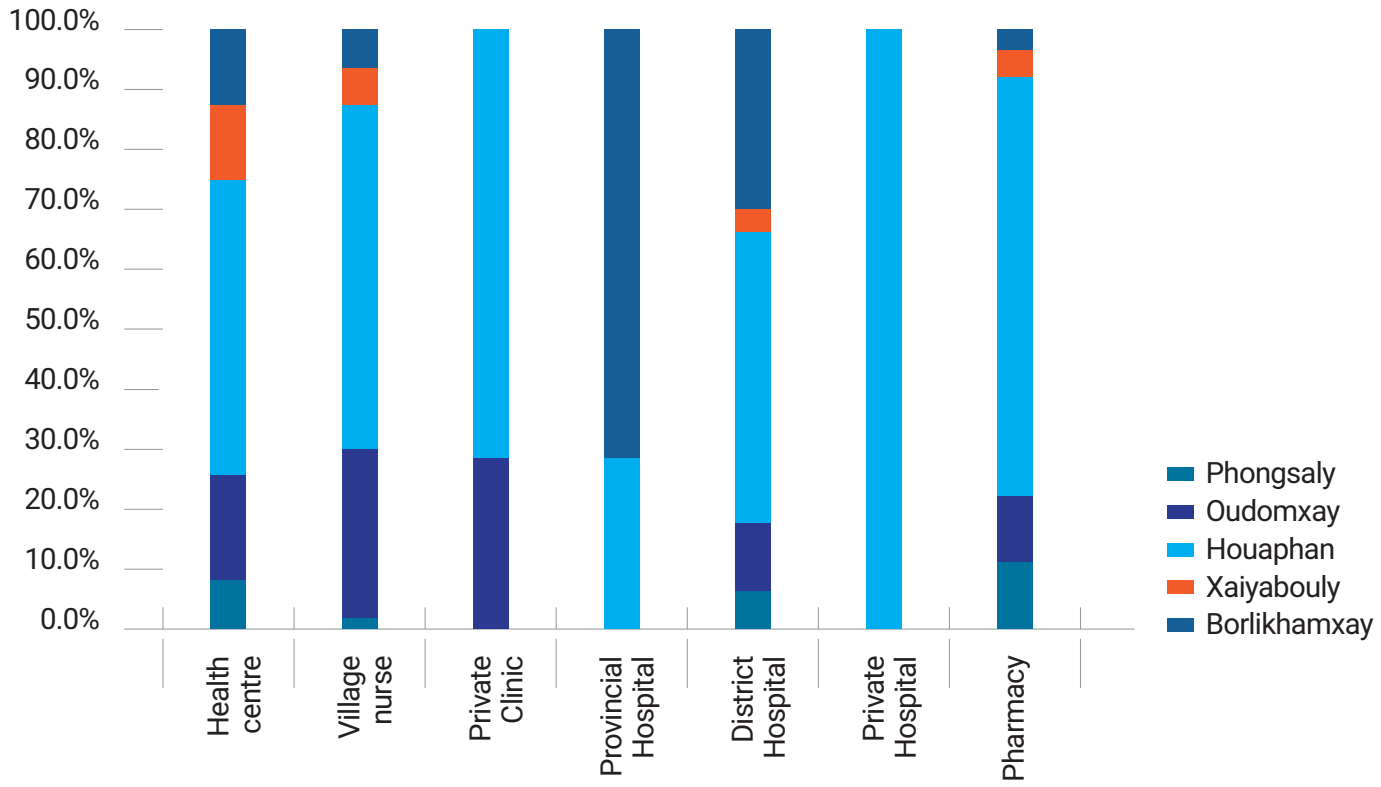


Table 2 below details how far villages are from the nearest of each of these health services. Information was also collected regarding if health professionals visited or live in the villages. The majority of villages either had a nurse living in their village or were visited by a nurse (68%), and more than half of villages either had a doctor living in the village or were visited by a doctor (55%). Many villages also either had a midwife or naturopathic doctor living in or visiting the village (both 37% each). While the majority of villages did not have a health center, results indicate health service coverage appears moderate due to doctors and nurses either living in or visiting the village. While a large majority of village heads reported no problems with the health services available for children in their community over the past 12 months (85%), some reported that the nearest health facility was quite far and that the road is bad (8%), that vaccinating children was difficult as children often become ill afterwards (6%), that health center staff were inattentive (2%), that medicine available at health centres was limited (2%), that poor households did not have enough money to access the center (1%), that there were not enough vaccines available for children (1%), that parents were inattentive to their child's health needs (1%), or that the village health volunteer did not have the basic necessary medicines available (<1%). As already noted, these results are based on responses from males only (with the exception of two female village heads). Considering that, in the Lao context, children's health and development is primarily the responsibility of women, it would be interesting to explore if women in the same villages have a different perspective on problems with health services.

Table 2:
Travel time from villages to their closest health service

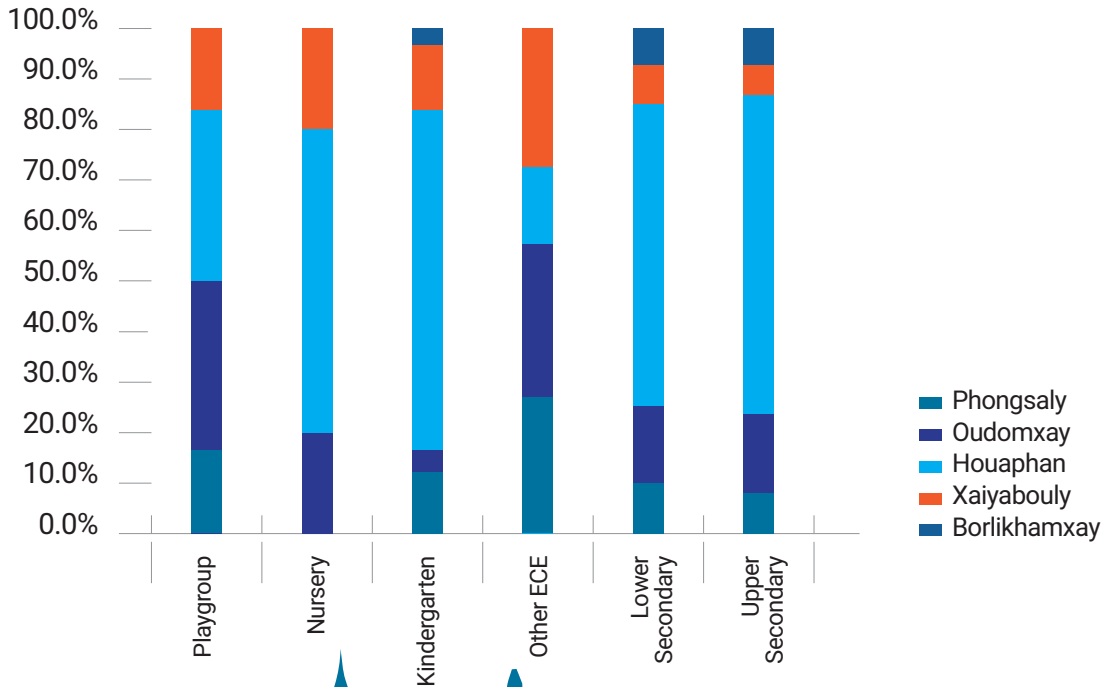
HEALTH SERVICE	PERCENTAGE OF VILLAGES WITH A TRAVEL DISTANCE OF :			
	≤ 30 minutes	> 30 ≤ 60 minutes	> 60 ≤ 120 mins	> 2 hours
Village nurse	63%	22%	10%	5%
Health centre	55%	24%	11%	11%
Pharmacy	34%	19%	24%	23%
District hospital	25%	22%	27%	27%
Province hospital	16%	2%	11%	71%
Private Clinic	30%	14%	17%	38%
Private Hospital	45%	3%	10%	43%

Education Services

Village heads provided information regarding the education services available in their village. Part of the selection criteria for the ECE Study was that every village had an existing primary school. In addition, many villages also had a kindergarten (39%). Few villages had other education or ECE services, such as a preschool playgroup (2%), nursery school (1%), or any other form of ECE (2%). Only 20 percent had a lower secondary school and very few had an upper secondary school (7%). Figure 6 below presents the spread of these services across the five provinces in which data was collected. As with healthcare services, these results suggest that there are more education services available in Houaphan than in any other province. Again, this is unsurprising considering that 59 percent of villages from which data was collected are located in Houaphan.

While the majority of village heads reported no problems with the education services for children available in their community over the past 12 months (64 percent), some reported that there was not enough space for children, or that the school building was not long-lasting/permanent (14 percent), that due to other constraints, education was not a priority and so they did not send their children to school (10 percent), that there were not enough teachers (7 percent), that the school was too far away (7 percent), that parents did not have enough money to support their children's attendance at education services (6 percent), that there was a lack of study equipment (6 percent), that teachers did not concentrate enough to teach to schedule (2 percent), that disabled children cannot study at the school (<1 percent), or that there was a lack of budget to supply food for children at school (<1 percent). Again, it should be noted that these results are based on responses from village heads of whom 99 percent were male. It is therefore possible that the perspectives of women in the same villages might differ to the above in relation to issues with education services for children.

Figure 8:
Distribution of education services across provinces



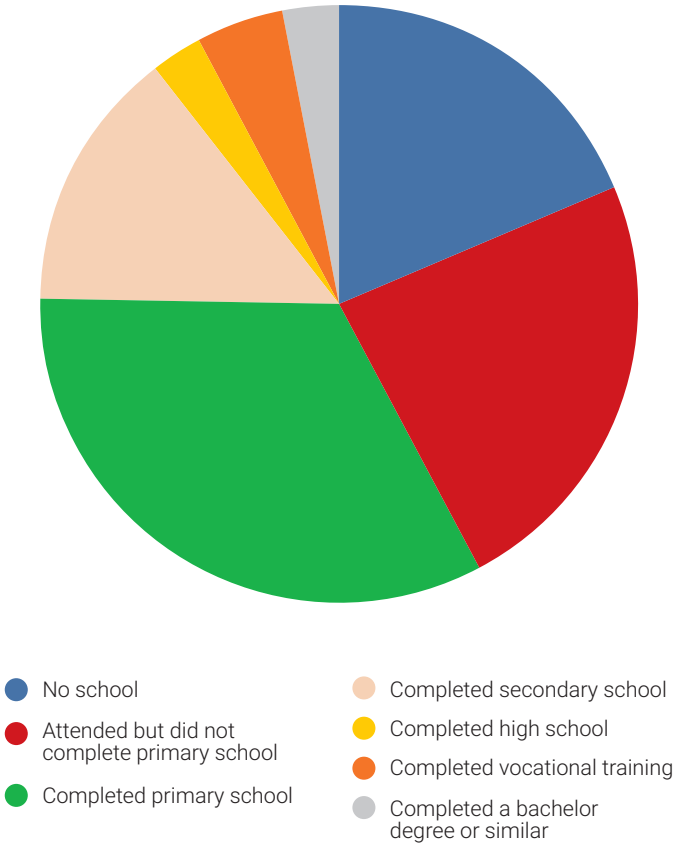
Important Events

While 44 percent of village heads reported that no important events had occurred in the village in the past three years, 32 percent of villages had experienced crop damage, 15 percent had new schools established, 9 percent had experienced an epidemic, another 9 percent had experienced landslides, 8 percent had new roads built, 6 percent had experienced a fire, another 6 percent had experienced a flood, and 2 percent each had experienced: the establishment of a new health centre, a storm, or aridity. The establishment of a new pre-primary classroom, a new teachers' house, a new factory/industry, or the arrival of electricity for the community were each experienced by 1 percent of villages. A few villages had also experienced a robbery, damage to a bridge, the establishment of a canteen room for children at school, a new temple, the establishment of a market and a new village office (each <1 percent). 70 percent of these important events were reported to negatively impact on villages and 30 percent were reported as positive events.

Households

Information regarding households was collected from the heads of 7,355 households. Heads of households ranged in age from 13 to 86 years old; 66 percent were male and 34 percent were female. As shown in **Figure 9**, the majority of heads of households had received some form of education: 25 percent had attended but not completed primary school, 35 percent had completed primary school, 15 percent had completed secondary school, 3 percent had completed high school, 5 percent had completed vocational training or university, and 20 percent had not been to school.

Figure 9:
Education level of heads of households



When asked to read a simple sentence, more than half of heads of households could read well (52 percent), 17 percent could read some part of it, and 30 percent could not it read at all. Less than 1 percent had a disability (e.g., a vision problem) which meant they could not read. The education and literacy levels for heads of households are further broken down by gender in **Table 3 below**. Results show that male heads of households are better educated than female household heads, and that this is then reflected in the literacy levels across male and female heads of households.

Table 3:
Education and literacy levels of heads of households, by gender

EDUCATION	OVERALL (%)	MALES (%)	FEMALES (%)
No school	20	10	10
Attended but did not complete primary school	25	17	8
Completed primary school	35	26	10
Completed secondary school	11	8	3
Completed high school	3	2	1
Completed vocational training	4	3	1
Completed a bachelor degree or similar	1	1	<1
LITERACY			
Could read well	52	38	13
Could read some part	17	12	5
Could not read at all	30	16	15
Could not read due to a disability	<1	<1	<1

Size

Households ranged in size from two to 21 members, with the majority of households comprising either Two to five members (41 percent) or six to 10 members (52 percent). A smaller number of households had 10–15 members (7 percent), and less than 1 percent of households had 16–21 members.

Building Materials

Houses were made from a range of different materials. The majority of roofs were made from tiles (51 percent) or zinc-alum sheets (32 percent), while some were also made from grass (10 percent), wood (6 percent), leaves (2 percent) or concrete (<1 percent). Most house walls were made from wood (65 percent), while some were also made from bamboo (18 percent), bricks/cement (17 percent) and zinc-alum sheets or plywood (<1 percent). Floors were made from wood (35 percent), dirt (28 percent), cement (23 percent), bamboo/leaves (9 percent), tiles (5 percent) or ceramic tiles (<1 percent).

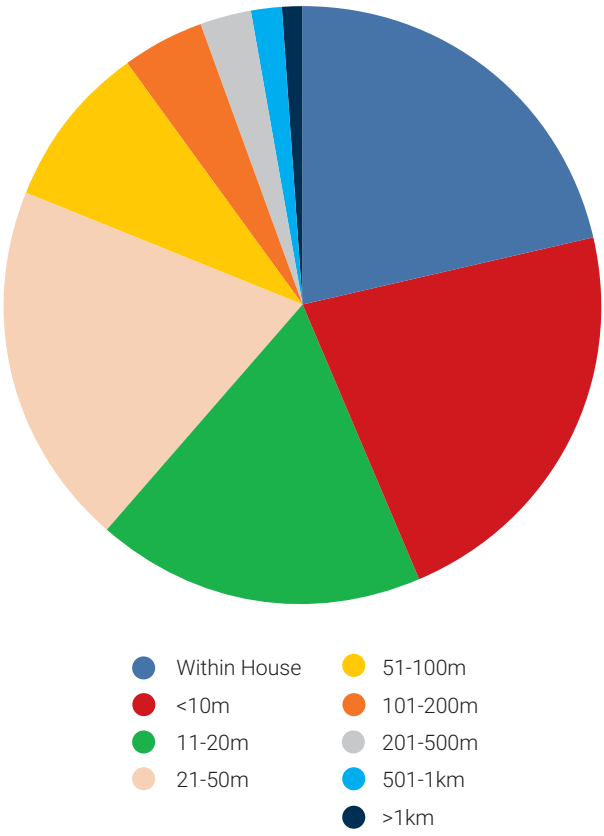
Transiency

Few households had moved villages in the past four years (3 percent). Of these, the majority had moved once only (89 percent), while a few had moved villages twice or three times (10 percent and 3 percent, respectively).

Drinking Water

The majority of households reported their main source of drinking water to be a gravity fed water system (74 percent), while others used piped water (11 percent), bottled water (8 percent), surface water (4 percent) or well water (3 percent)A few used water from a borehole or rain water (both <1 percent). While almost a third of households had this source of water within their house (30 percent), the majority of households (70 percent) had their main source of water located outside of their house. For most, this was relatively close by. For 32 percent of households, their main water source was 10 or fewer metres away, for 26 percent it was 11-20 metres away, for another 26 percent it was 21-50 metres away, for 9 percent it was 51-100 metres away, for 5 percent it was 101-200 metres away, for 2 percent it was 201-500 metres away, for 1 percent it was 501m to 1 kilometre away, and for another 1 percent of households, it was more than a kilometre away from their house.

Figure 10:
Distance of households to drinking water



Sanitation

When asked about sanitation, 65 percent of households reported having their own toilet, 5 percent shared toilets with other households, and less than 1 percent of households used public toilets. Many households (30 percent) did not use toilets. Of the households that did use toilets, 74 percent were using a pit latrine, 21 percent a flush to pipe system, and 5 percent a dry latrine. For those that did not use a toilet, the majority normally defecated in an open agricultural land or a sandy area near a river(51 percent), and others in a forest near the village (20 percent), in a hole that is then covered (14 percent), in a river or lake (7 percent), in a hole that is not covered afterward (6 percent), or in a pond or paddy field (3 percent).

Electricity

The majority of households had access to electricity, either from grids (53 percent), from a generator or battery (4 percent), from a mini hydropower turbine for each household (20 percent), or from solar cells (4 percent) – 19 percent did not have access to electricity.

Socio-economic Status

Households were asked about their assets in order to assess their socio-economic status. The majority of households (72 percent) reported owning agricultural land and at least one duck or chicken (80 percent), a motorcycle (76 percent), a pig (71 percent) and a mobile or landline phone (75 percent). Many households also owned at least one cow or buffalo (50 percent), a television (46 percent), with fewer owning a car, motor boat or tractor (26 percent). Few households owned at least one goat (11 percent), bicycle (10 percent), radio/cassette player (9 percent) or horse (1 percent). The majority of households were reported to have separate rooms (66 percent), while 34 percent of houses did not. Just 2 percent of households had experienced a food shortage for two consecutive days in the past 12 months. Similarly, 4 percent of households had been unable to purchase enough clothes for their children in the past 12 months, while another 4 percent had been unable to purchase enough books, stationery and toys for their children in the past 12 months. When asked about how many children's books households owned, 40 percent had between one and three books, 11 percent had between four and six, 2 percent had between seven and nine and 2 percent had between 10 and 30.The remaining 45 percent of households did not have any books for their children.

Figure 11:
Number of children's books in households

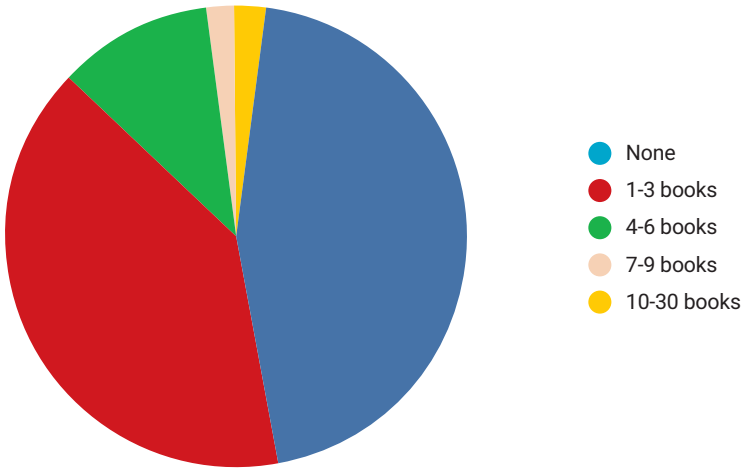
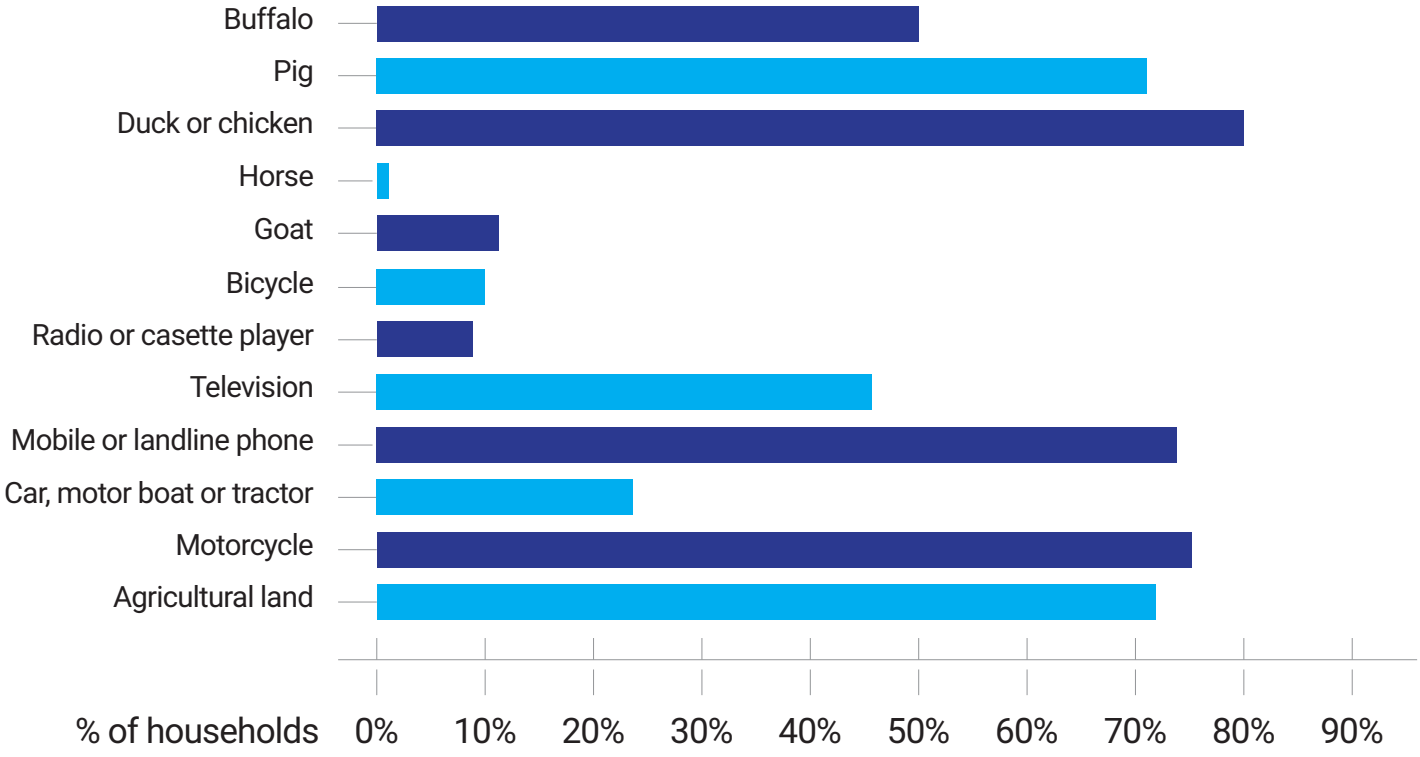


Figure 12:
Household assets



Aid

Households were asked about their receipt of different types of aid – 2 percent had received financial aid in the form of cash, and 11 percent had received aid in the form of rice (or other food) or goods (2 percent), clothing (5 percent), equipment to clean their latrine (4 percent), or agricultural tools, household equipment and articles, livestock, education equipment and filtered water (each less than 1 percent).

Village Education Development Committees

Household heads were also asked about the VEDC in their community; 74 percent reported that a VEDC existed in their village, 17 percent said that there was no VEDC, and 10 percent did not know if there was a VEDC.

Village Environment

The majority of household heads reported that it was safe for children to play outside of the house (75 percent), while 24 percent thought it was not safe and some did not know (1 percent). The majority of villages reported that they did not have open areas for children to play outside of their houses (95 percent).

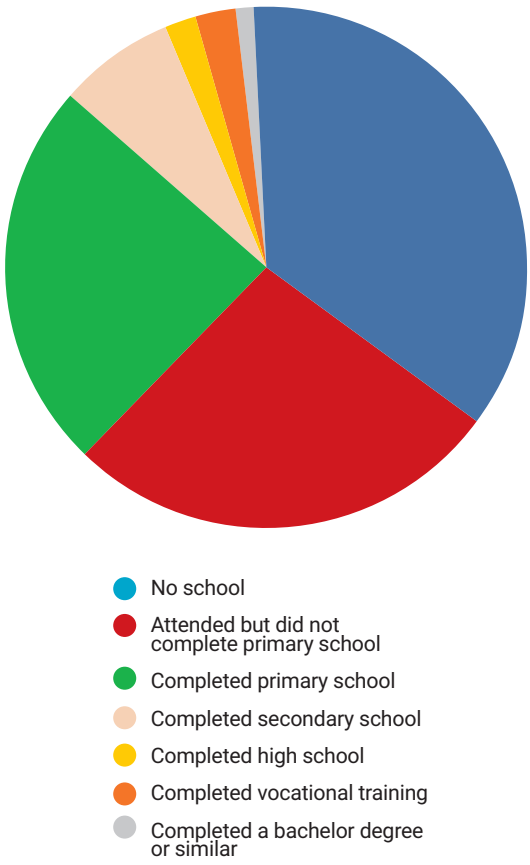
PART THREE
THE HEALTH AND DEVELOPMENT OF CHILDREN IN NORTHERN LAO PDR

Information on children's health and development was gathered from the primary caretakers of 7,520 children. Additional information on children's development was obtained through a direct assessment of children's capabilities.

Caretakers

The majority of caretakers surveyed were female (88 percent) and identified themselves as the mothers of the children being assessed (85 percent). The remainder were the children's fathers (11 percent), grandparents (3 percent), aunts, uncles and siblings (<1 percent). Caretakers ranged in age from 14-78 years old, with the majority aged 20-29 years (57 percent) or 30-39 years (28 percent).Much smaller percentages of caretakers were aged less than 20 (4 percent), between 40-49 years old (8 percent), or over 50 years of age (4 percent). Caretakers had low education and literacy levels - 30 percent of caretakers had never been to school, 27 percent had attended but not completed primary school, 29 percent had completed primary school, 8 percent had completed secondary school, 2 percent had completed high school, 3 percent had completed vocational training and less than 1 percent had a bachelor degree. When asked to read a short sentence in Lao language, 45 percent of caretakers were not able to read at all, 17 percent could read a little, and 36 percent could read well.

Figure 13:
Caretaker's level of education



Caretaker's education and literacy levels are further broken down by gender in **Table 4** below. Again, results show that male caretakers were generally better educated than females, with a greater proportion of males than females having completed some education. This is then reflected in levels of literacy – the majority of females could not read at all, while the majority of males could read well.

Table 4:
Caretaker's education and literacy levels by gender

EDUCATION	OVERALL (%)	MALES (%)	FEMALES (%)
No school	30	2	28
Attended but did not complete primary school	27	4	24
Completed primary school	29	4	25
Completed secondary school	8	2	6
Completed high school	2	1	2
Completed vocational training	3	1	2
Completed a bachelor degree or similar	<1	<1	<1
LITERACY			
Could read well	36	7	31
Could read some part	17	3	13
Could not read at all	45	3	42
Could not read due to a disability	<1	<1	<1

Children

Children ranged in age from two to five years; 51% were male and 49% female. As shown in **Table 5**, there was a roughly equivalent number of children in each age group, as well as a roughly even number of males and females in each age group.

Table 5:
Age and gender of children

AGE	OVERALL (%)	MALES (%)	FEMALES (%)
2 years	1,540 (21%)	52%	48%
3 years	2,005 (27%)	51%	49%
4 years	2,148 (29%)	51%	49%
5 years	1,827 (24%)	51%	49%
Total	**7,520**	**51%**	**49%**

Figure 14 below shows that the majority of children were Lao-Tai (30 percent), Khmu (25 percent) and Hmong (27 percent). Other children were Prai (5 percent), Phong (4 percent) and Akha (4 percent), while each of the Lao, Leu, Yang, Cingmoon, Kmer, Toum, Singsili, Hor and Ilmain ethnic groups had 1 percent or fewer. Table 6 below presents children's ethnicities across the five provinces. Khmu children make up the majority of the samples in Phongsaly and Oudomxay, while almost all children in Xayaboury were of Prai ethnicity. The sample in Houaphanh was made up of predominantly Lao-Tai and Hmong children, while children in Borlikhamxay were predominantly Lao-Tai, Hmong or Khmu.

Figure 14:
Children's ethnicity

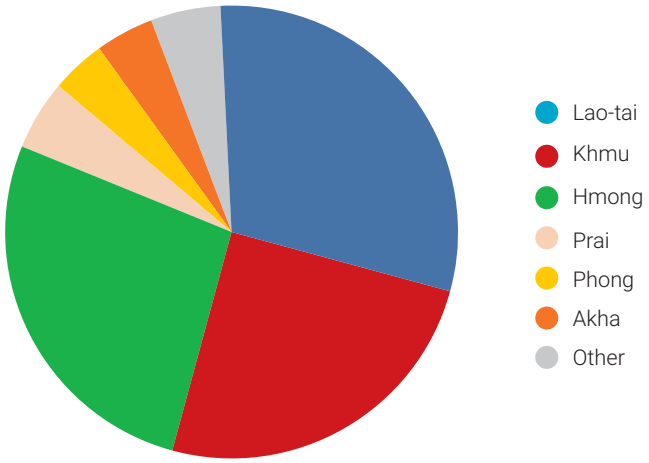


Table 6:
Number and percentage of children of each ethnicity across provinces

ETHNICITY	PHONGSALY (%)	OUDOMXAY (%)	HOUAPHANH (%)	XAYABOURY (%)	BORLIKHAMXAY (%)
Lao-Tai	89 (18%)	204 (11%)	1806 (40%)	5 (1%)	123 (36%)
Khmu	215 (43%)	1079 (60%)	530 (12%)	2 (<1%)	69 (20%)
Hmong	4 (1%)	227 (13%)	1738 (39%)	1 (<1%)	73 (22%)
Prai	-	-	1 (<1%)	368 (92%)	-
Phong	-	-	249 (6%)	-	11 (3%)
Akha	163 (33%)	167 (9%)	-	-	-
Lao	-	17 (1%)	-	-	-
Leu	3 (1%)	53 (3%)	-	-	1 (<1%)
Yang	16 (3%)	-	-	-	-
Cingmoon	1 (<1%)	-	79 (2%)	24 (6%)	-
Kmer	-	27 (2%)	-	-	21 (6%)
Toum	-	-	-	-	42 (12%)
Singsili	9 (2%)	21 (1%)	-	-	-
Hor	-	1 (<1%)	-	-	-
Ilmain	-	3 (<1%)	77 (2%)	-	-
Total	**500 (100%)**	**1800 (100%)**	**4480 (100%)**	**400 (100%)**	**340 (100%)**

Child Health

Good health and nutrition are essential not only for children's survival, but for healthy development and growth. Health and nutrition lay the foundations for development throughout childhood, in turn having a positive impact on later learning, educational achievement and adult productivity. To promote holistic child development, good health and nutrition for the country's children is critical.

General Health

Caretakers were asked about what they thought the current health status of the child in their care was. The majority (67 percent) reported the child to be very healthy, some believed the child had normal health (32 percent), and very few believed the child to be either unhealthy or often sick (1 percent). These findings are interesting considering results regarding children's health and nutrition presented below. In the past 12 months, the majority of children had worms (65 percent), with some also having experienced diarrhoea (33 percent). In the past month, 9 percent of children had an illness or health problem (excluding worms and diarrhoea) that needed to be treated.

Breastfeeding

Not only does breastfeeding provide infants with nutrition for healthy growth and development, it also reduces infant mortality and provides protection against disease and infection. It is recommended by the World Health Organization (WHO) that children be exclusively breastfed (i.e., fed nothing other than breastmilk including food or water) for the first six months of life. Thereafter, children should receive complimentary foods with continued breastfeeding up until two years of age.

Almost all children (99 percent) surveyed had been breastfed at some stage. For the small number of children that had not been breastfed, this was mainly due to their mother not having enough milk (<1 percent), or because they had been adopted by another family (<1 percent). For children who had been breastfed, the majority were breastfed until they were 7–12 months old (27 percent) or 13–24 months old (62 percent). The remainder were breastfed from 1–6 months old (4 percent), 25–36 months old (7 percent) and 37–60 months old (1 percent). The most common reasons mothers stopped breastfeeding were that the child reached an age when they felt that they should no longer be breastfed (50 percent), because the mother had to work (23 percent), was either pregnant or wanted to be pregnant (12 percent), or because the child did not want their mother's milk anymore (6 percent).

Figure 15 below shows length of breastfeeding time across age, gender, ethnicity and caretaker's education. Interestingly, Lao-Tai children were on average not breastfed for as long as children of Khmu, Hmong or other ethnicities, and uneducated parents breastfed their children for longer than parents who had some level of education.

Figure 15:
Child's age when they stopped breastfeeding

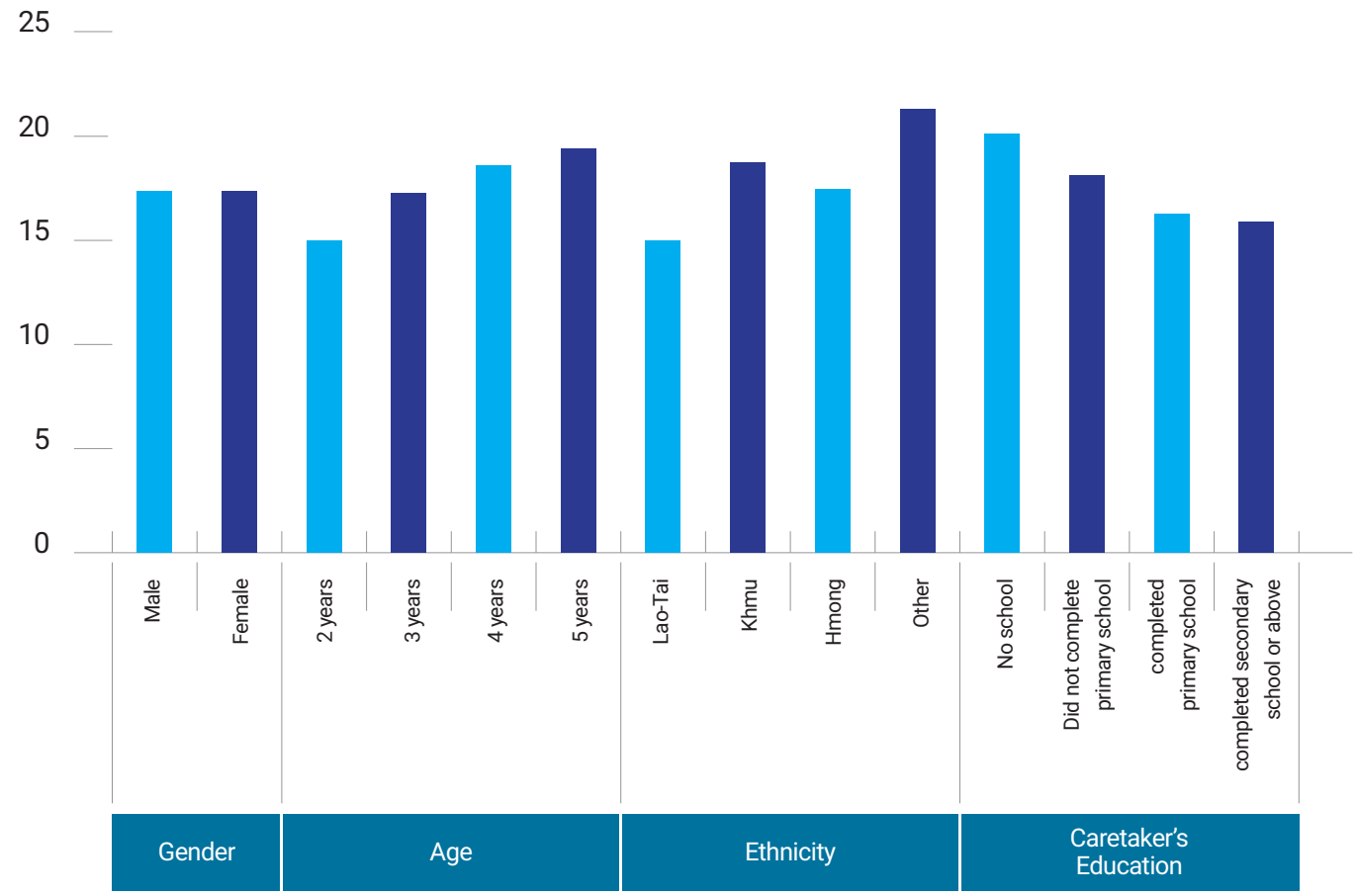
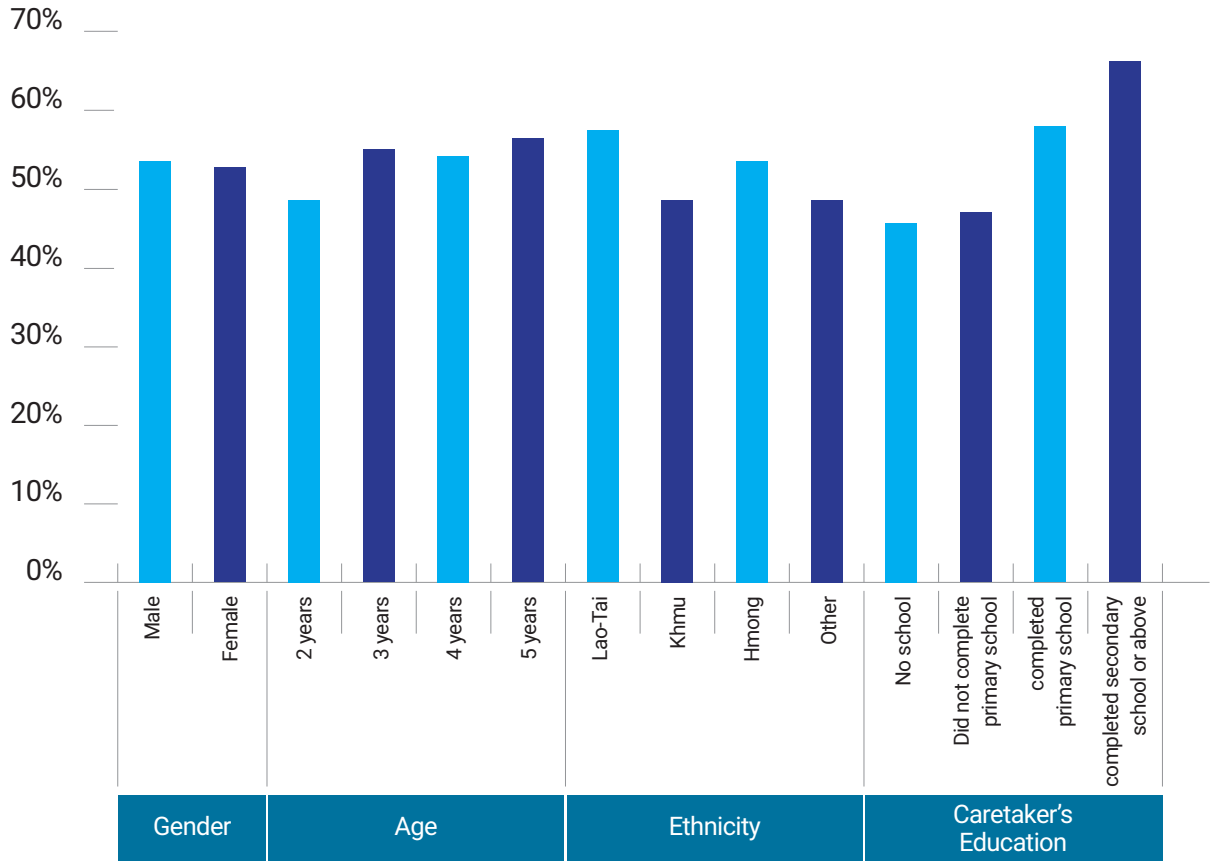


Figure 16 below shows that when looking more closely at exclusive breastfeeding rates, there are disparities across ethnicity and family background. In particular, more Lao-Tai children were exclusively breastfed until at least six months of age than Khmu and Hmong children, and children of other ethnicities. Further, educated parents were more likely to exclusively breastfeed their children for at least six months compared with parents who had never been to school.

Figure 16:
Children who were exclusively breastfed until at least six months of age



Undernutrition

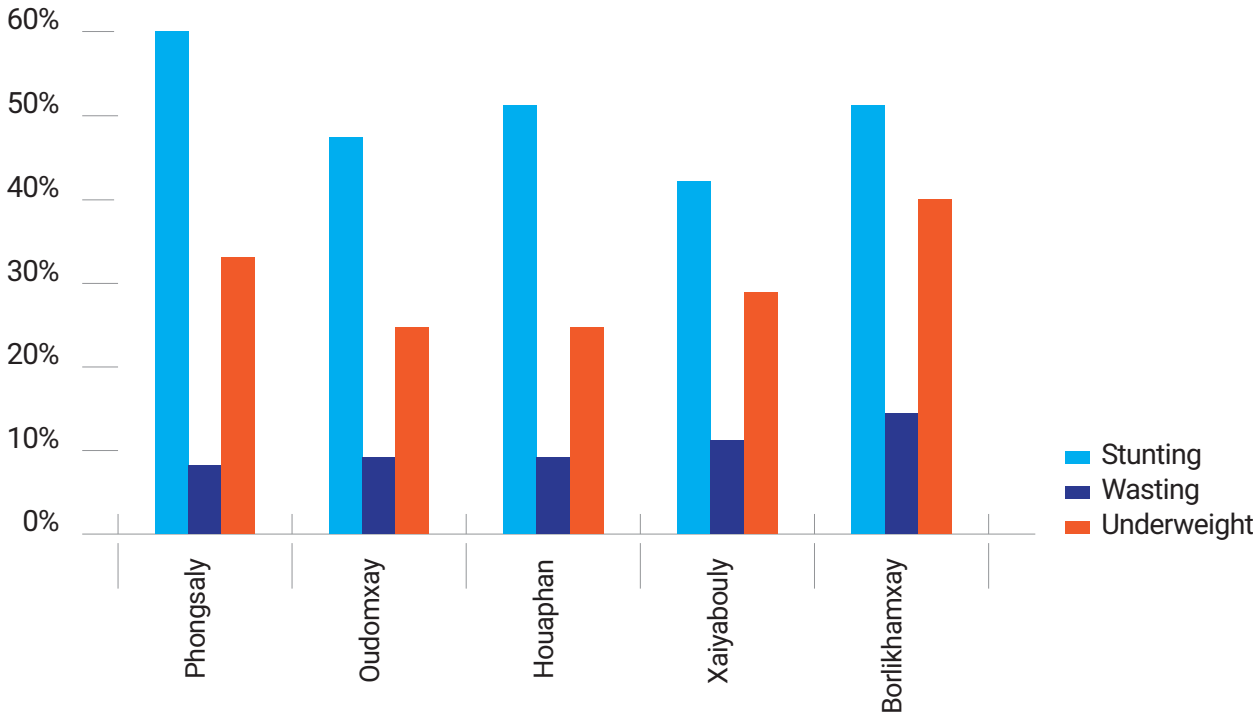
Children's height and weight was measured to calculate the incidence of stunting, wasting and being underweight. Stunting refers to a child being too short for their age; it is the failure to grow both physically and cognitively and is the result of chronic or recurrent undernutrition. Wasting refers to a child who is too thin for their height, reflecting recent sudden weight loss or acute undernutrition, usually as a result of starvation or severe disease. Being underweight can imply stunting, wasting or both. **Table 7** presents the overall prevalence of these three forms of undernutrition alongside the degree of public health significance according to the WHO classification system.

Table 7:
Prevalence of undernutrition and public health significance

FORM OF UNDERNUTRITION	CHILDREN (%)	WHO CLASSIFICATION
Stunting	50	40+ = 'very high' public health significance
Wasting	9	5-9 = 'medium' public health significance
Underweight	27	20-29 = 'high' public health significance

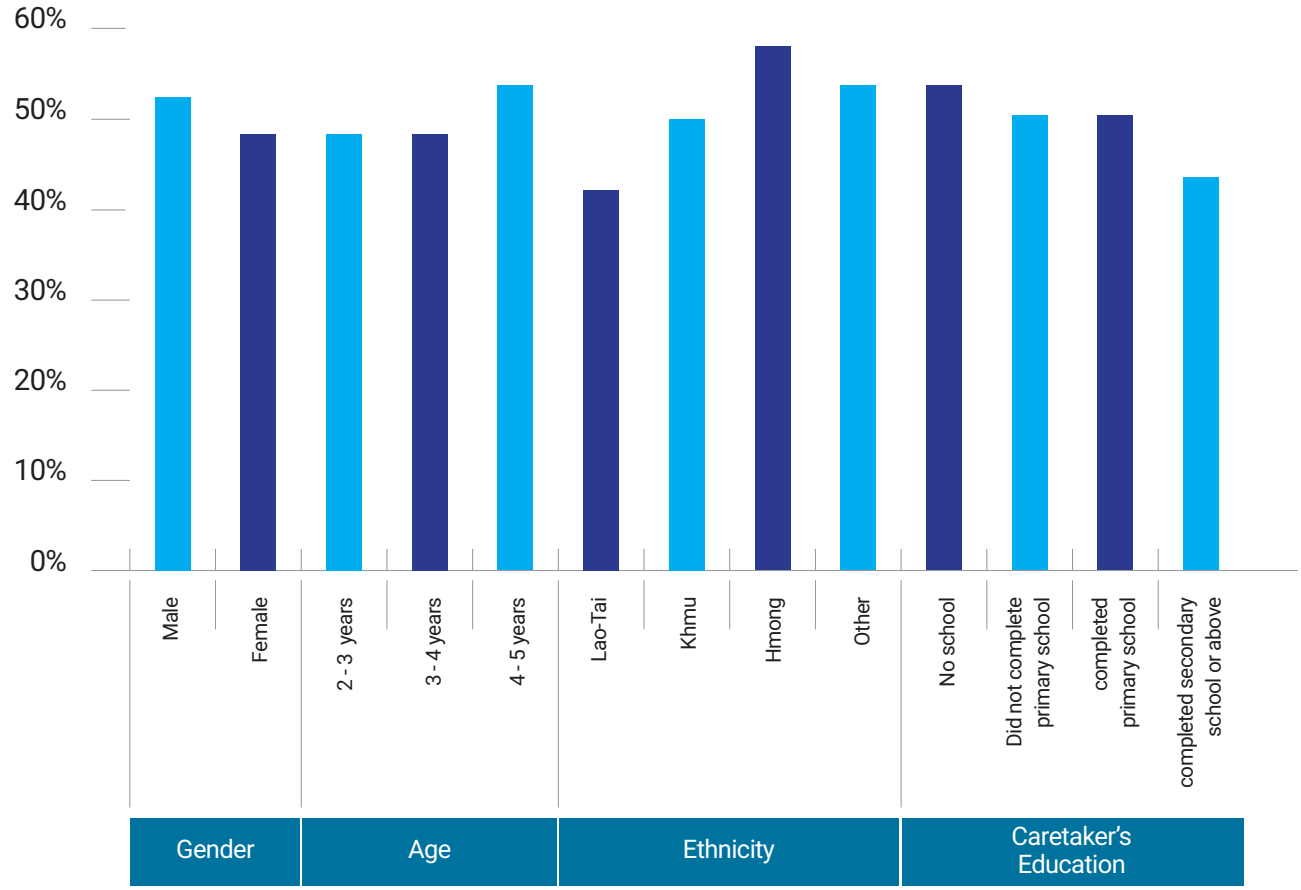
Figure 17 below shows the prevalence of child undernutrition across the five provinces. Evidently, stunting was most prevalent amongst children in Phongsaly, with 60 percent of children affected, while the rate was lowest in Xaiyabouly (42 percent). In contrast, the proportion of children affected by wasting was highest in Borlikhamxay, which was almost double the average of the sample (15 percent). The proportion of underweight children was highest in Borlikhamxay (40 percent) and Phongsaly (33 percent).

Figure 17:
Undernutrition across provinces



Child stunting is classified as a very high public health concern in northern Lao PDR, with half of all children surveyed being stunted. Stunting is largely irreversible, and can have detrimental consequences in later life, such as poor motor and cognitive skills, leading to reduced adult productivity. These findings are interesting to reflect on when considering that only 2 percent of households reported food shortages for more than two consecutive days over the last 12 months. It is possible that households were unwilling to admit to their level of food insecurity, or that there is a lack of variation and quantity of food being provided to young children, resulting in such high rates of stunting. Further, it is also possible that stunting is beginning in utero due to poor maternal nutrition. When examining stunting in greater detail, disparities across age, gender, ethnicity and family background emerge, as shown in **Figure 18** below. More children from Khmu, Hmong and other ethnicities were stunted than Lao-Tai children, and children whose parents had some form of education were less likely to be stunted than children whose parents had never gone to school.

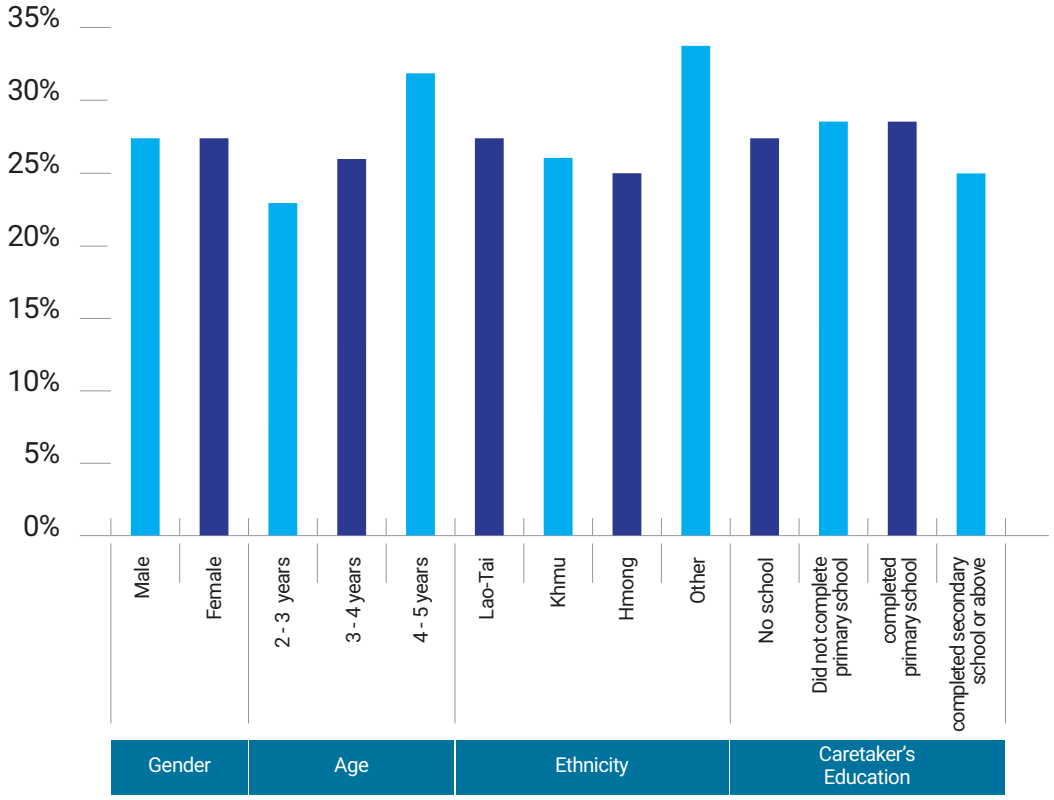
Figure 18:
Prevalence of stunting by gender, age, ethnicity and caretaker's education



Wasting at the level found in this sample is considered a medium public health concern according to the World Health Organisation (WHO) universal growth standards. If wasting goes unidentified and untreated, the condition progresses severely, requires specialized nutritional rehabilitation and greatly increases the risk of child mortality. The WHO has set a global target to reduce and maintain childhood wasting to less than 5 percent - wasting in northern Lao PDR is currently almost double this. Coupled with the stunting rate, this tells us that children are not receiving nutrition (and access to healthcare) that they should be.

As shown by **Figure 19** below, the wasting data does not reveal gender differences, but there were differences across age, ethnicity and family background. Children from other ethnicities were more likely to be wasting. Slightly more Lao-Tai children were found to be wasting than Khmu and Hmong children. Finally, while fewer children whose parents had completed secondary school or above were wasting, there was very little variation in the proportion of children wasting among those whose parents had either not gone to school, had gone to school but not completed primary school, or had completed primary school.

Figure 19:
Prevalence of wasting by gender, age, ethnicity and caretaker's education



The prevalence of underweight children in northern Lao PDR is considered to be of high public health significance. As this indicator does not take into account a child's height, it is not possible to determine whether a child is underweight due to acute or chronic nutritional deficiencies. Nevertheless, ending all forms of malnutrition by 2030 is one of the Sustainable Development Goals - so while not as informative as stunting or wasting, the proportion of underweight children is still an important indicator to track.

Diet

Caretakers were asked to report on the food their child had consumed in the past week. All children had eaten rice (100 percent), almost all had consumed vegetables (96 percent), meat (92 percent), and fruit (83 percent).The majority had eaten sweets such as cakes, crackers or bread (77 percent), raw fish (74 percent), eggs (72 percent), instant noodles (58 percent), roots such as cassava or taro (56 percent), and candy or chocolate (51 percent).Some had also consumed carbohydrates such as corn or sago (26 percent), dry fish (15 percent), and milk (not including breast milk) (13 percent) in the past week. Table 8 shows the frequency with which children consumed each of these foods: from not at all, to three times per week, to every day of the week.

Table 8:
Children's food consumption in the last week

FOOD	NUMBER OF DAYS CHILDREN CONSUMED THIS FOOD TYPE (% CHILDREN)							
	None	1	2	3	4	5	6	7
Milk	87%	2%	4%	3%	1%	1%	<1%	2%
Eggs	28%	11%	26%	18%	4%	5%	1%	5%
Meat	8%	9%	24%	24%	9%	11%	2%	9%
Raw fish	26%	14%	23%	16%	6%	6%	2%	5%
Dry fish	85%	5%	6%	2%	1%	1%	<1%	1%
Rice	0%	<1%	<1%	<1%	<1%	<1%	<1%	99%
Carbohydrates	74%	8%	9%	4%	1%	2%	<1%	1%
Roots	44%	10%	20%	13%	4%	5%	1%	3%
Vegetables	4%	4%	10%	10%	6%	16%	9%	39%
Fruit	17%	11%	28%	17%	6%	8%	2%	8%
Instant noodles	13%	30%	11%	3%	4%	4%	1%	4%
Cakes/breads	23%	6%	11%	9%	5%	8%	5%	30%
Candy/chocolate	49%	8%	14%	7%	4%	4%	2%	11%

These findings highlight that, overall, children in northern Lao PDR are not getting a balanced diet. They have high consumption of carbohydrates (rice, taro, cakes etc.), and low consumption of milk products, proteins and fats. This could in part help to explain the high stunting rates reported earlier. While children in northern Lao PDR are not food insecure, it is clear that they are not eating enough of the right kinds of foods to obtain the necessary nutrients for healthy growth.

Caretakers also reported that 17 percent of children had received/eaten a school meal in the past week: the majority (79 percent) had received a school meal five days that week, with the remainder having a school meal once (2 percent), twice (2 percent), three times (7 percent), four times (5 percent), six times (<1 percent) or seven times in the week (5 percent). **Table 9** below explores school meal consumption by children's age among the 17 percent of children who were reported to have a school meal in the past week. Evidently, children of all ages are benefitting from the school meals program. Of the children who had school meals five times in the past week, 46 percent were five years of age, 33 percent were four, 17 percent were three and 3 percent were two years old. As mentioned earlier, 61 percent of village heads reported that there is a World Food Programme or school food program in their village. Because data was collected on 20 children from each village, it is difficult to determine if children are receiving school meals as expected, as children selected to participate may not accurately represent the number of children receiving school meals in the village.

Table 9:
School meal consumption by child age

	2 YEARS (N, %)	3 YEARS (N, %)	4 YEARS (N, %)	5 YEARS (N, %)
Had a school meal in the past week	48 (4%)	229 (19%)	414 (34%)	544 (44%)
Once in the past week	3 (17%)	4 (22%)	6 (33%)	5 (28%)
Twice in the past week	3 (10%)	5 (17%)	10 (33%)	12 (40%)
3 times in the past week	3 (3%)	25 (29%)	31 (36%)	28 (32%)
4 times in the past week	1 (2%)	16 (26%)	22 (35%)	23 (36%)
5 times in the past week	31 (3%)	169 (17%)	323 (33%)	450 (46%)
6 times in the past week	0 (<1%)	0 (<1%)	1 (<1%)	0 (<1%)
7 times in the past week	7 (11%)	10 (16%)	21 (33%)	26 (41%)

Vaccinations

Immunization is one of the most cost-effective health investments – it controls and eliminates life-threatening infectious disease, and is estimated to prevent up to three million deaths annually.

More than half of caretakers reported they had their child's vaccination card (56 percent); 29 percent were able to present their child's vaccination card but without any details recorded on it, and 28 percent presented a vaccination card that did have information recorded on it. Examining only the responses from caretakers who were able to present their child's vaccination card, we are able to estimate that up to 24 percent of children had received their BCG vaccine for tuberculosis, 20 percent had been vaccinated against Measles, 22 percent had been fully vaccinated against both Polio and DPT (three doses of each). While 12 percent of children had received two doses of the Hepatitis B vaccine, no children had received all three doses and were therefore not fully vaccinated against the infection. It is likely that children of families who did not have(or who were unable to provide) an immunization card have either had no immunizations at all, or have lower coverage than families who were able to present an immunization card. **Table 10** below presents vaccination results by age, with an upper and lower estimate of the coverage. This information is presented alongside the WHO recommended routine vaccinations for all children.

Table 10:
Vaccination coverage by child age and WHO vaccination recommendations

VACCINATION	AGE	LOWER ESTIMATE OF CHILDREN VACCINATED	UPPER ESTIMATE OF CHILDREN VACCINATED	WHO AND UNICEF OFFICIAL IMMUNISATION STATISTICS FOR LAOS PDR – RATES AT 23 MONTHS (WHOLE COUNTRY)	WHO RECOMMENDATION
BCG	2	10%	34%	83%	Age of first and only dose – as soon as possible after birth
	3	8%	27%		
	4	6%	20%		
	5	5%	19%		
Measles	2	8%	18%	No estimate	Age of first and only dose – 9 or 12 months
	3	6%	21%		
	4	5%	17%		
	5	4%	15%		
Polio (3 dosages)	2	9%	31%	89%	Minimum 6 weeks old at first does, then minimum 4-8 week intervals between second and third dosages.
	3	7%	24%		
	4	5%	18%		
	5	5%	16%		
DPT (3 dosages)	2	9%	31%	89%	Minimum 6 months old at first dose, then minimum 4-week intervals between second and third dosages.
	3	7%	24%		
	4	5%	19%		
	5	5%	17%		
Hepatitis B (2 dosages only)	2	5%	13%	No estimate	First dose as soon as possible after birth, then minimum 4-week intervals between second and third dosages.
	3	4%	17%		
	4	3%	9%		
	5	%	9%		

These rates of immunization that we found in our study area (northern rural and remote) are well below international standards and well below the official statistics for the whole of Laos. In 2015, at a global level, coverage of three doses of Hepatitis B vaccine was approximately 83 percent, 85 percent of children had received a measles vaccination by their second birthday, and 86 percent of infants had received three doses of Polio vaccine. In addition, 126 countries had reached at least 90 percent coverage of DTP vaccine (three doses).

As detailed in the WHO Global Vaccine Action Plan 2011-2020, equitable access to immunization is a core component of the right to health. Countries themselves have ownership and responsibility for establishing good governance for immunization, and for providing effective and quality immunization services for all. Evidently, Lao PDR has much work to do in order to increase immunization rates, and to provide access to safe, effective, quality and affordable medicines and vaccines as outlined in SDG 3.

Caretaker Knowledge on Child Health

Caretakers were asked how long they thought children should be fed only breastmilk– 2 percent responded less than three months, 50 percent 3-6 months, 27 percent more than 12 months, 21 percent more than 12 months and 1 percent did not know.

When a child has diarrhoea, 46 percent of caretakers answered that children should consume the same amount of food as normal, 19 percent said that they should have more food than normal, 31 percent said less food than normal, 2 percent believed the child should not be fed anything, and another 2 percent did not know. Similarly, when a child has diarrhoea, 38 percent of caretakers reported children should drink the same amount of water as normal, 41 percent said that they should drink more than normal, 19 percent said less than normal, 1 percent said they should not drink any water, and another 1 percent did not know.

Child Development

Early childhood development is generally defined as the holistic development of children from conception. Development is the result of the process of change in which the child comes to master increasingly complex levels of moving, thinking, feeling and interacting with people and objects in his/her environment. There are various aspects of development, such as physical, social, emotional, language and cognitive development. Early childhood development is considered to be the most important phase in life, which determines later health, wellbeing, learning, behavior and achievements across the life course. It is a time of both opportunity and vulnerability and each child's development is dependent on a combination of biological and environmental factors.

As discussed earlier, the indicator used to measure child development is based on the Early Human Capability Index (eHCI), which has been used internationally. The version of the eHCI index used in Lao PDR provides a score for each child on seven different developmental domains: verbal communication, approaches to learning, numbers and concepts, cultural knowledge, literacy (reading and writing), social and emotional skills, and perseverance. Scores for each of the domains range from 0 to 1; 1 being the best score and 0 being the poorest. The data is not weighted or age standardised, so older children should receive higher scores on each of the domains, to reflect more advanced development. From these seven domains an overall development score is derived, also ranging from 0 to 1, with 1 being the best score.

For each of the domains, **Table 11** presents the highest and lowest score (scale range), the 25th and 75th percentile (interquartile range), the mean (average score), and the standard deviation around the mean. Valid scores were available for all 7,520 children on all domains.

Table 11:
Developmental domains descriptive results

DOMAIN	MIN	25TH PERCENTILE	MEAN	STANDARD DEVIATION	75TH PERCENTILE	MAX
Verbal Communication	0	.75	.84	.26	1	1
Approaches to Learning	0	.57	.67	.28	.86	1
Numeracy and Concepts	0	.20	.37	.26	.50	1
Literacy (reading and writing)	0	.00	.14	.18	.17	1
Cultural Knowledge	0	.60	.71	.21	.80	1
Social and Emotional Skills	0	.36	.48	.20	.64	1
Perseverance	0	.50	.56	.33	.75	1

Figure 20 below presents average scores for each of the seven developmental domains for all children, as well as an average overall development score. Evidently, children in northern Lao PDR have particularly poor maths, reading and writing skills. In contrast, children's verbal communication skills and knowledge of culture appear to be developing well though these results are expected considering the age of the children assessed and the items assessed in these domains – for example, it is expected that , the majority of children aged 2-5 years would have the ability to communicate their needs using a simple word or sentence, or be able to participate in traditional cultural events. Each of these aspects of development is explored in more depth below.

Figure 20:
Average child development scores across developmental domains

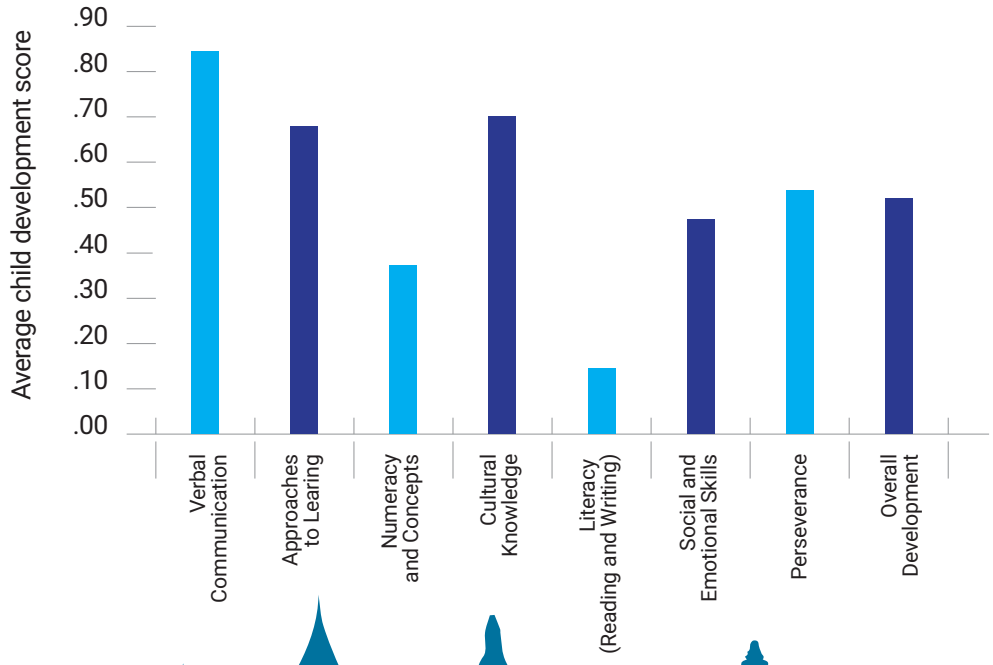


Figure 21 below and Tables 12-15 explore disparities in children's development across children's gender, age, ethnicity and family background – specifically, their caretaker's level of education. When examining overall child development, the results demonstrate only small differences in development between boys and girls. As expected, overall child development improves as children grow older: the older the child, the more advanced their stage of development. When examining ethnicity, Lao-Tai children generally appear to be developing better than children of other ethnicities, with Hmong children usually demonstrating the poorest performance. Another pronounced difference in development is between children with educated or uneducated parents. Children with parents who had not completed any school performed consistently poorer than children whose parents attended and/or completed primary school. Children of parents with a higher level of education, having completed secondary school or above, had better development again. Overall, these disparities in developmental scores are expected, and consistent with the international literature on child development.

Figure 21:
Children's overall development by gender, age, ethnicity and caretaker's education

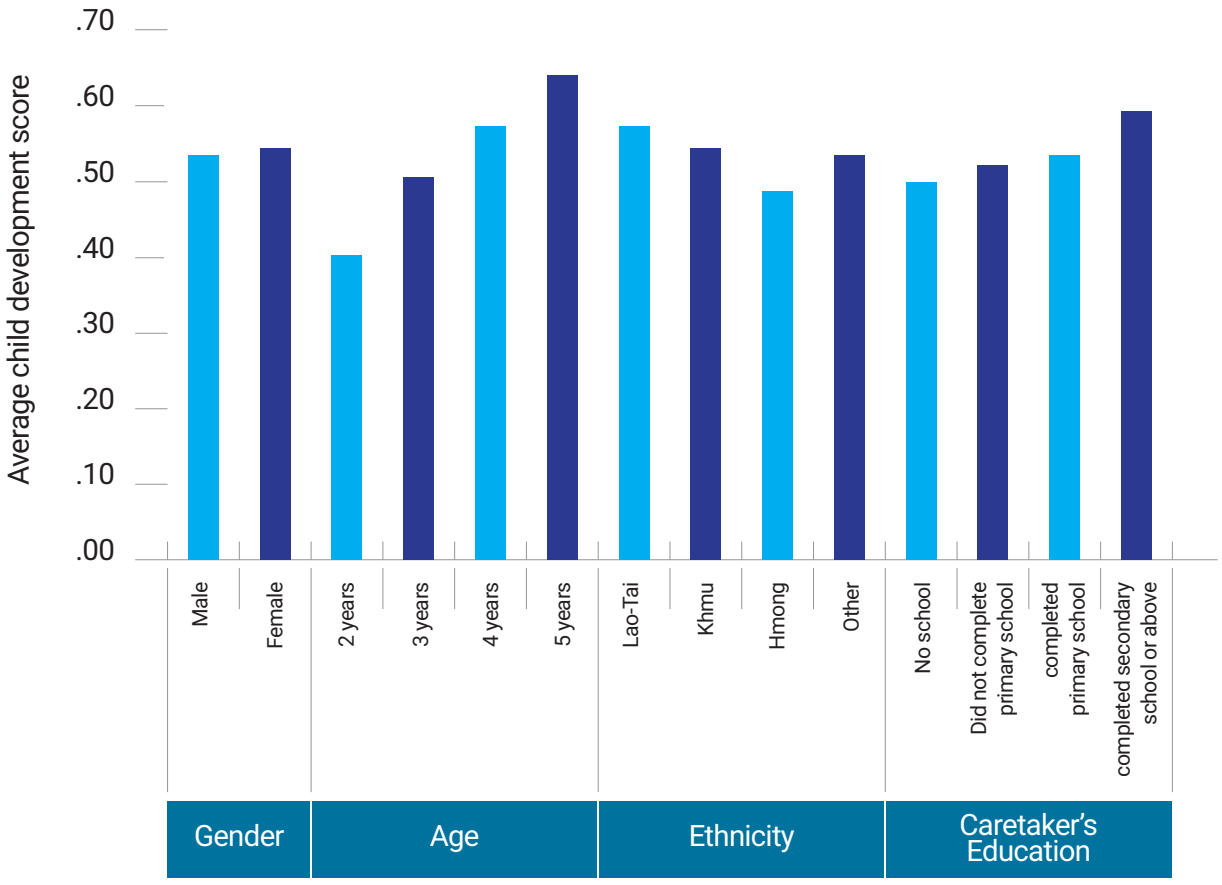


Table 12 below shows results from a univariate general linear model demonstrating the relationship between child age and scores on each developmental domain. As expected, children's age is strongly related to scores in all domains of development, with older children performing better than younger children. This association is strongest for early numeracy skills, followed by early literacy skills.

Table 12:
Child development by child age

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	2 years	.69	.32	15.88	265.27**
	3 years	.85	.24		
	4 years	.89	.22		
	5 years	.91	.20		
Approaches to Learning	2 years	.54	.30	13.96	198.00**
	3 years	.65	.28		
	4 years	.72	.25		
	5 years	.75	.24		
Numeracy and Concepts	2 years	.18	.19	41.47	810.55**
	3 years	.31	.21		
	4 years	.42	.23		
	5 years	.54	.25		
Literacy (reading and writing)	2 years	.06	.09	11.97	460.13**
	3 years	.10	.12		
	4 years	.15	.17		
	5 years	.25	.23		
Cultural Knowledge	2 years	.58	.25	14.59	363.59**
	3 years	.69	.20		
	4 years	.75	.18		
	5 years	.79	.18		
Social and Emotional Skills	2 years	.37	.18	13.41	368.13**
	3 years	.46	.19		
	4 years	.51	.19		
	5 years	.58	.20		
Perseverance	2 years	.43	.33	13.65	132.52**
	3 years	.54	.33		
	4 years	.60	.32		
	5 years	.58	.20		
Overall Development	2 years	.41	.16	16.28	791.21**
	3 years	.51	.14		
	4 years	.58	.13		
	5 years	.64	.15		

Note : *p,.05, **p<.01

Table 13 below presents results from a univariate general linear model demonstrating how children's gender is related to performance on each developmental domain. Results demonstrate a small but statistically significant difference between boys and girls on overall development, and larger statistically significant differences on approaches to learning, literacy skills, and social and emotional development. Boys performed better than girls in the approaches to learning domain, and girls scored higher than boys on reading and writing, and on social and emotional development.

Table 13:
Child development by child gender

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Male	.84	.26	.01	.08
	Female	.84	.25		
Approaches to Learning	Male	.84	.25	1.21	15.91**
	Female	.66	.28		
Numeracy and Concepts	Male	.37	.26	.15	2.24*
	Female	.37	.26		
Literacy (reading and writing)	Male	.13	.17	.56	18.36**
	Female	.15	.18		
Cultural Knowledge	Male	.70	.21	.24	5.27**
	Female	.71	.22		
Social and Emotional Skills	Male	.47	.20	1.91	45.97**
	Female	.50	.21		
Perseverance	Male	.55	.33	.75	6.91**
	Female	.57	.33		
Overall Development	Male	.53	.16	.17	6.14*
	Female	.54	.17		

Note : *p,.05, **p<.01

Table 14 below presents results from a univariate general linear model demonstrating the relationship between children's ethnicity and scores in each developmental domain.This relationship was statistically significant across all domains of development, particularly so when examining reading and writing skills. On average, Lao-Tai children perform better than Hmong, Khmu and children of other ethnicities on all domains except verbal communication (for which Khmu children score only slightly higher), social and emotional skills (for which children of other ethnicities score the same as Lao-Tai children), and perseverance (for which Khmu and children of other ethnicities score higher than Lao-Tai children). Conversely, Hmong children score the least well of all ethnicities on all domains of development, with the exception of social and emotional development (for which Khmu children score the same, on average).

Table 14:
Child development by child ethnicity

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Lao-Tai	.86	.25	1.45	22.14**
	Khmu	.87	.24		
	Hmong	.81	.27		
	Other	.82	.27		
Approaches to Learning	Lao-Tai	.71	.25	2.87	38.27**
	Khmu	.69	.28		
	Hmong	.63	.29		
	Other	.66	.27		
Numeracy and Concepts	Lao-Tai	.42	.28	3.34	50.28**
	Khmu	.35	.24		
	Hmong	.33	.23		
	Other	.37	.27		
Literacy (reading and writing)	Lao-Tai	.20	.20	5.14	178.68**
	Khmu	.12	.16		
	Hmong	.09	.12		
	Other	.16	.18		
Cultural Knowledge	Lao-Tai	.75	.20	3.31	74.11**
	Khmu	.72	.21		
	Hmong	.65	.21		
	Other	.71	.24		
Social and Emotional Skills	Lao-Tai	.51	.21	1.72	41.78**
	Khmu	.46	.20		
	Hmong	.46	.20		
	Other	.51	.21		
Perseverance	Lao-Tai	.56	.31	4.27	40.05**
	Khmu	.59	.35		
	Hmong	.49	.33		
	Other	.60	.31		
Overall Development	Lao-Tai	.57	.17	2.22	84.61**
	Khmu	.54	.16		
	Hmong	.49	.18		
	Other	.55	.17		

Note : *p,.05, **p<.01

Table 15 below presents results from a univariate general linear model exploring how children's development scores are associated with their caretaker's level of education. Again, there was a statistically significant relationship across all domains of development, with the strongest association observed between caretaker's education and children's scores in the literacy domain. This is consistent with international evidence – caretakers who are able to read and write are more likely to try to foster these skills in the children they are caring for, while it is very difficult for illiterate caretakers to teach their children early literacy skills that they do not have themselves.

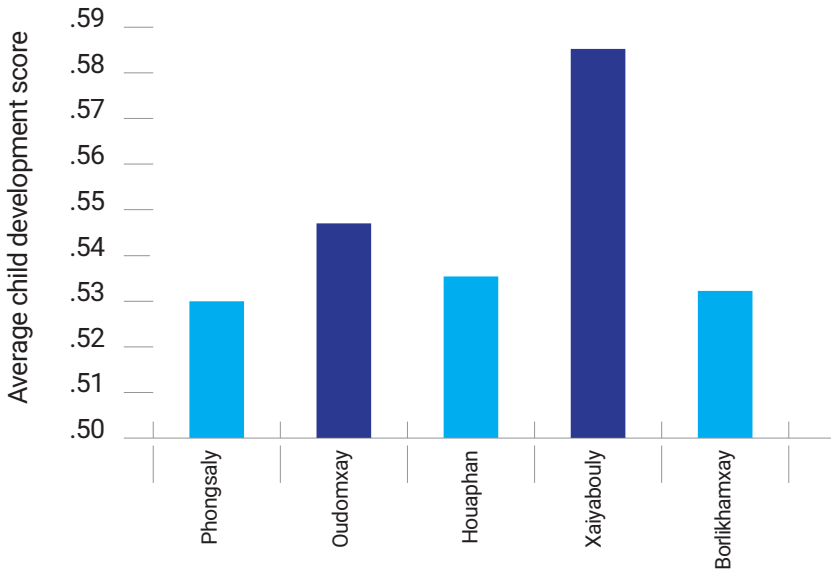
Table 15:
Child development by caretaker's education level

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	No School	.83	.27	.50	4.50**
	Primacy School (incomplete)	.83	.26		
	Completed Primary School	.85	.25		
	Completed Secondary School or above	.87	.23		
Approaches to Learning	No School	.63	.30	4.77	64.25**
	Primacy School (incomplete)	.65	.28		
	Completed Primary School	.70	.26		
	Completed Secondary School or above	.76	.21		
Numeracy and Concepts	No School	.32	.24	3.41	51.43**
	Primacy School (incomplete)	.36	.25		
	Completed Primary School	.40	.27		
	Completed Secondary School or above	.43	.28		
Literacy (reading and writing)	No School	.10	.14	4.22	144.74**
	Primacy School (incomplete)	.13	.16		
	Completed Primary School	.17	.19		
	Completed Secondary School or above	.22	.22		
Cultural Knowledge	No School	.67	.22	2.40	53.40**
	Primacy School (incomplete)	.69	.22		
	Completed Primary School	.73	.21		
	Completed Secondary School or above	.76	.20		
Social and Emotional Skills	No School	.45	.20	1.68	40.84**
	Primacy School (incomplete)	.48	.20		
	Completed Primary School	.50	.21		
	Completed Secondary School or above	.52	.20		
Perseverance	No School	.55	.34	1.93	17.91**
	Primacy School (incomplete)	.52	.34		
	Completed Primary School	.58	.32		
	Completed Secondary School or above	.58	.31		
Overall Development	No School	.51	.16	2.23	85.49**
	Primacy School (incomplete)	.52	.16		
	Completed Primary School	.56	.16		
	Completed Secondary School or above	.59	.16		

Note : *p,.05, **p<.01

Figure 22 below shows average child development scores across the five different provinces in which data was collected. Results demonstrate statistically significant differences in how children are developing overall, across provinces (F(4)= 9.15, p = .000), with child development highest in Xaiyabouly (.58), and lowest in Phongsaly and Houaphan (both 53). This is aligned with the levels of poverty found in these areas – Xaiyabouly has the lowest score on the poverty severity index (1.5) whilst Houaphan has the highest of these five provinces (2.8). This is consistent with the international literature demonstrating that poverty and poor child development go hand in hand.

Figure 22:
Child development by province

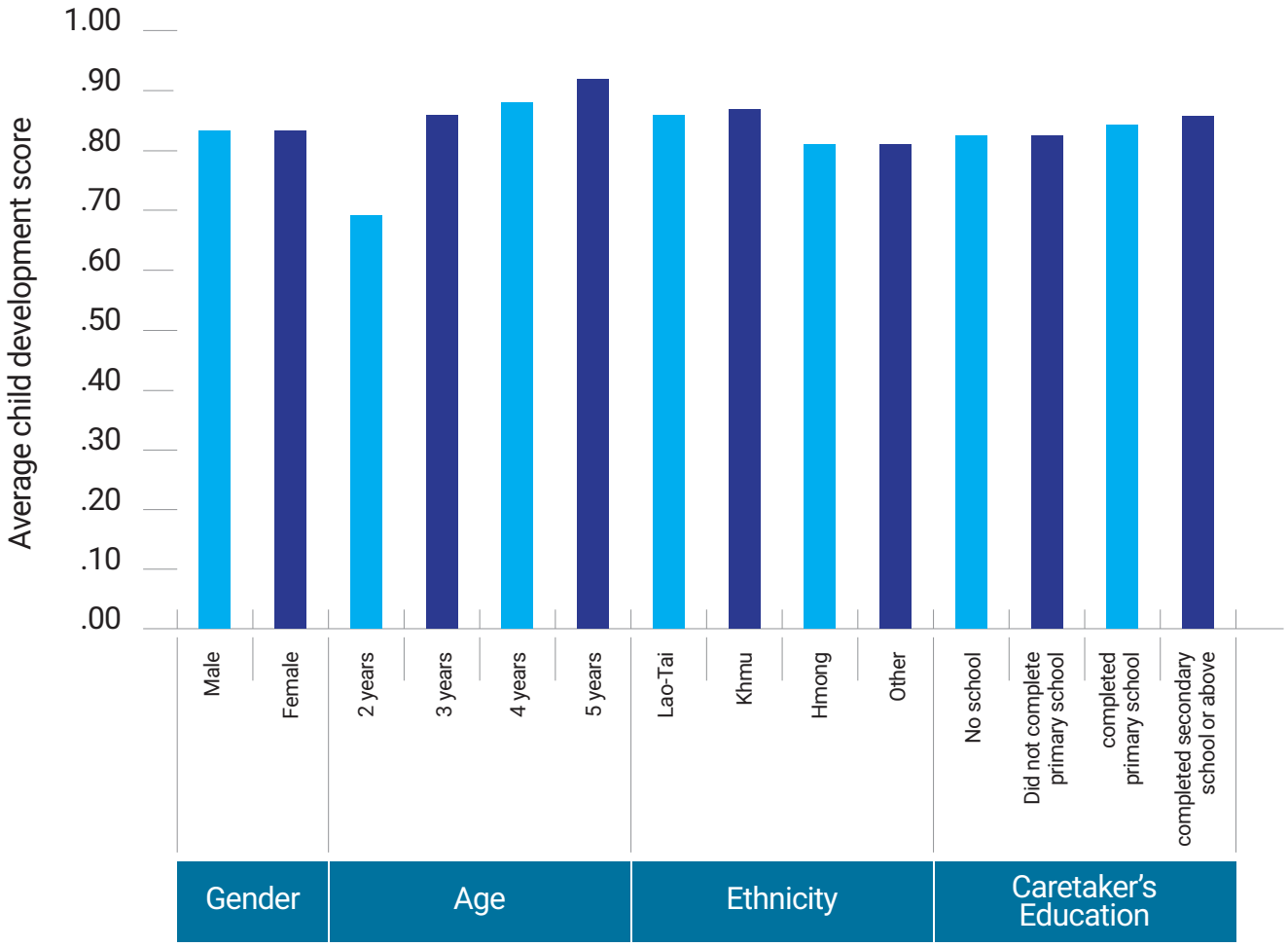


Verbal Communication Skills

Children communicate from birth through sounds, facial expressions and gestures, and from here a child's communication skills grow rapidly throughout their first years of life. To be ready for school and to learn successfully in a classroom, it is crucial that children are able to communicate their needs and thoughts to adults and other children alike.

Examples of items measured in this domain include children's ability to communicate their needs, speak simple sentences, and stop an activity when told to do so. As previously noted, the data shows that children's verbal communication skills are quite good, as would be expected for children of this age range. **Figure 23** below shows that there is not a great deal of difference between children's communication skills across different demographic groups, unlike the greater differences seen in other domains of development (refer to Tables 12 to 15 for significance values). However, there is a steep improvement in the communication skills of two and three year olds, which reflects the expected developmental milestones of children this age. There are only small differences between the communication skills of children of different ethnicities and children of educated and uneducated parents.

Figure 23:
Children's verbal communication skills by gender, age, ethnicity and caretaker's education

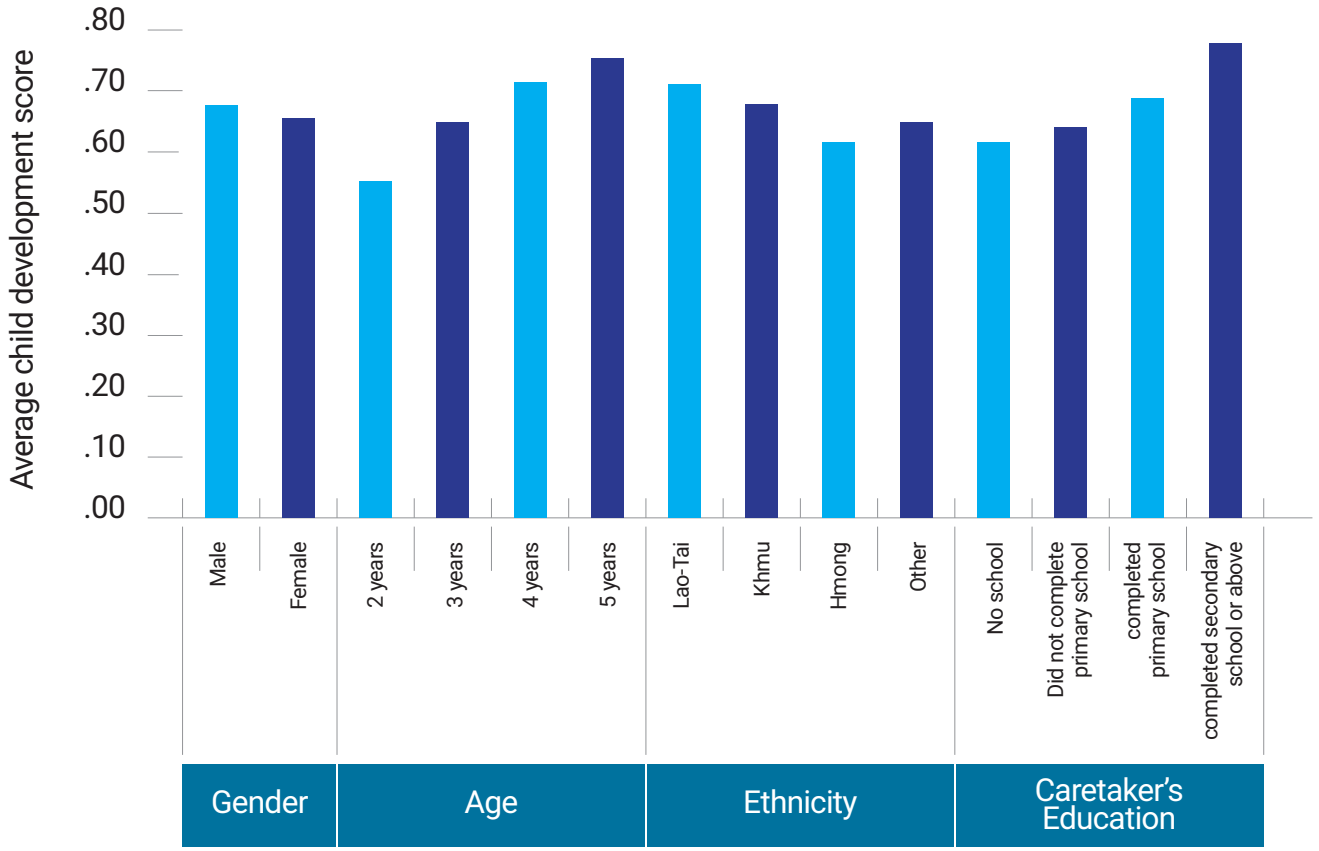


Approaches to Learning

Children's approaches to learning include how they learn and develop new skills, and their attitude towards learning experiences. For infants and toddlers, this begins with their interest in the world around them, and their curiosity and willingness to interact with people and objects. With adult support, children feel safe and confident to try new things and take risks. When parents nurture their children's natural curiosity by playing games, talking to them about their experiences, counting, reading and so on, this lays a foundation for future learning and success.

Examples of items measured in this domain include children's demonstrated interest to learn new things, play new games and pay attention when completing an activity. Overall, children in northern Lao received good scores. **Figure 24** shows small disparities across age, ethnicity and family background which are statistically significant (refer to Tables 12 to 15). Hmong children received the lowest scores relative to Lao-Tai, Khmu and children of other ethnicities, while children whose parents completed secondary school or above scored the highest on this domain, compared to children with less educated parents. Further testing for interaction effects demonstrated that there is a statistically significant relationship between a caretaker's education and children's gender when examining scores on approaches to learning ($F= 3.61$, $p = .013$). There was no difference between the scores of boys and girls of caretakers who had completed secondary school or above (both $M = .76$), but a significant difference between the scores of boys and girls whose caretakers who had never gone to school ($M = .66$, $M = .60$, respectively).

Figure 24:
Children's approaches to learning by gender, age, ethnicity, and caretaker's education

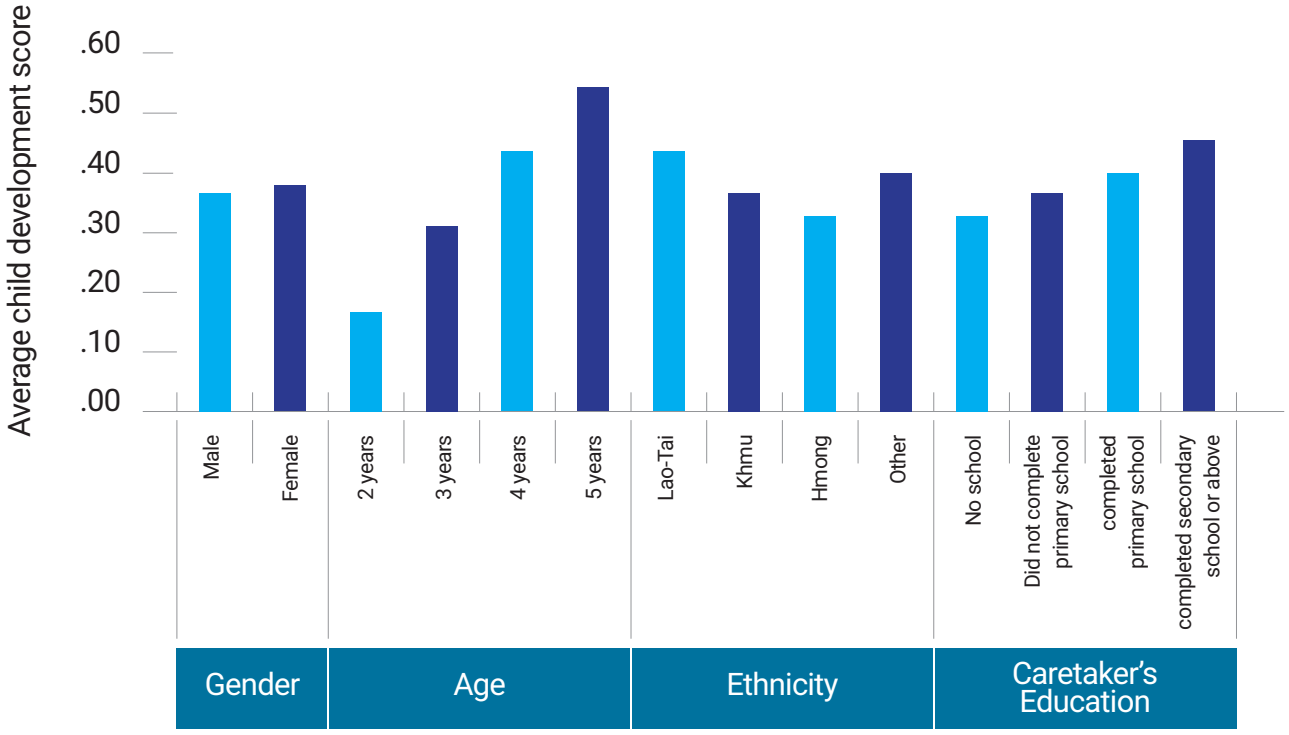


Early Numeracy Skills

Basic numeracy skills and knowledge of numeracy concepts – such as being able to recognize a number, having knowledge of smaller objects and heavier objects, and the ability to count – are important for children to be ready to learn at school. Children will have a greater interest in learning at school when they have already developed an interest in counting, recognising numbers and shapes.

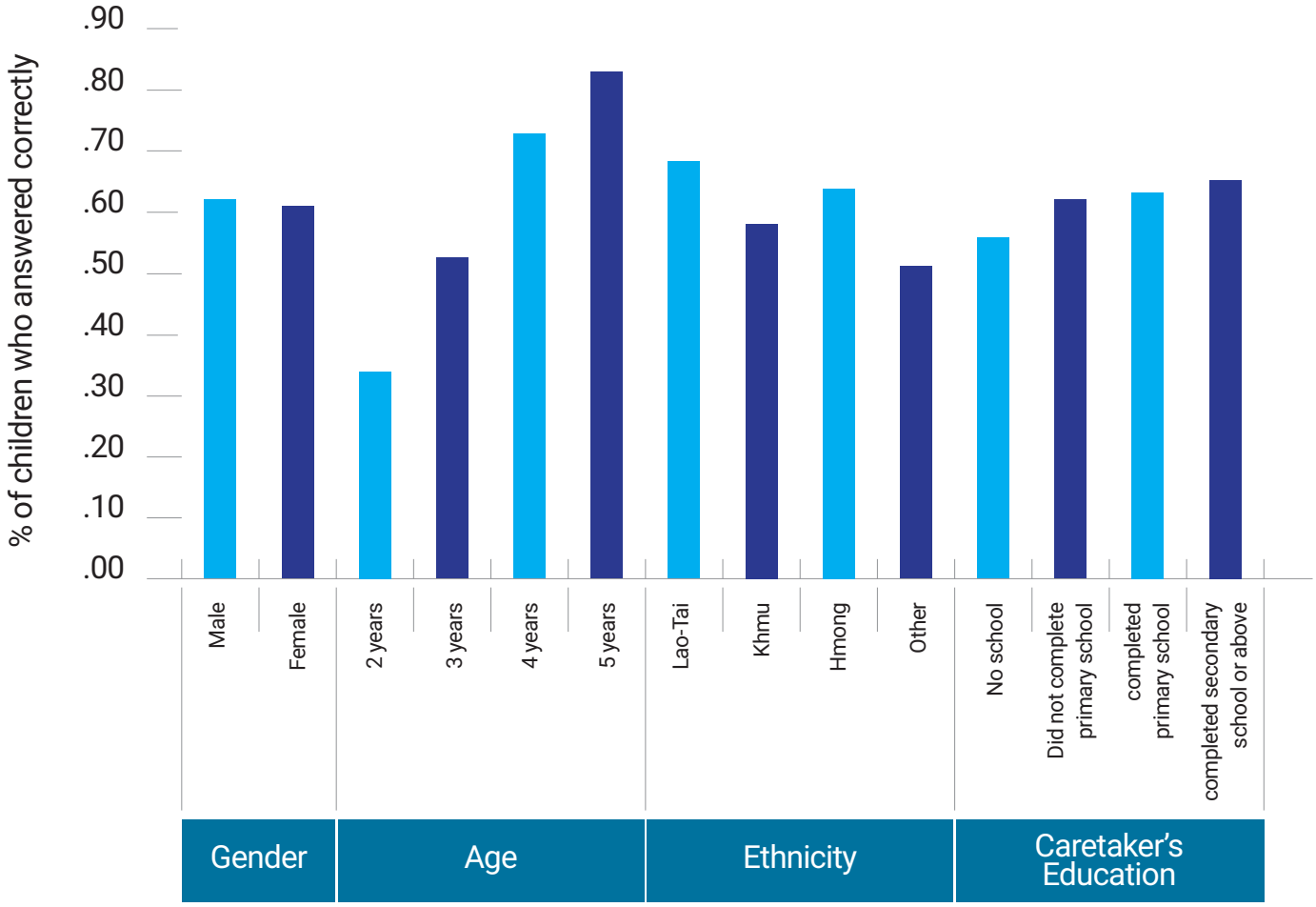
As mentioned above, results demonstrate that children in northern Lao PDR have particularly poor numeracy skills, relative to other domains of development. **Figure 25** below shows that when examining indicators of early numeracy skills as reported by caretakers, there are significant disparities across age, ethnicity and family background (refer to Tables 12 to 15 for significance values). As would be expected, children's score in this domain of development increased significantly with age. Furthermore, while still low overall, Lao-Tai children's maths skills were better developed than those of Khmu and Hmong children, or children of other ethnicities, while children with better educated parents had higher scores in this domain than children whose parents did not go to school. Despite these significant main effects, no interaction effects between children's gender, caretaker's education, and children's ethnicity were found.

Figure 25:
Early numeracy skills and knowledge of numeracy concepts by gender, age, ethnicity and caretaker's education



Nine different aspects of children's numeracy skills were explored further via a direct assessment of children's abilities. It is important to note that for these direct assessment tasks, there were a large number of children who gave no response, or gave an 'I don't know' response, rather than answering the question correctly or incorrectly. Details of the missing data for each direct assessment measure is included below. The responses given are likely due to children feeling uncomfortable in the assessment situation with an unfamiliar person, despite the great efforts made by enumerators to play with and build rapport with children to make them feel at ease. Quantitative comparison: Children were asked to identify the picture with the greater number of tomatoes. No response was received from 30 percent of children, 1 percent of children said they did not know the answer, 62 percent of children answered correctly, and 8 percent answered incorrectly. Of the 70 percent of children who responded to this question, **Figure 26** below shows that five year olds were most likely to answer this question correctly, along with Lao-Tai children and children whose parents completed secondary school or above.

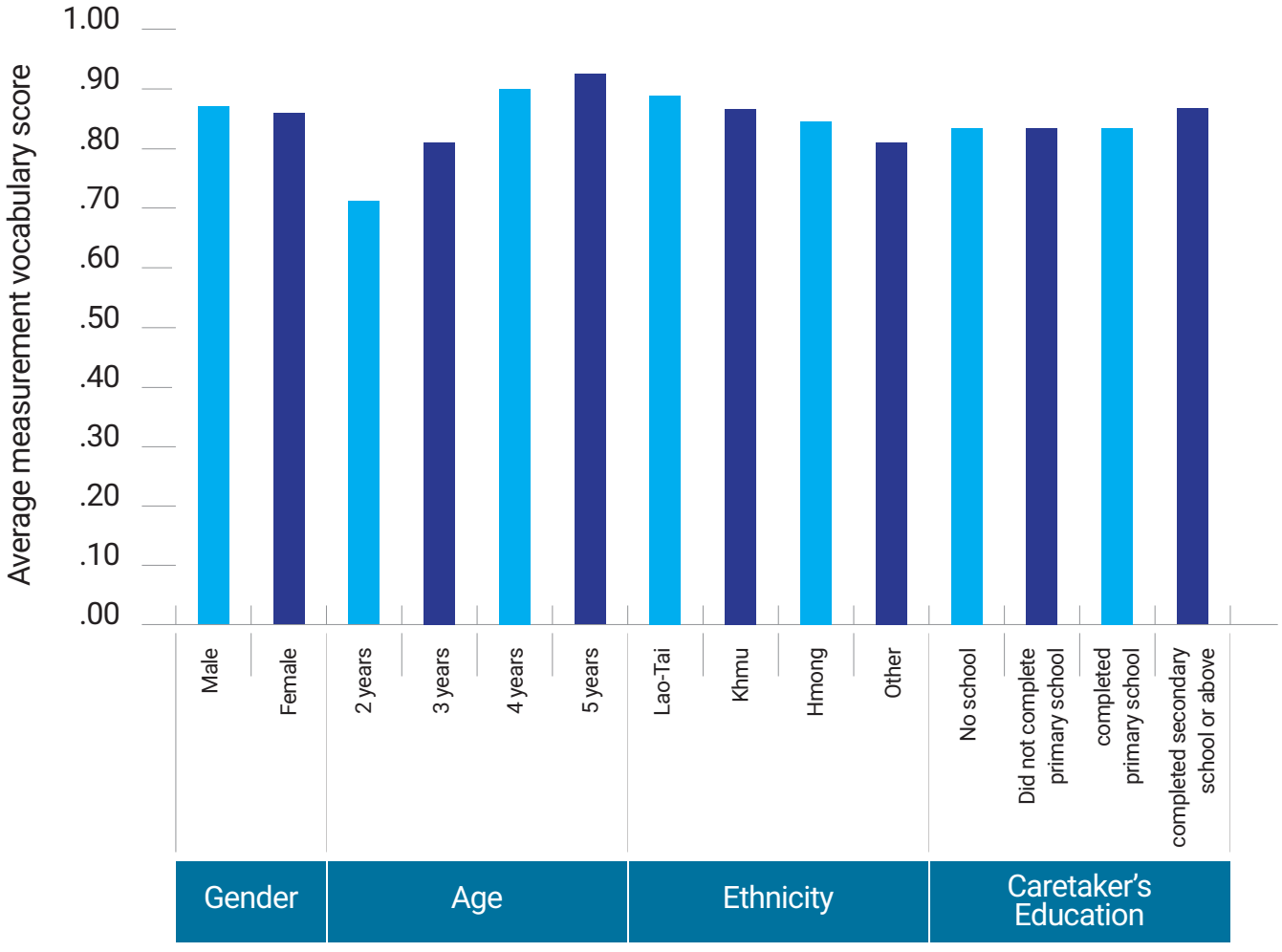
Figure 26:
Quantitative comparison by gender, age, ethnicity, and caretaker's education



Measurement Vocabulary

These items measured children's knowledge of measurement terms such as smallest and largest. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. The majority of children (51 percent) received a top score of 1, although no response was received from 29 percent of children. Of the 71 percent of children who responded, **Figure 27** shows significant disparities in ability by age only, with older children having a better measurement vocabulary than younger children.

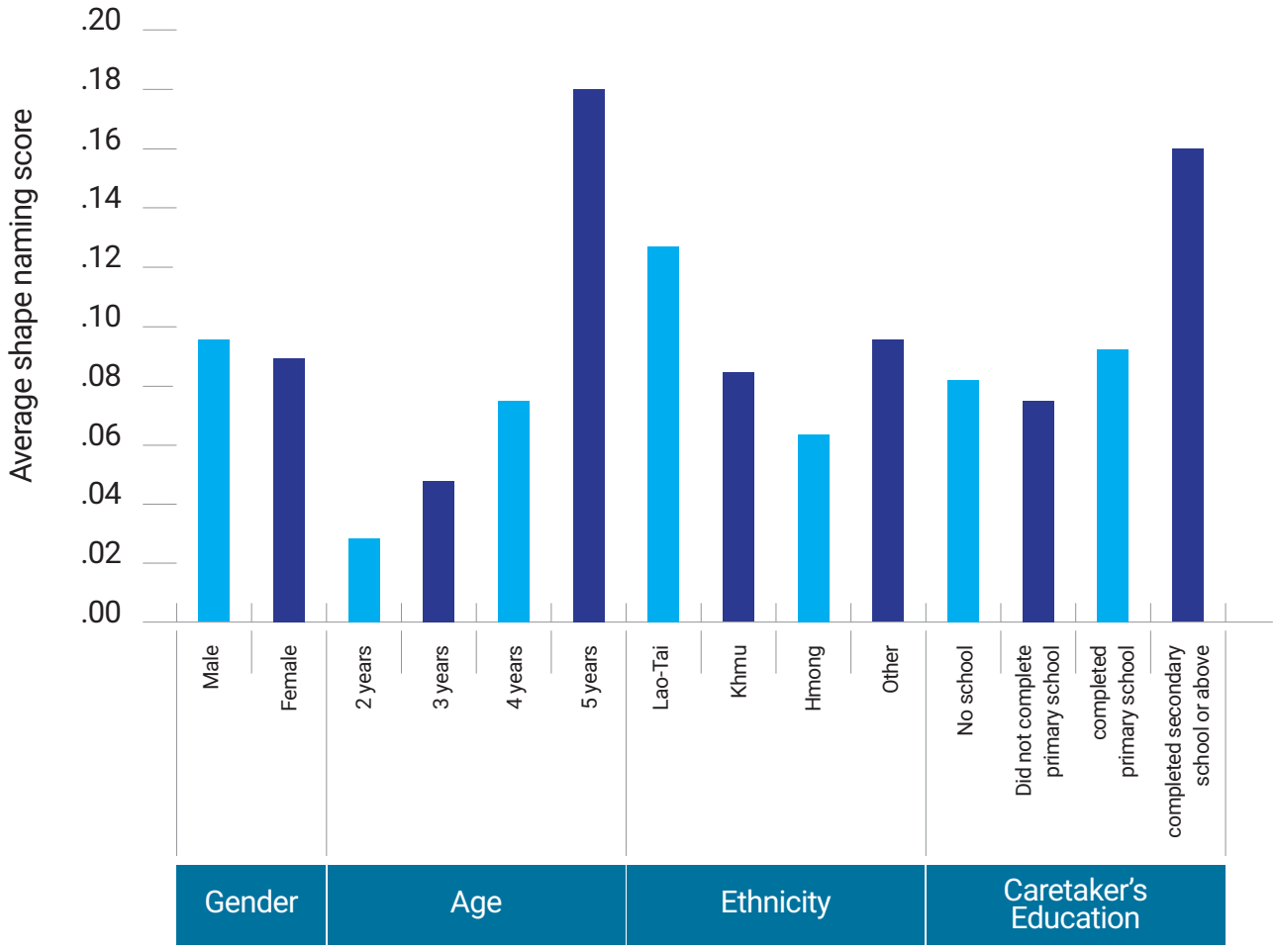
Figure 27:
Measurement vocabulary by gender, age, ethnicity, and caretaker's education



Shape Naming

This task required children to name a number of geometrical shapes. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. The results demonstrated that children's knowledge of shapes was very poor. No response was received from 58 percent of children, and another 34 percent received a score of 0. For the 42 percent of children who did respond, **Figure 28** below shows significant disparities in development across age, ethnicity and parent's education. Older children were significantly more familiar with shapes than younger children, Lao-Tai children performed better than Khmu, Hmong and children of other ethnicities, and children whose parents completed secondary school or above also received a significantly higher score on this scale when compared to children of parents with a lower education level.

Figure 28:
Shape naming by gender, age, ethnicity, and caretaker's education

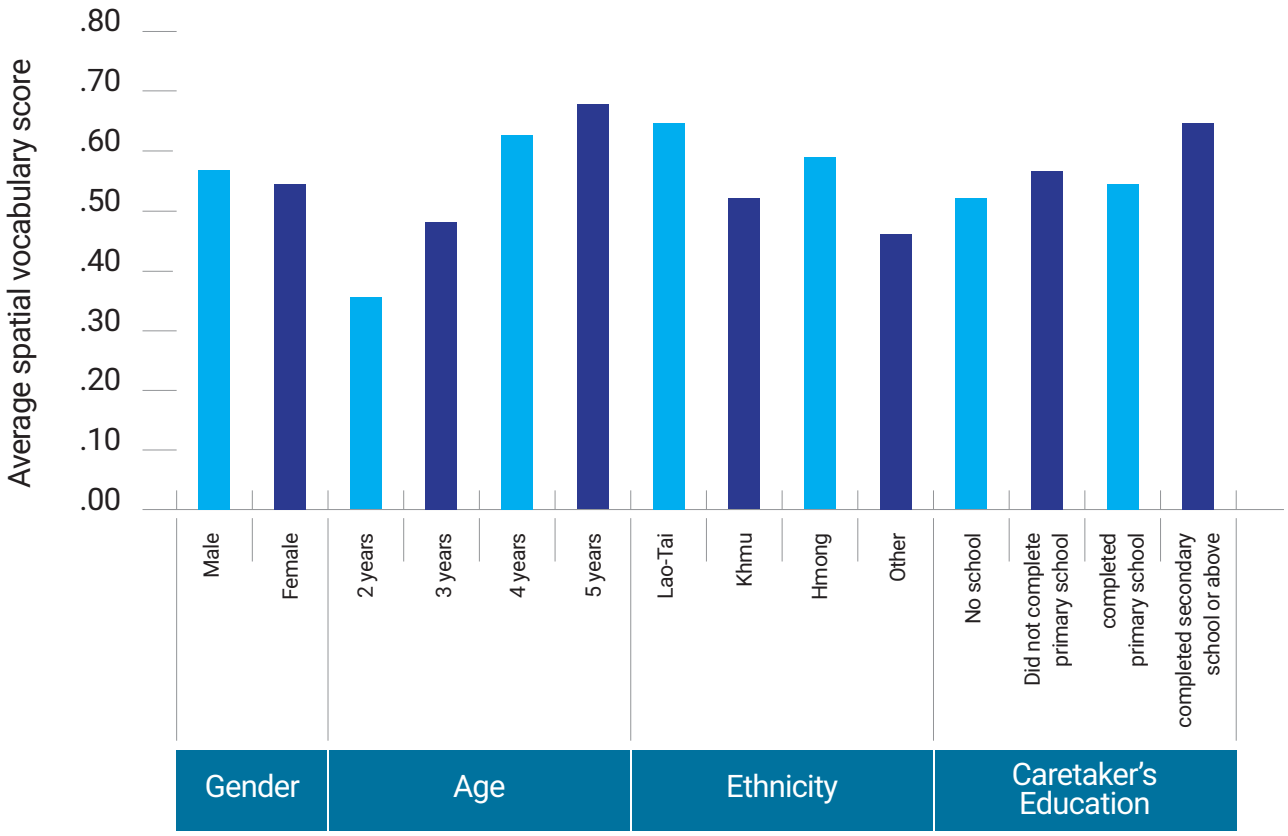


Spatial Vocabulary

These items measured children's knowledge of spatial terms such as 'on top of' and 'underneath of'. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. No response was received from 36 percent of children, and another 20 percent received a top score of 1. Of the 64 percent of children who did respond,

Figure 29 below shows that older children had a better developed spatial vocabulary than younger children, males scored slightly better than females, Lao-Tai children received a higher score than Khmu, Hmong and children of other ethnicities, and children with parents who completed primary school did better than children with less educated parents.

Figure 29:
Spatial vocabulary by gender, age, ethnicity, and caretaker's education



Counting

This item sought to determine how high children could count. Almost half of children (45 percent) did not respond, another 1 percent responded that they did not know, 39 percent could count to at least three, 19 percent could count to at least 10, 7 percent could count to at least 20 and 4 percent of children could count to 30. Of the 55 percent of children who provided a response, Figure 29 below shows significant disparities across age, indicating that (as would be expected) older children's counting skills are more developed than those of younger children. Though smaller, we also see disparities by ethnicity, with Lao-Tai children on average being able to count higher than children of other ethnicities, and children with uneducated parents having worse counting skills than those of children with educated parents.

Figure 30:
Counting ability by gender, age, ethnicity, and caretaker's education

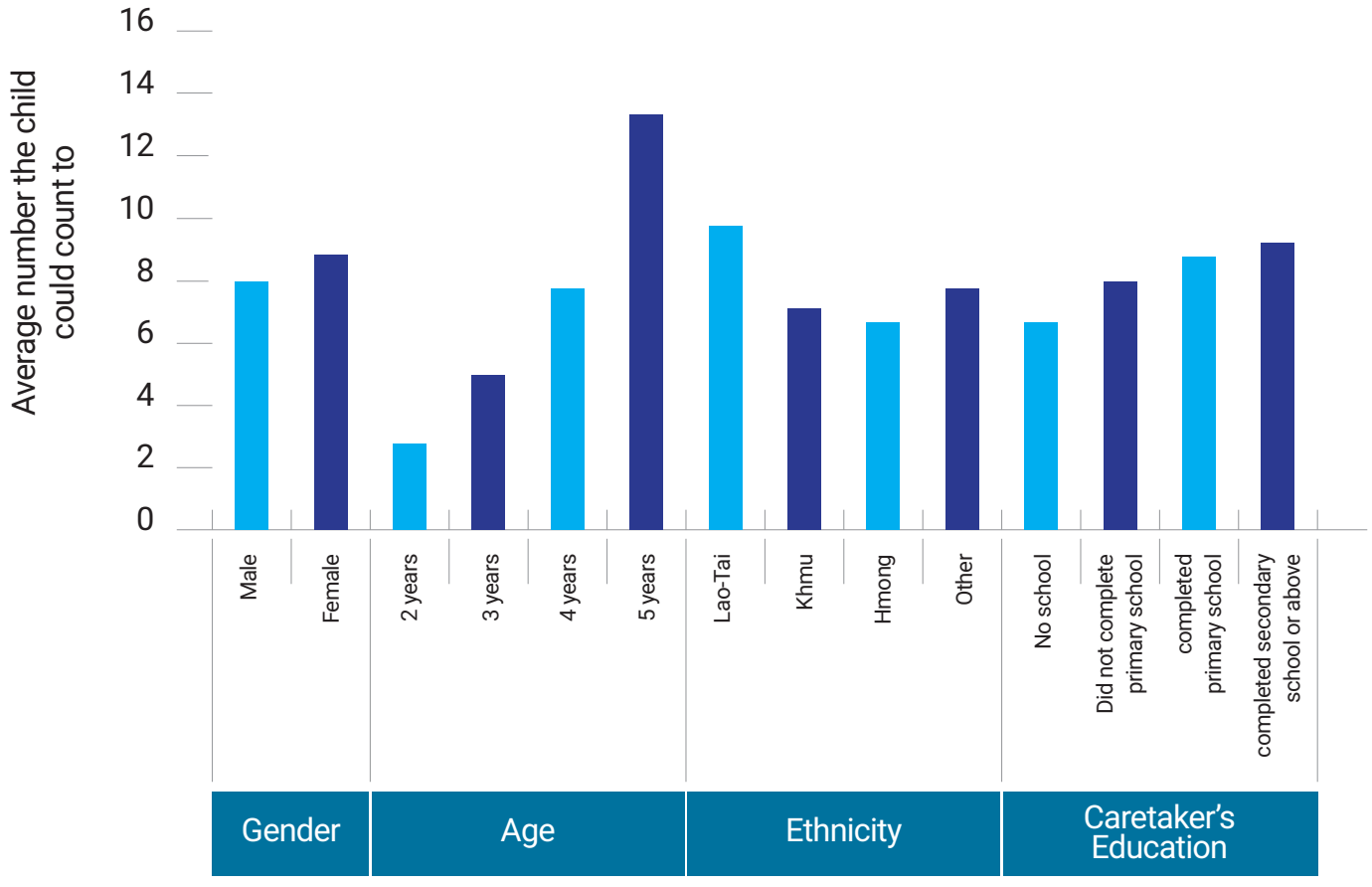
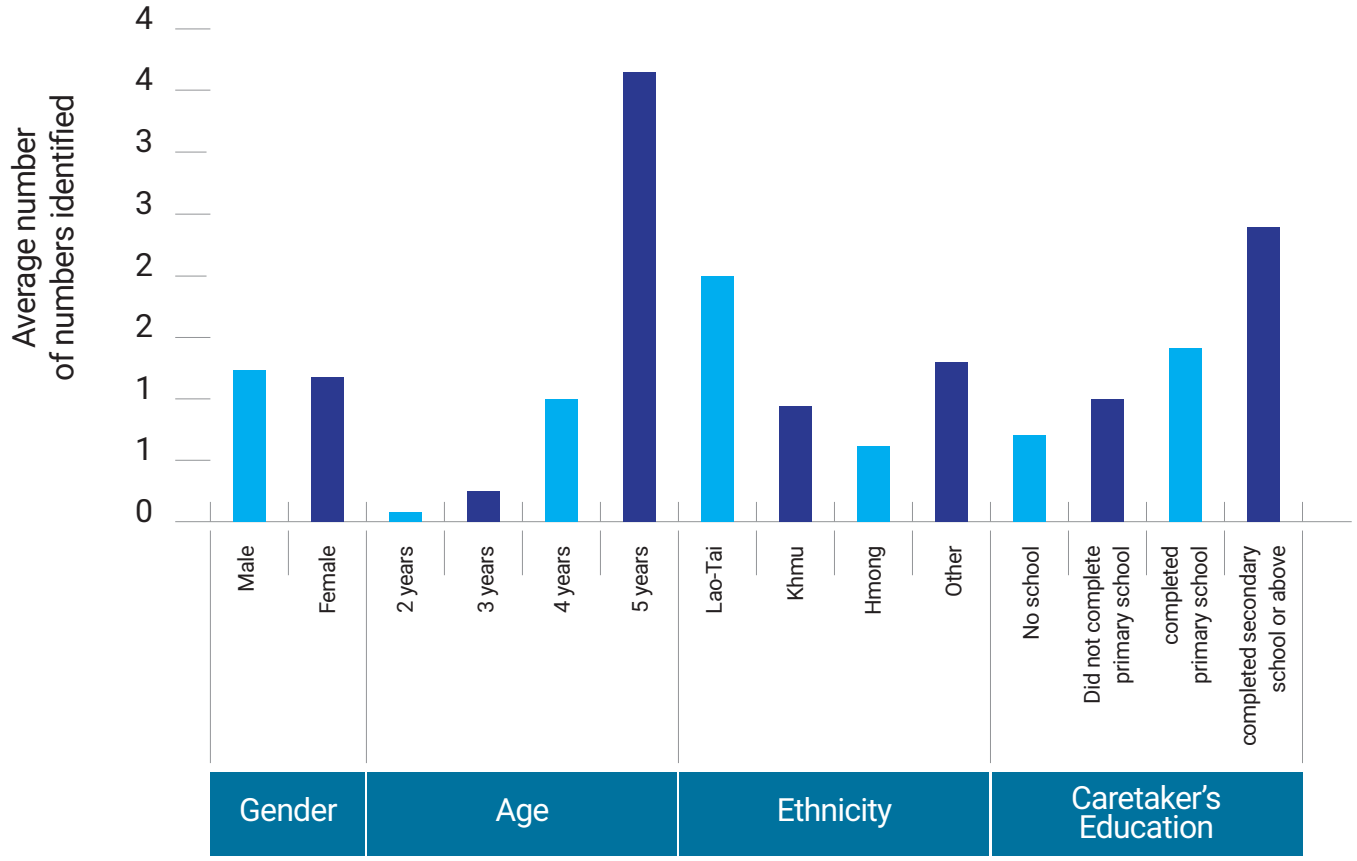


Figure 31:
Number identification by gender, age, ethnicity and caretaker's education



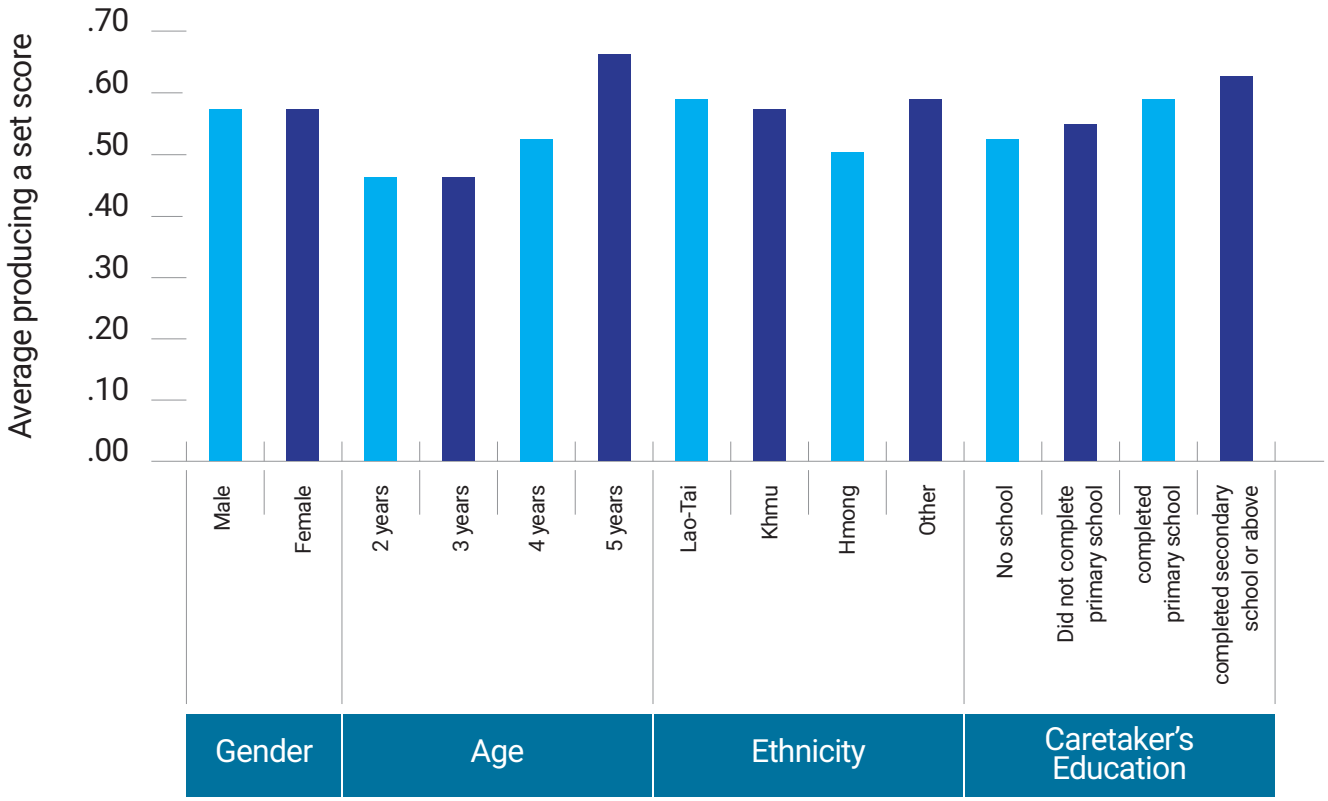
Number Identification

This task involved showing children a series of numbers and asking them to name them. Children performed quite poorly on this task – the large majority of children did not respond, or could not name any of the numbers (82 percent). Of remaining 18 percent of children, 4 percent identified one correct number, 6 percent identified between 2-5 correct numbers, 3 percent identified between 6-10 correct numbers, 4 percent identified between 11-19 correct numbers, and 2 percent of children identified all 20 numbers correctly. Of the 18 percent who responded, **Figure 31** above demonstrates the average number of correct responses across gender, age, ethnicity and caretaker's education. Older children were able to identify more numbers than younger children, Lao-Tai children performed better than children of Khmu, Hmong and other ethnicities, and children of parents who completed secondary school also did better than children with less educated parents.

Producing a Set

This task involved children producing sets of counting objects based on enumerator instruction (e.g. “please give me three pieces of macaroni”). Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. The majority of children did not respond (66 percent), but 34% of children able to produce at least one correct set of objects. Of the 34 percent who did respond, **Figure 32** below shows that age was an important factor in being able to complete this task competently. Disparities in performance by ethnicity are apparent, with Hmong children performing more poorly than Lao-Tai, Khmu and children of other ethnicities.

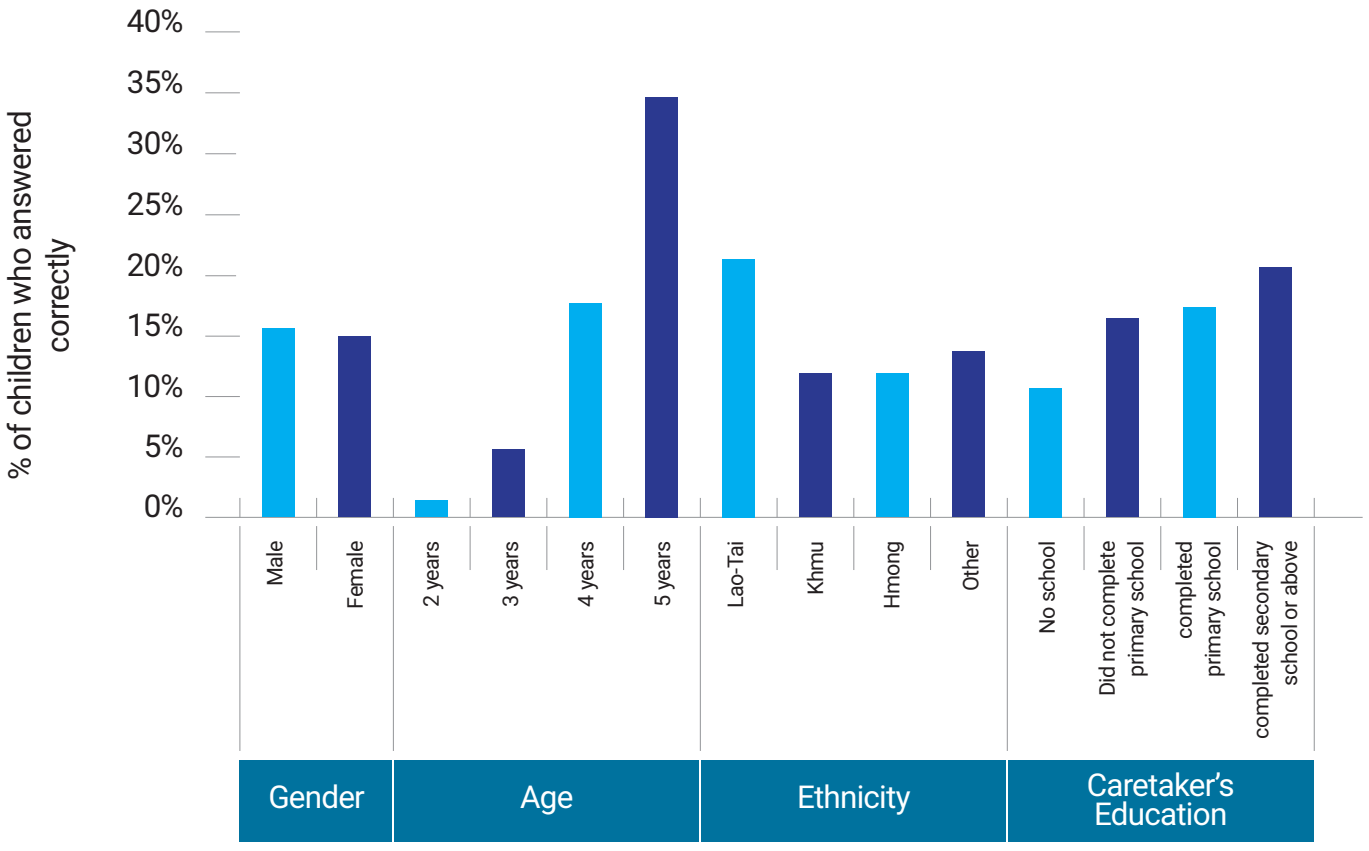
Figure 32:
Producing a set by gender, age, ethnicity, and caretaker's education



Addition with Two Sets

This item assessed children's basic addition, asking them to add 2 + 3 together using counting objects. More than half of children (55 percent) did not respond, 15 percent gave the correct answer, 6 percent answered correctly but got to the total by counting to five, <1 percent responded correctly but could only show five fingers rather than saying the word 'five', 19 percent answered incorrectly, and 5 percent said they did not know the answer. **Figure 33** shows that, of the 45 percent of children who provided a response, the best predictor of being able to answer this question correctly was age. When looking at results by ethnicity, Lao-Tai children performed significantly better than their peers, and children whose parents completed secondary school or above also performed better than children with parents who had never attended school.

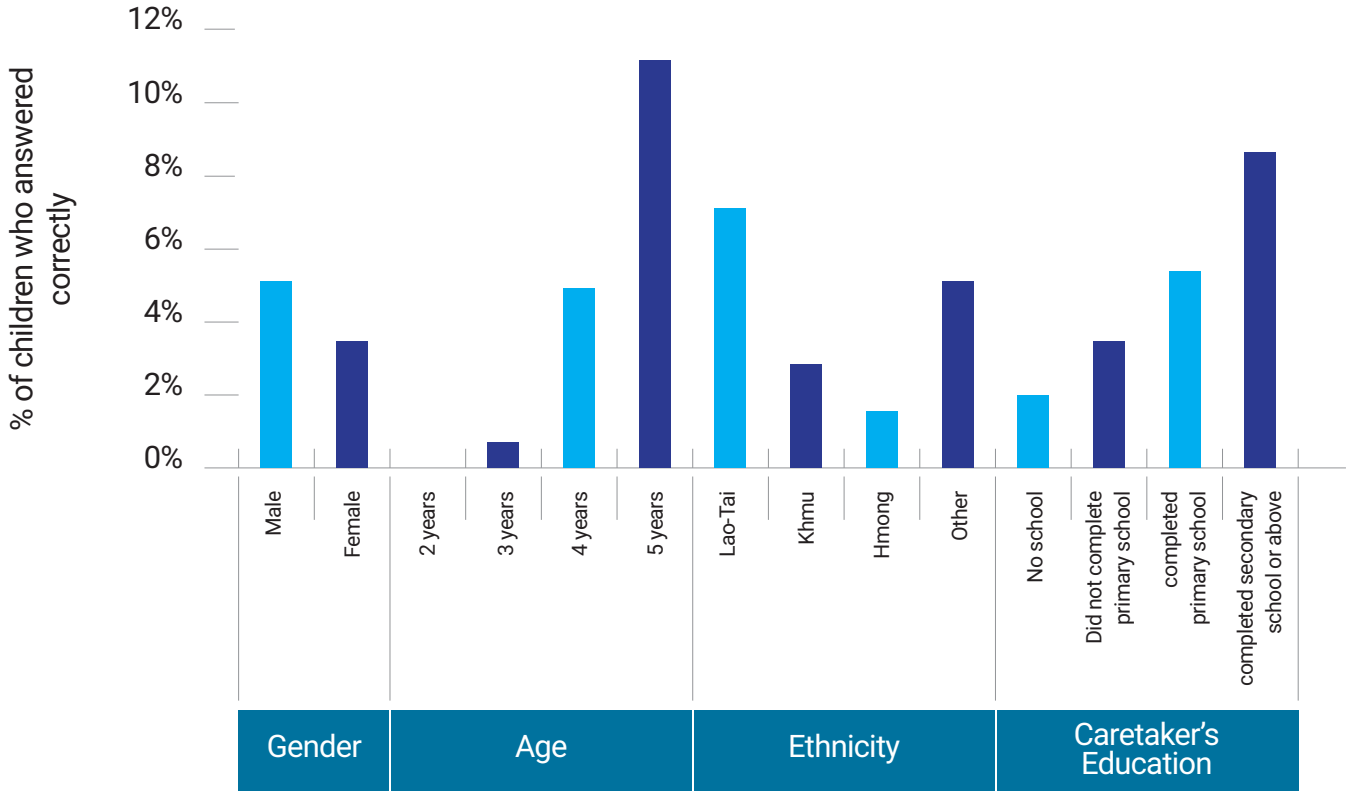
Figure 33:
Addition by gender, age, ethnicity and caretaker's education



Spatial Visualisation

This task asked children to complete a five-piece picture puzzle, assessing their ability to visualize spatially. No response was received from 37 percent of children, 8 percent said they did not know how to complete the puzzle, 4 percent got all five puzzle pieces correct, 1 percent got four correct pieces, 3 percent got three correct pieces, 10 percent got two matching pieces, and 38 percent were not able to match any puzzle pieces together. **Figure 34** shows that, of the 73 percent of children who provided a response, males were more likely to complete the puzzle than females, and five year olds were most likely to be able to complete the puzzle. Lao-Tai children performed the best, while Hmong children performed the poorest. Children whose parents completed secondary school or above did significantly better than children with parents who had never attended school.

Figure 34:
Spatial visualisation by gender, age, ethnicity and caretaker's education



Early Literacy Skills

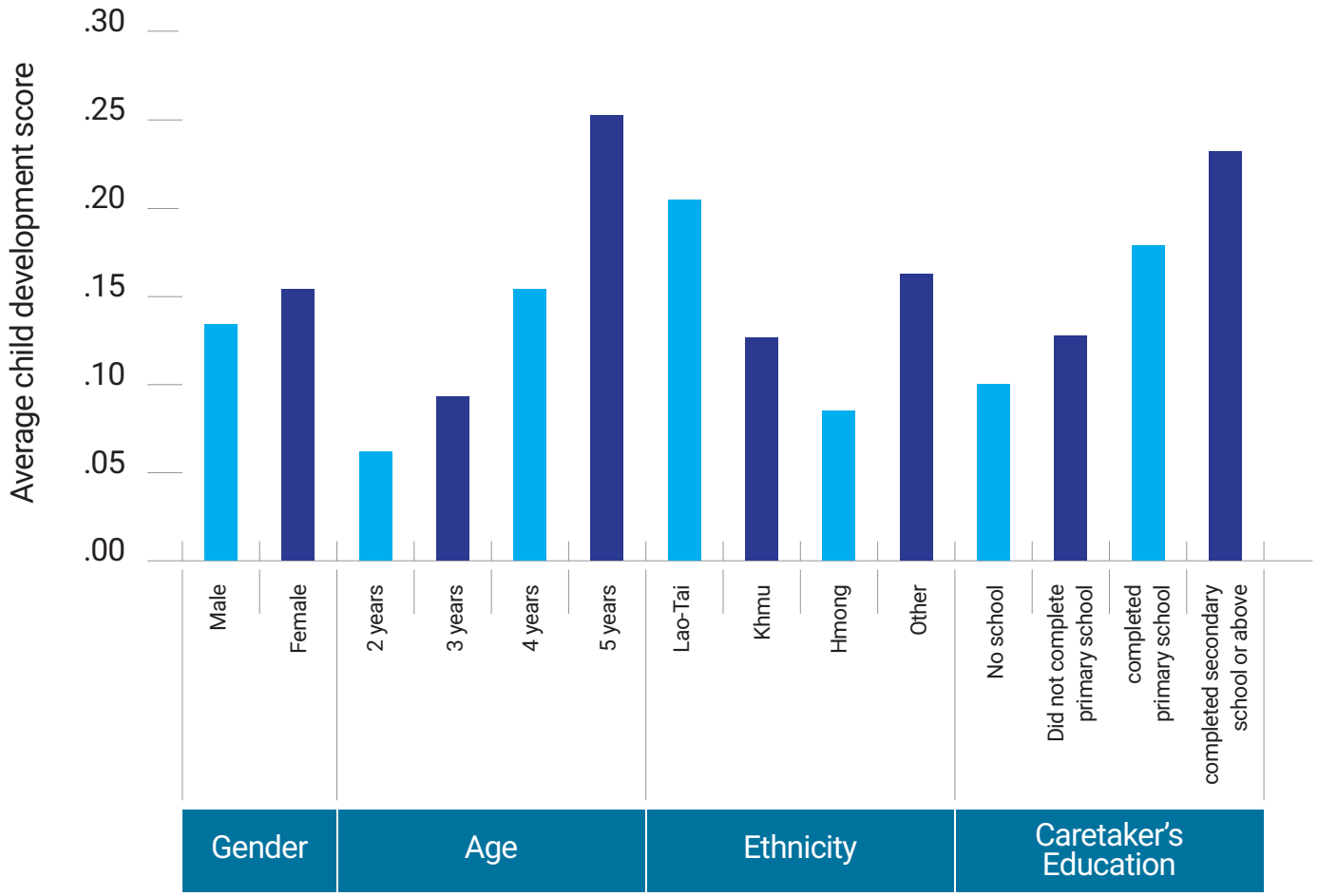
Literacy skills are a vital part of overall child development. Familiarity with words, sounds, language and books, as well as the formal aspects of literacy that develop later in childhood – being able to read and write – are all crucial skills children need in order to be able to further learn and develop.

The data shows that of all aspects of development, children in northern Lao PDR performed most poorly on literacy skills, despite the fact that many caretakers believed children should start reading and writing by the age of three (43 percent and 32 percent, respectively). Considering the majority of caretakers could not read at all, or only a little, unfortunately it is unsurprising that such illiteracy is being passed down to children. **Figure 35** below shows that when examining indicators of early literacy skills as reported by caretakers, again there are significant disparities across gender, age, ethnicity and family background (see **Tables 12 to 15** for significance values). Girls outperformed boys, and older children had significantly better literacy development than younger children.

While still very low overall, Lao-Tai children had better literacy skills when compared to Khmu, Hmong and children of other ethnicities, with Hmong children showing the poorest levels of development in this domain. Further, as would be expected, children with better educated parents had significantly higher scores in this domain than children whose parents did not go to school.

Further testing for interaction effects demonstrated that there is statistically significant interaction between caretaker's education and children's gender when examining scores for early literacy skills ($F= 3.81$, $p = .010$). Specifically, there was no difference between the scores of boys and girls of caretakers who had never gone to school (both $M = .10$), but a significant difference between the scores of boys and girls of caretakers who have completed secondary school or above ($M = .21$, $M = .24$, respectively). This interaction effect is opposite to that seen above in the approaches to learning domain.

Figure 35:
Early literacy (reading and writing) skills
by gender, age, ethnicity, and caretaker's education



Six different aspects of children's literacy skills were explored further via a direct assessment of children's abilities. Again, it should be noted that there were a large number of children who gave no response, or gave an 'I don't know' response, rather than answering the question correctly or incorrectly. The number of missing responses were considerably higher for the literacy direct assessment the literacy direct assessment items than for the direct assessment numeracy items. This is likely a reflection of children feeling uncomfortable in the assessment situation, as well as the very low literacy skills and understanding of literacy concepts of the children assessed.

Familiarity with Print Concepts

These items assessed children's familiarity with books; how to open them, where to start reading and so on. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. The majority of children (53 percent) did not provide a response when asked these questions –a reflection of the fact that 45 percent of households had no books, so children had likely not come across a book before. Just over a third of children (35 percent) had at least some knowledge of books. Of the 47% of children who provided a response, **Figure 36** below shows that age was an important factor in being able to complete these tasks competently. Small disparities in performance by ethnicity are also apparent, with Lao-Tai children performing better than children of all other ethnicities, and children of parents who completed secondary school being more familiar with books and print concepts than children with less educated parents.

Figure 36:
Print familiarity scores by gender, age, ethnicity and caretaker's education

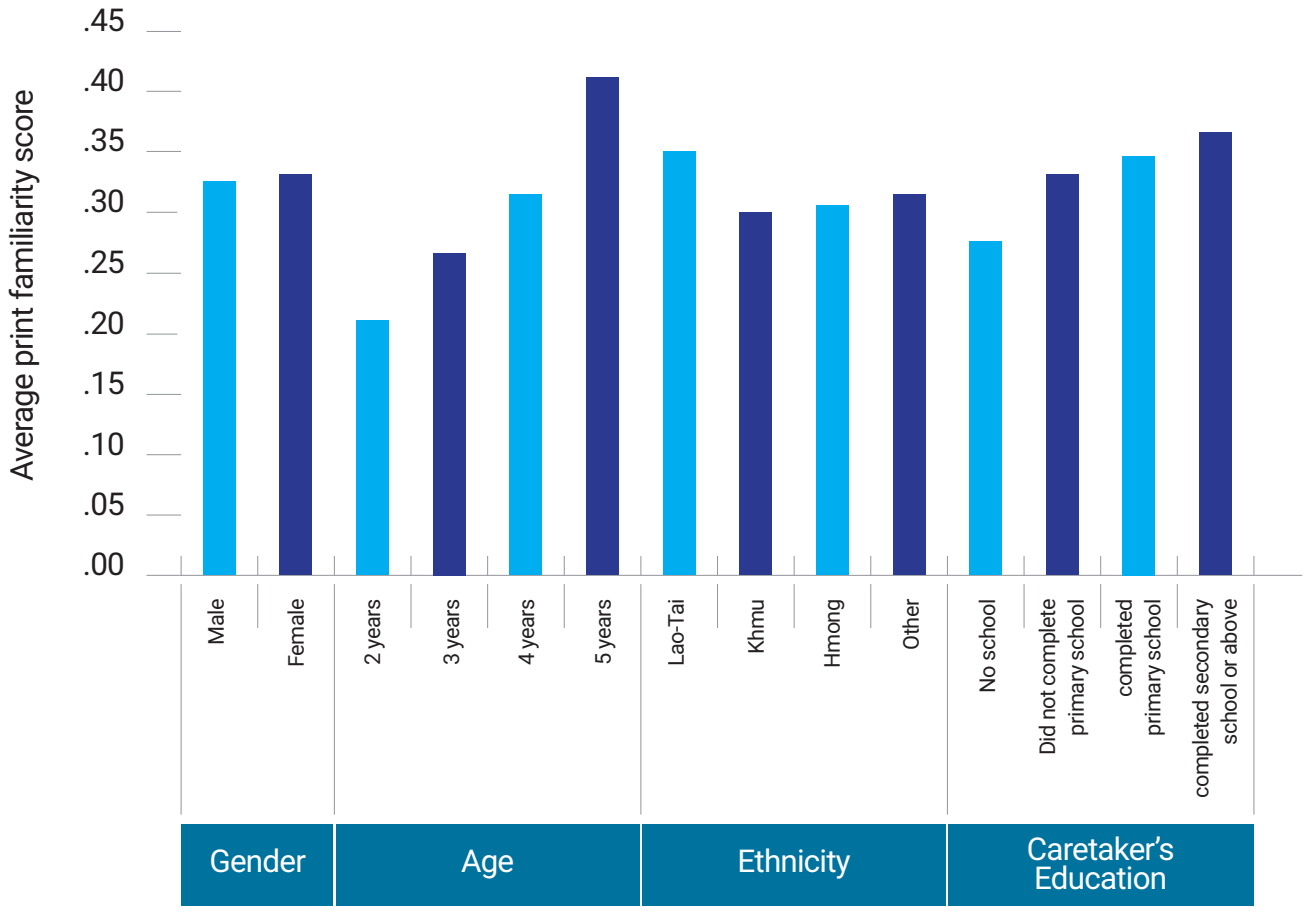


Figure 37:
Relationship between print familiarity and books in the home

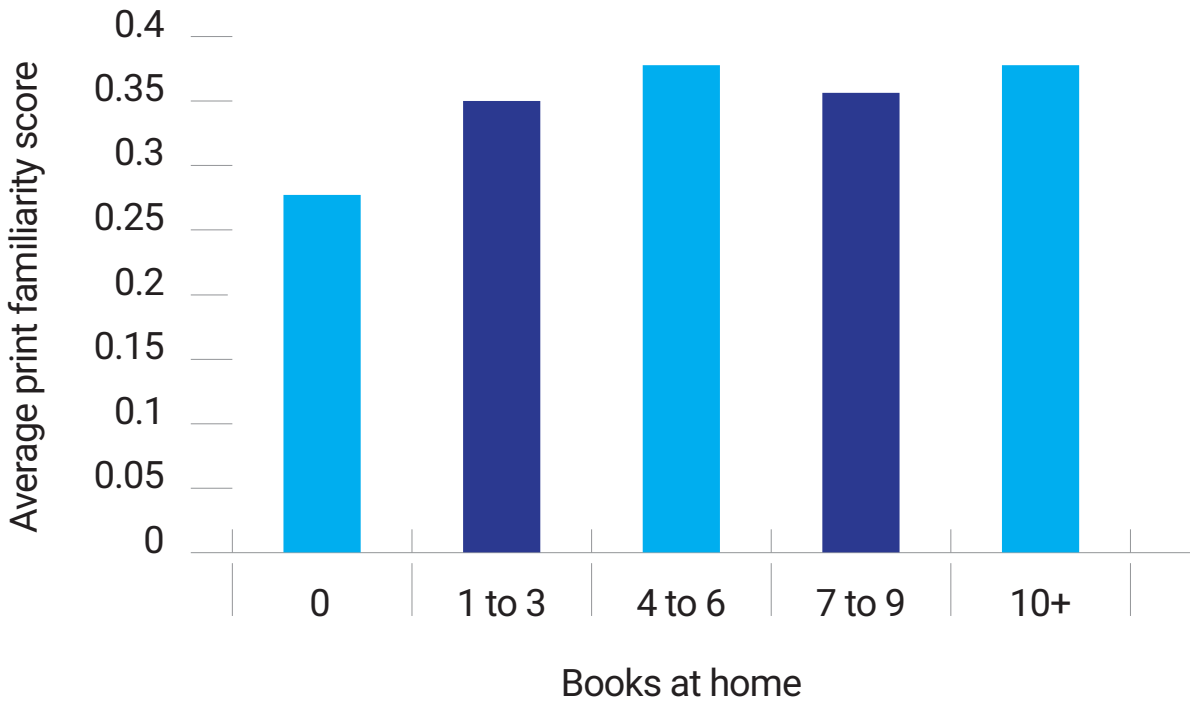
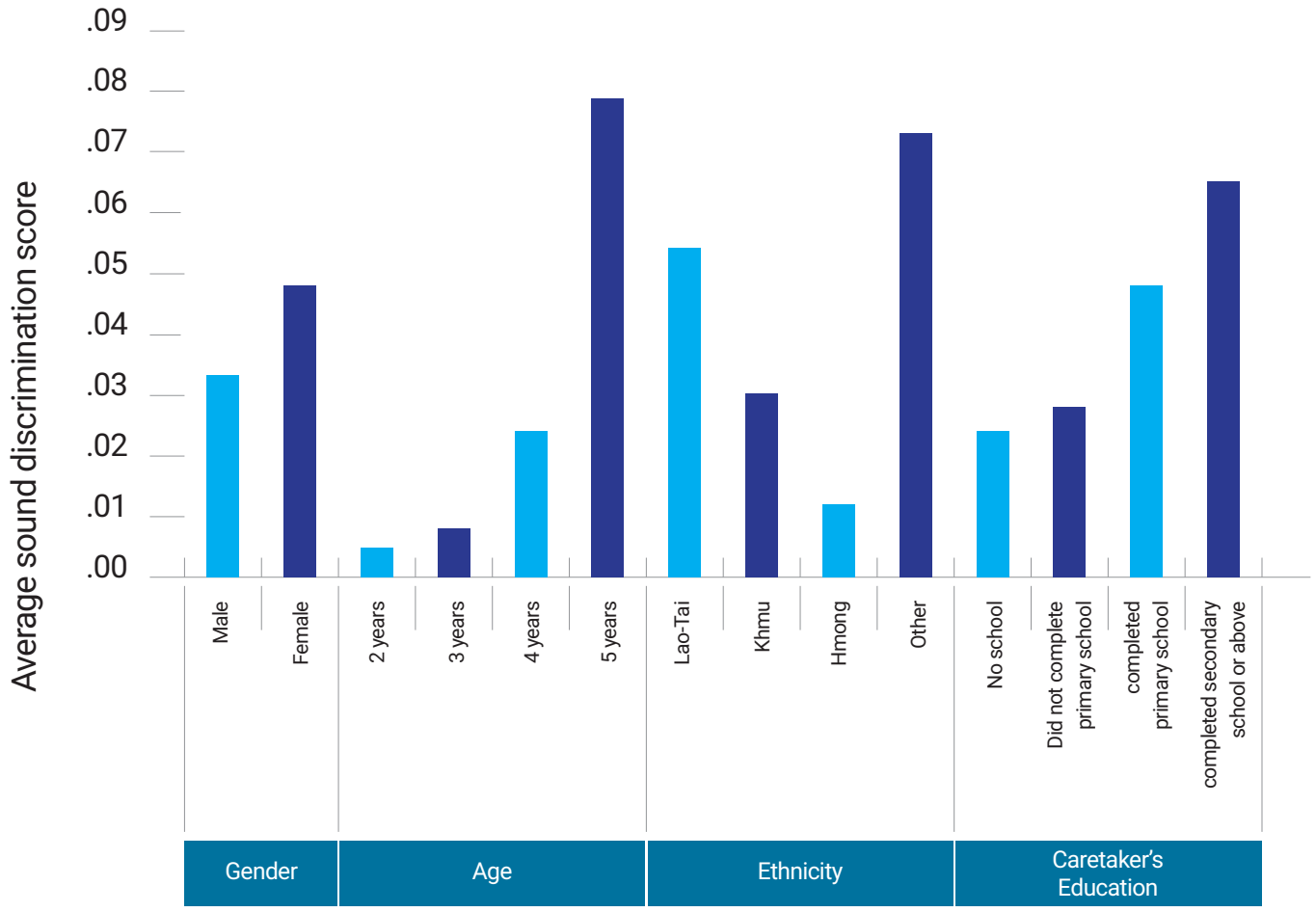


Figure 37 above examines children's print familiarity relative to the presence of books in their household. Evidently, having at least one to three books in the home is helpful for the promotion of children's early literacy skills.

Initial Sound Discrimination

These tasks involved asking children to identify, from a choice of three words, which word started with a particular sound. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. A large majority of children (76%) did not provide a response, and an additional 23% provided incorrect responses, leaving just 2% of children who responded correctly at least once. **Figure 38** below shows disparities across gender, age, ethnicity and parent's education level, although the data should be interpreted with caution as it is based on very few children overall (n=137).

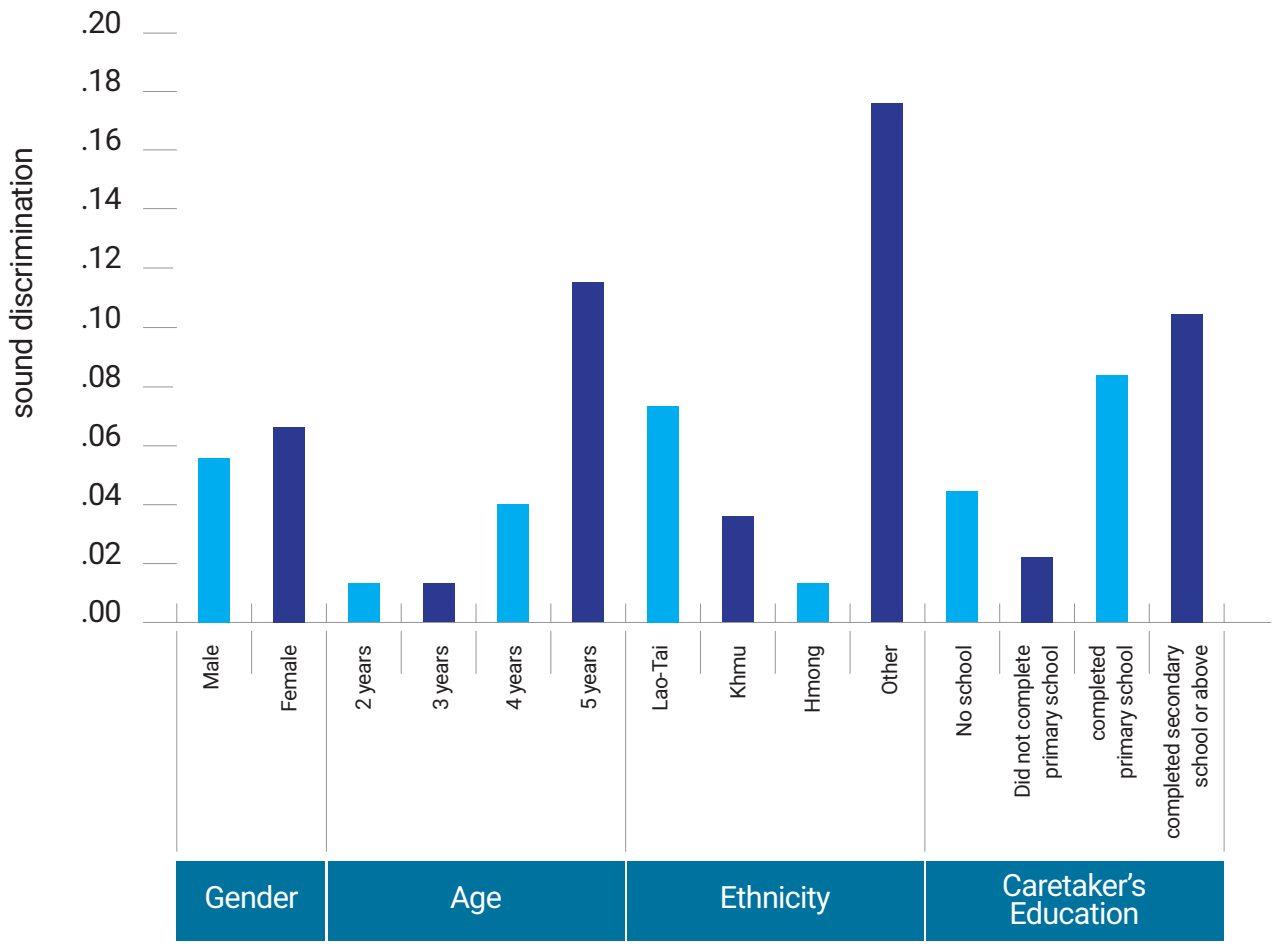
Figure 38:
Sound discrimination by gender, age, ethnicity and caretaker's education



Initial Sound Identification

These tasks involved asking children which sound words started with. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. Again, most children (77%) did not provide a response, and another 21% provided incorrect responses, leaving just 2% of children who responded correctly at least once. **Figure 39** below presents disparities across gender, age, ethnicity and parent's education level. As above, the data should be interpreted with caution as it is based on very few children overall (n=178).

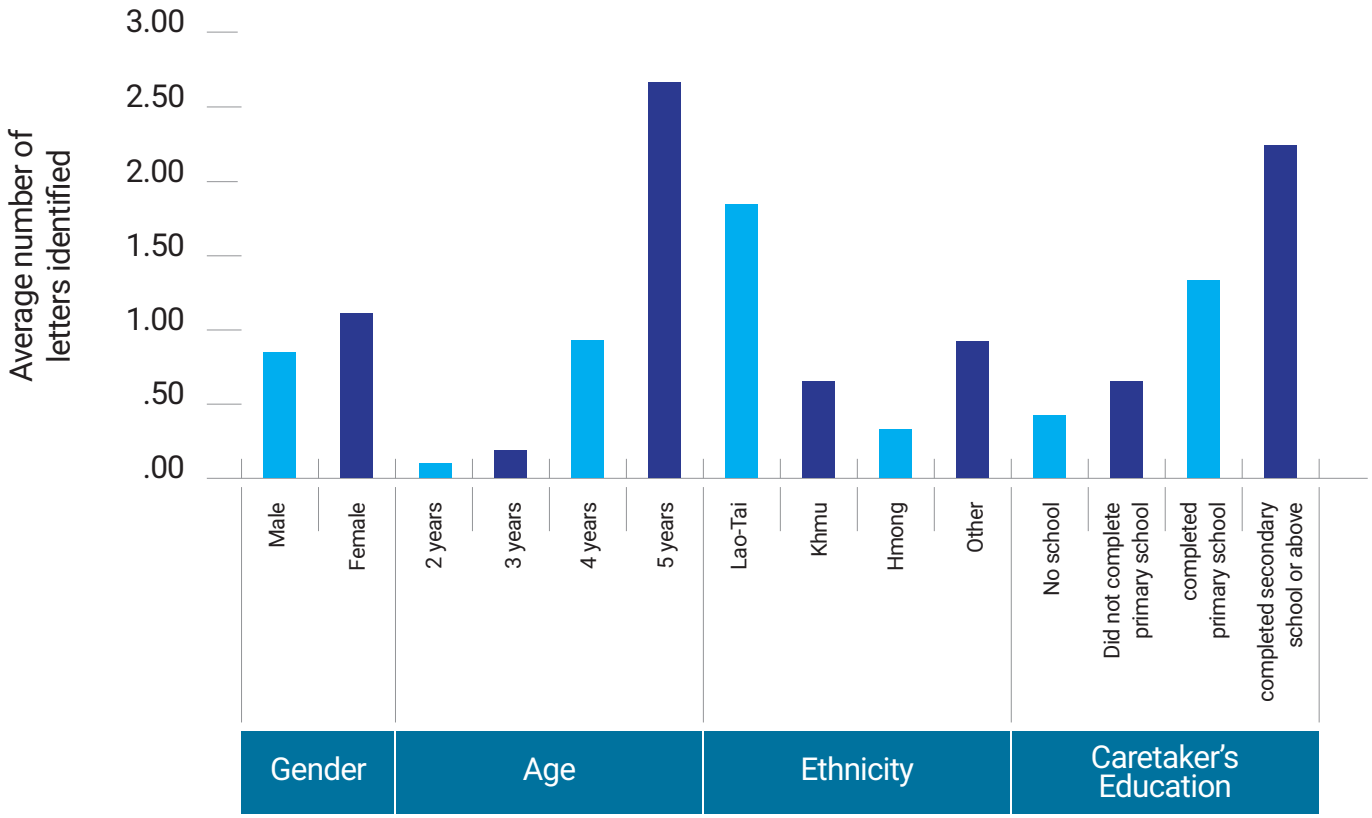
Figure 39:
Sound discrimination by gender, age, ethnicity and caretaker's education



Letter Name Knowledge

This task involved showing children a series of letters, and asking them to name them. The majority of children did not respond or were not able to identify any letters correctly (88%). Of the remaining 12% of children, 2% were able to identify one letter only, 4% identified between 2-5 correct letters, 1% identified between 6-10 correct letters, 3% identified between 11-19 correct letters and 2% identified all 20 letters correctly. Of the children who responded, **Figure 40** below shows the average number of correct responses across gender, age, ethnicity and caretaker's education. Older children were able to identify more letters than younger children, Lao-Tai children performed better than children of Khmu, Hmong and other ethnicities, and children of parents who completed secondary school also did better than children with less educated parents.

Figure 40:
Letter name knowledge by gender, age, ethnicity and caretaker's education



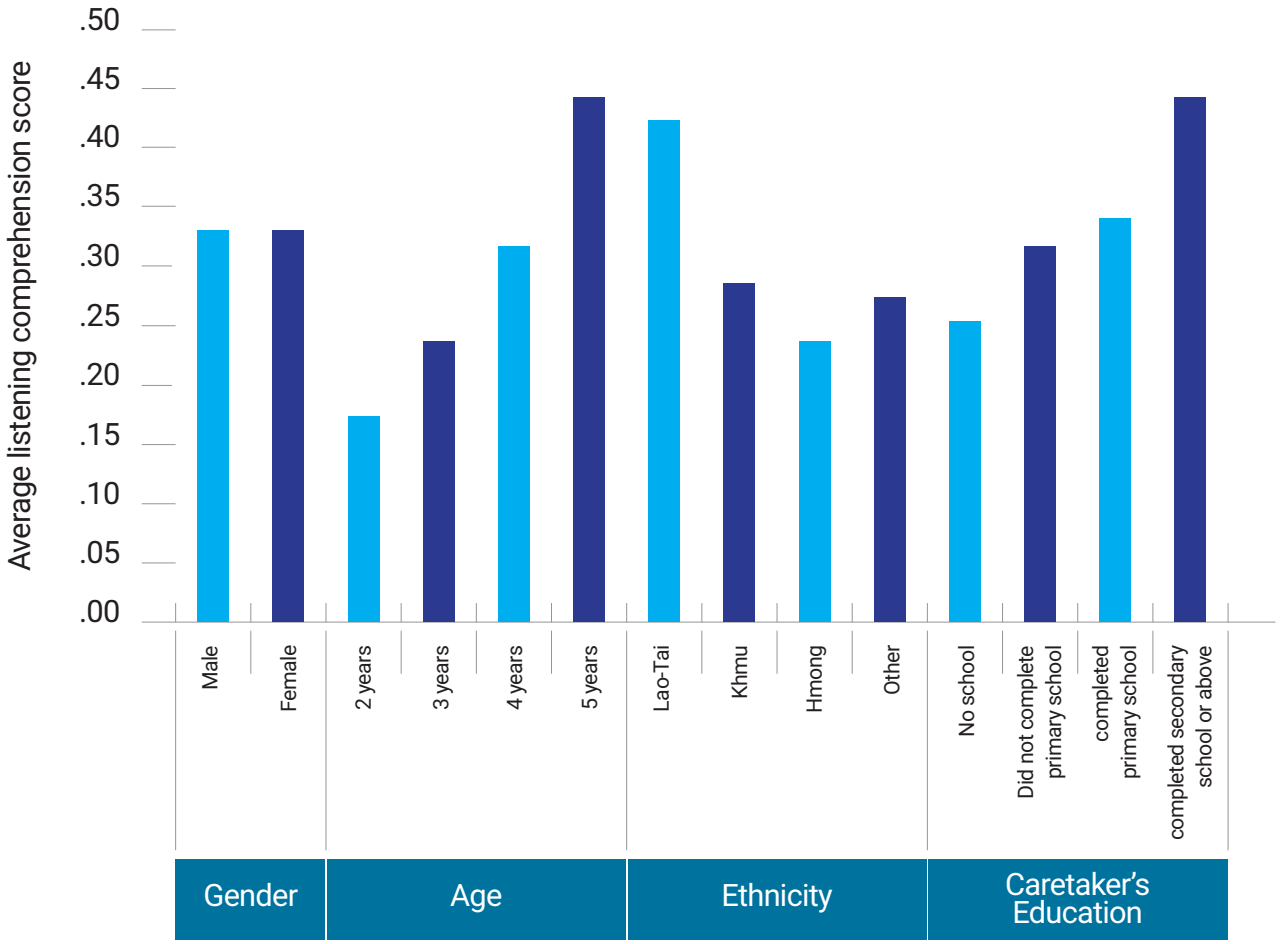
Name Writing

Children were asked to write their name any way they knew how. Almost half of children did not respond (49%), 3% of children said that they did not know how to write their name, 23% did not write anything, 18% made some scribbles with no discernible symbols, and 7% were able to write some symbols or letters, albeit incorrectly. No children were able to correctly write their name.

Listening Comprehension

This scale assessed children's ability to listen to a story, and then answer descriptive questions about details of the story. Items were combined and the average was taken to give an overall score of 0-1, 1 being the best score. Most children (71%) did not provide a response; another 10% provided incorrect responses, leaving 20% of children who responded correctly at least once. Of the 30% of children who provided a response, **Figure 41** below explores disparities in results across children's gender, age, ethnicity and parent's education. Older children had better listening comprehension than younger children, Lao-Tai children performed significantly better than children of Khmu, Hmong or other ethnicities, and children with parents who had completed secondary school had better listening comprehension than children of parents with a lower level of education or no education.

Figure 41:
Listening comprehension by gender, age, ethnicity and caretaker's education



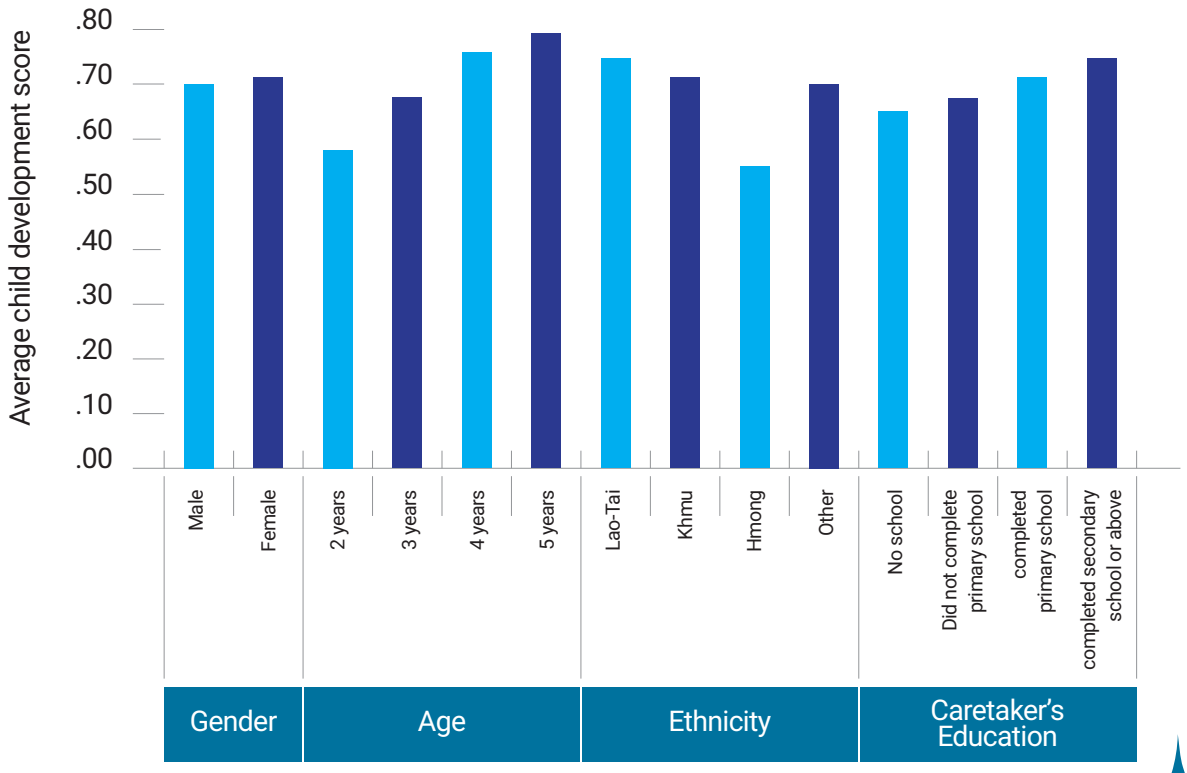
Cultural Knowledge

Culture is important because we learn to communicate and understand our world through the context of our languages, traditions, behaviours, beliefs and values. Children's knowledge of culture, including for example knowledge of important traditions and culturally appropriate ways in which to behave, is important because it shapes the way they see themselves and what is important.

Examples of items measured in this domain include children's knowledge of common animals, traditional food dishes, and ability to participate in traditional cultural events. Overall, children scored well in this aspect of development, second only to verbal communication. **Figure 42** below demonstrates significant disparities across age, ethnicity and parent's level of education. Again, these are the results that are to be expected, as it is assumed that the majority of children aged 2-5 years would have grasped a good understanding of their culture. Only small improvements would be expected as children grow older, due to increased exposure to cultural traditions.

Further testing for interaction effects demonstrated that there is statistically significant interaction between caretaker's education and children's gender when examining children's knowledge of culture ($F= 3.78$, $p = .010$). Specifically, girls of caretakers who had never gone to school on average scored lower than boys of caretakers who had never gone to school ($M = .66$ versus $M = .68$). This pattern was reversed for children of caretakers who had completed secondary school or above, with girls scoring higher than boys ($M = .78$ versus $M = .75$).

Figure 42:
Children's knowledge of culture by gender, age, ethnicity and caretaker's education



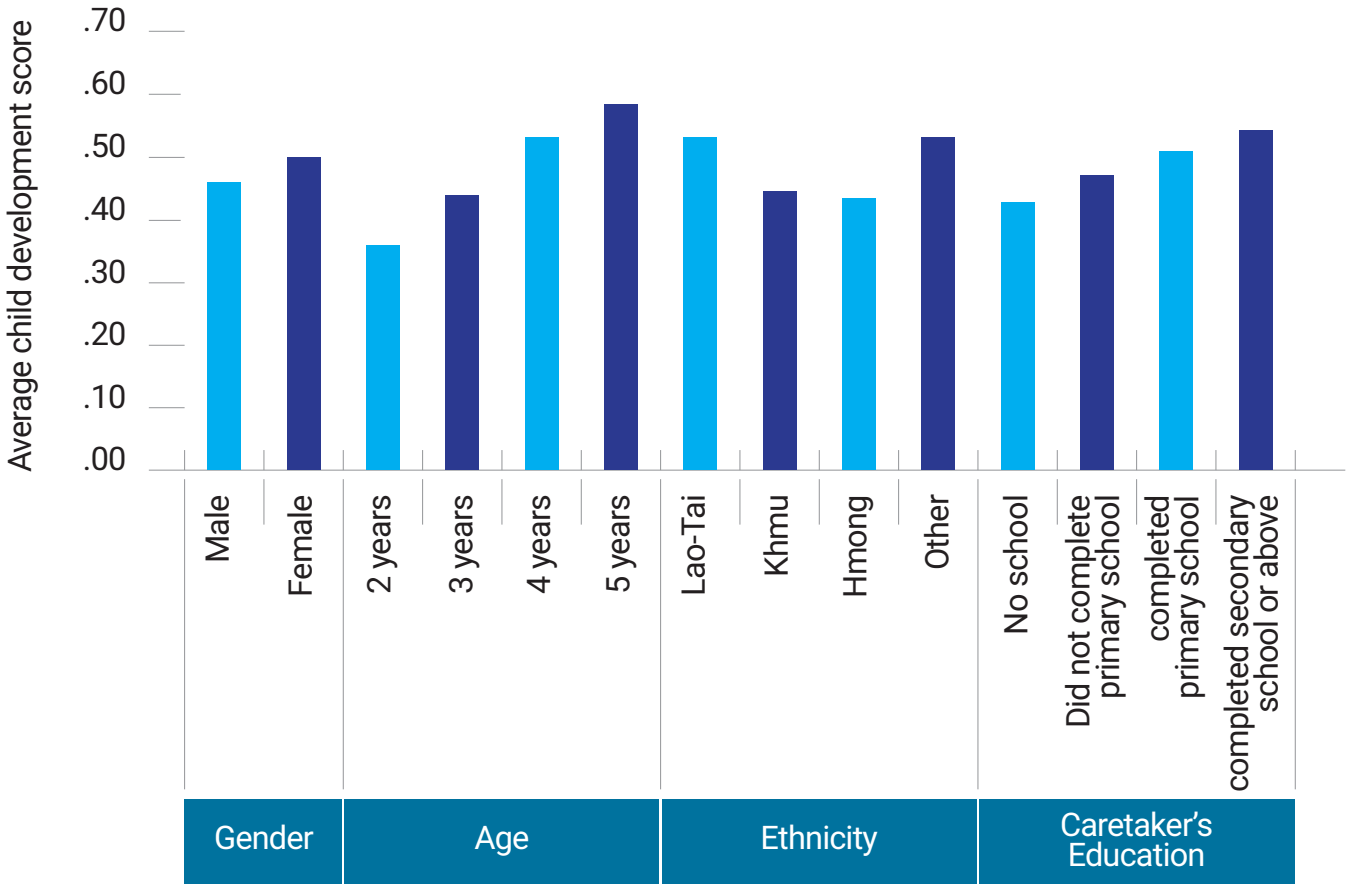
Social and Emotional Skills

Social and emotional skills are important as they help children get along with others and form healthy relationships throughout life. Children develop these social skills through their earliest relationships. Positive and supportive relationships teach children how to get along with others, and they also help children learn that they are capable and important. These skills are important for children to have when they reach school, as they are best able to adapt to a classroom environment when they can consider others, have patience, and are beginning to manage their emotions.

Examples of items measured in this domain include children's ability to share with others, respect adults and other children, and be considerate of other people's feelings. Results demonstrate that overall children received low scores on social and emotional skills. The scores were higher only than scores in the literacy and numeracy domains. **Figure 43** below shows that, when examining children's social and emotional skills, there are significant disparities across ethnicity and parent's level of education. Again, it is not surprising that the largest differences in children's social and emotional development are seen with age, with older children's social and emotional skills further developed than that of younger children (refer to **Tables 12 to 15** for significance values).

Further testing for interaction effects demonstrated no significant interaction effect between caretaker's education and children's gender when examining children's social and emotional skills. There was however, a statistically significant interaction between children's ethnicity and children's gender ($F= 3.12$, $p = .025$). Specifically, the difference in social and emotional development between boys and girls of Lao Tai children ($M = .48$, $M = .54$, respectively) and between boys and girls of all other ethnicities ($M = .49$, $M = .52$, respectively) is significantly larger than differences in scores between boys and girls of Khmu ethnicity ($M = .45$, $M = .47$, respectively) and between boys and girls of Hmong ethnicity ($M = .45$, $M = .47$, respectively).

Figure 43:
Social and emotional development by gender, age, ethnicity and caretaker's education



Perseverance

Perseverance refers to a child's ability to persist or stick to an activity without losing interest too quickly, and to pursue goals or tasks through to their completion despite any difficulties experienced. Perseverance is important for children's overall learning and future success as it enables them to persevere through challenges, therefore fostering a strong work ethic and resilience. Examples of items measured in this domain include children's ability to work at something independently, their tendency to finish a task, and their ability to stay focused. Overall, children in northern Lao PDR were found to have mid-range perseverance scores. **Figure 44** below shows disparities in perseverance scores, mainly across children of different ages and ethnicities (refer to **Tables 12 to 15** for significance values). Older children had higher perseverance scores than younger children, and Hmong children received significantly lower scores in this developmental domain than Lao-Tai, Khmu and children of other ethnicities. Interestingly, there does not appear to be a clear pattern of disparity in perseverance scores across caretakers' educational backgrounds. Despite these significant main effects, no interaction effects between children's gender, caretaker's education, and children's ethnicity were found.

Figure 44:
Children's perseverance by gender, age, ethnicity and caretaker's education

Executive Functioning

Executive function skills are the mental processes that enable planning, memory, the focus of attention, and management of multiple tasks. Good executive functioning is important for children to be able to remember instructions, plan their actions, solve problems, and complete tasks – all of which a child will need to do at school and throughout life. Poor executive function can negatively impact a child's ability to learn new things, and therefore their overall development.

Development of a child's executive function was measured via three direct assessments. Again, it should be noted that there were a large number of children who gave no response to these direct assessments, or gave an 'I don't know' response, rather than answering the question correctly or incorrectly. This is likely due to children feeling uncomfortable that they were in an assessment situation with an unfamiliar person, despite the efforts enumerators made to make children feel at ease. The number of missing data for each direct assessment measure is included below.

Heads Toes Task

In this task children were asked to play a game in which they must do the opposite of what the enumerator asks. For example, the enumerator instructs children to touch their head, but instead of following the instructions, the children are supposed to do the opposite and touch their toes. This task is designed to measure a range of aspects of executive function including inhibitory control, working memory and attention focusing. Children receive one point for each correct answer they provide. The scale ranges from 1-10, with 10 being the best score.

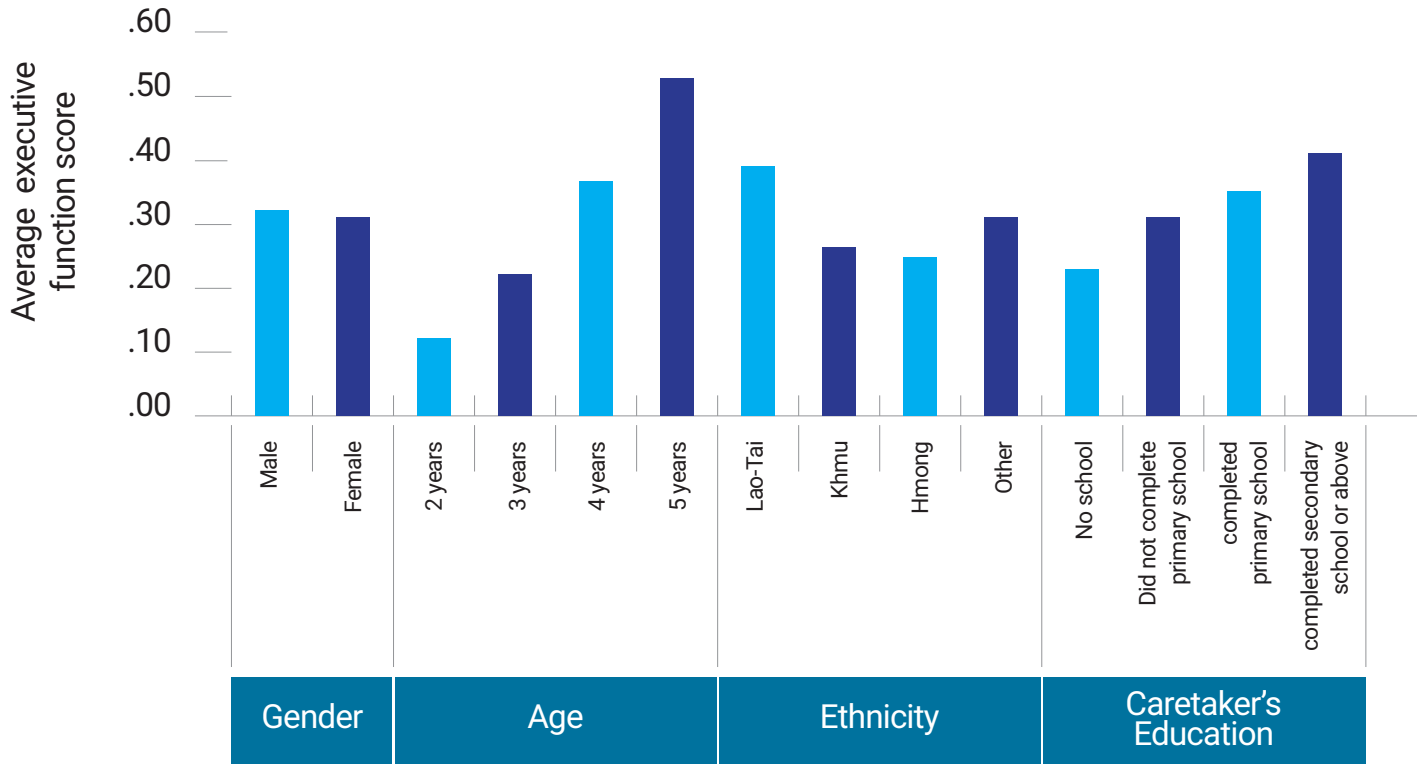
The large majority of children (81%) did not respond. Of those who did, 7% scored from 1-5, 12% scored from 6-10, with 7% getting a top score of 10. Figure 45 below explores disparities in these results across children's gender, age, ethnicity, and parent's education. On average, older children had better executive function than younger children, Lao-Tai children performed significantly better than children of Khmu, Hmong or other ethnicities, and children with educated parents had better executive functioning scores than children of uneducated parents.

Figure 45:
Executive function (heads toes task)
by gender, age, ethnicity and caretaker's education

Forward Digit Span

This task asked children to repeat numbers read aloud to them, in the order that they were read. This was a test of memory, which is an important aspect of executive function. The majority of children (56%) did not respond or get any items correct. 14% of children did however receive a top score of 1. Figure 46 below shows that on average (for those who did respond), older children had better executive function than younger children, Lao-Tai children performed significantly better than children of Khmu, Hmong or other ethnicities, and children with educated parents had better executive functioning scores than children of uneducated parents.

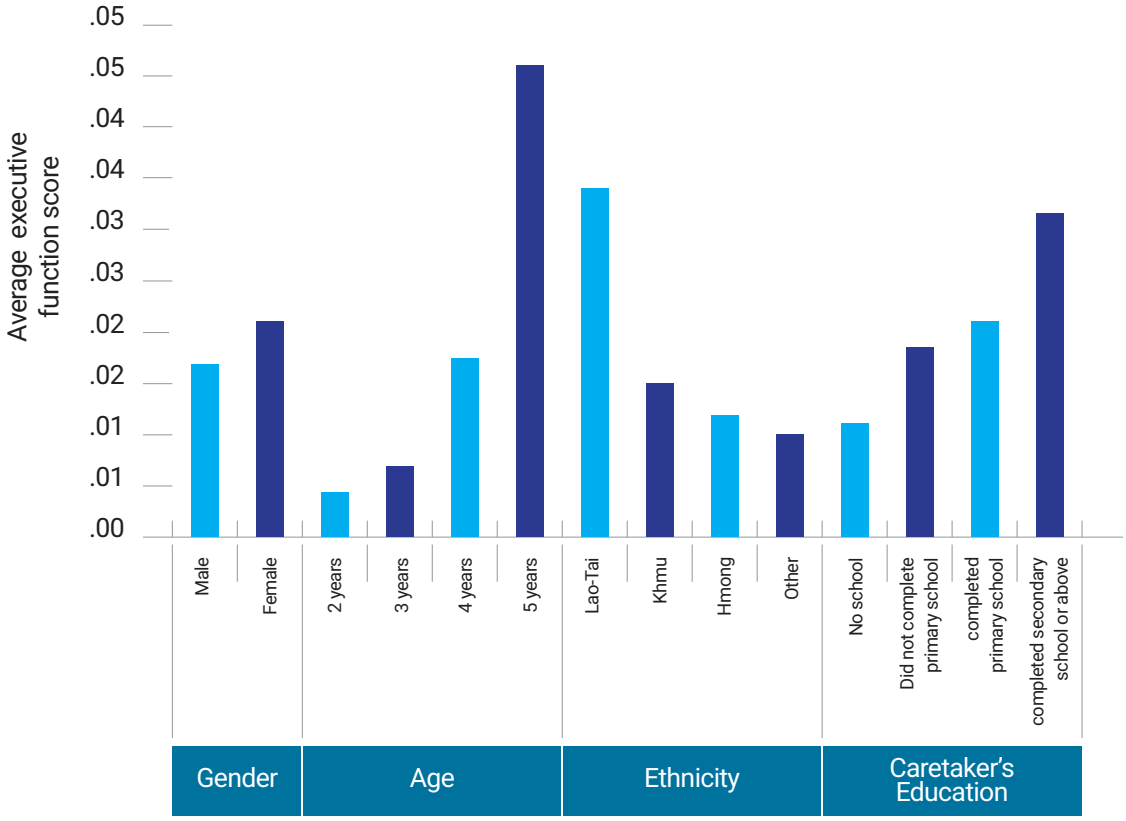
Figure 46:
Executive function (forward digit span)
by gender, age, ethnicity and caretaker's education



Backward Digit Span

Similar to forward digit span, in this task children were read a string of numbers, although this time they were required to repeat them backward to the order in which they heard them. This task measures not only a child's memory, but also their ability to mentally transform or manipulate the information presented to them. This is the most difficult task of all items that were used to assess children's development, which is reflected by the fact that 96% of children provided no response or no correct answers. Of the small number of children who did respond, **Figure 47** below shows disparities across gender, age, ethnicity and parent's education level. This information should however be interpreted with caution as it is based on very few children overall (n=328).

Figure 47:
Executive function (backward digit span) by gender, age, ethnicity and caretaker's education

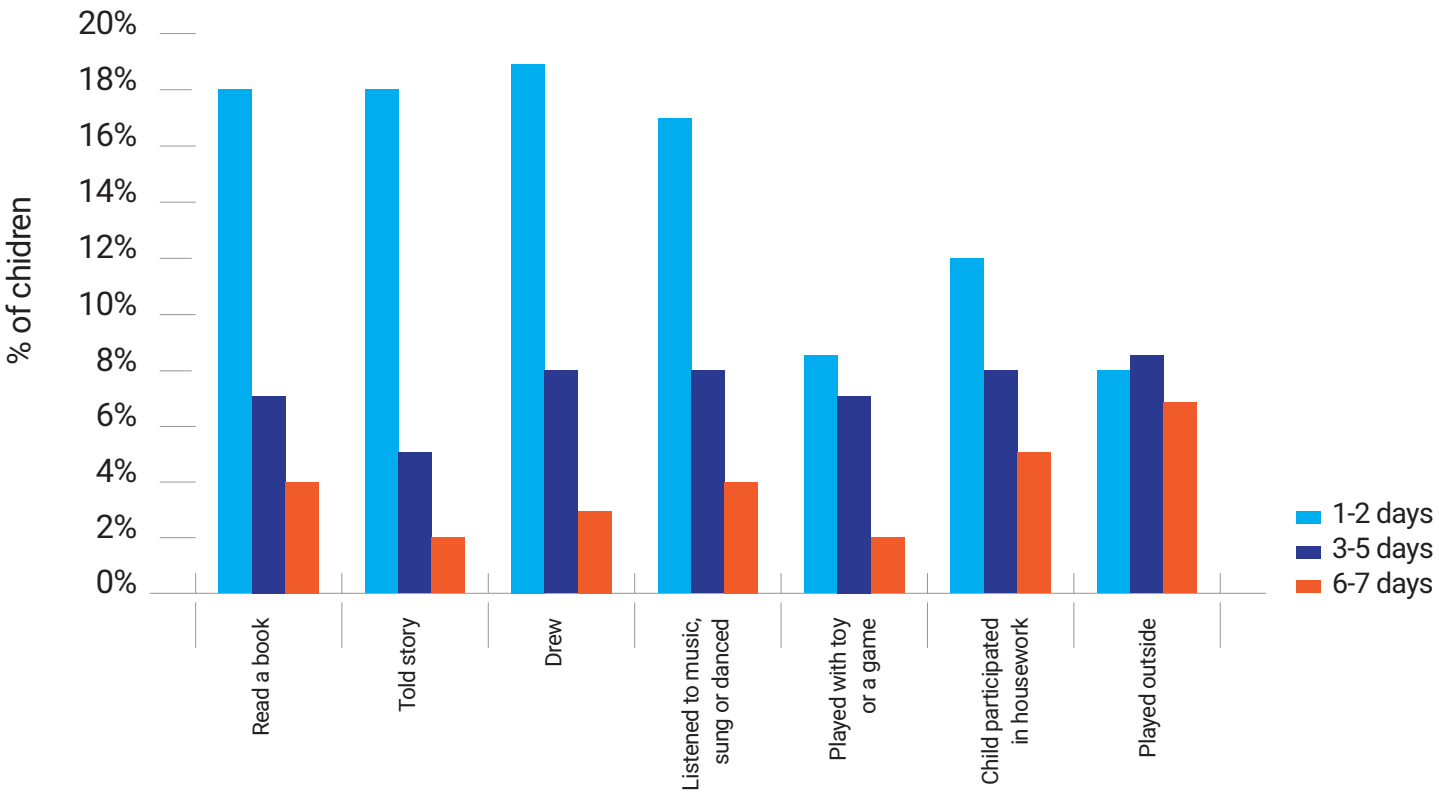


Stimulation in the Home Environment

A nurturing home environment that provides safety, love and opportunities to learn, explore and play is essential for healthy child development. It is therefore important for parents to tell stories, sing and play with their children. While almost all caretakers (97%) agreed that it is important that parents interact with and stimulate their children to help them learn well before they go to kindergarten, unfortunately these beliefs were not reflected in responses to questions regarding stimulation in the home environment. Caretakers were asked about seven different activities that families commonly engage in with their children, and if they had undertaken any of these activities with their child in their home over the past week. Rates of caretaker and child interaction were very low.71% of caretakers had not read a book to their child, 75% had not told their child a story, 70% had not engaged in drawing with their child, 71% had not listened to music, sung or danced with their child, 82% had not played any games with their child, and 76% had not engaged in any outdoor activities with their child in the last seven days. In addition, 75% of children had not participated in housework (e.g., cooking, cleaning). Compared to other countries, these results indicate that children in northern Lao PDR are receiving very low levels of stimulation and support for their development in their home environments.

As previously noted, the large majority (88%) of caretakers in this study were female. When exploring children's participation in the above activities, differences can be observed between male and female caretakers. 32% of male caretakers (N=942) had played a game with their child in the past seven days, compared to 16% of all female caretakers (N=6578); 30% of male caretakers had told their child a story compared to 25% of female caretakers; 34% of male caretakers had drawn with their child compared to 30% of female caretakers; 38% of male caretakers had sung or danced with their child compared to 28% of females; 33% of male caretakers reported that their child participated in housework compared to 24% of female caretakers; and 25% of male caretakers had engaged in outdoor activities with their child compared to 24% of female caretakers. An equal amount of male and female caretakers (29%) reported having read a book to their child in the past week. These results suggest that male caretakers are interacting with their children at home considerably more than female caretakers.

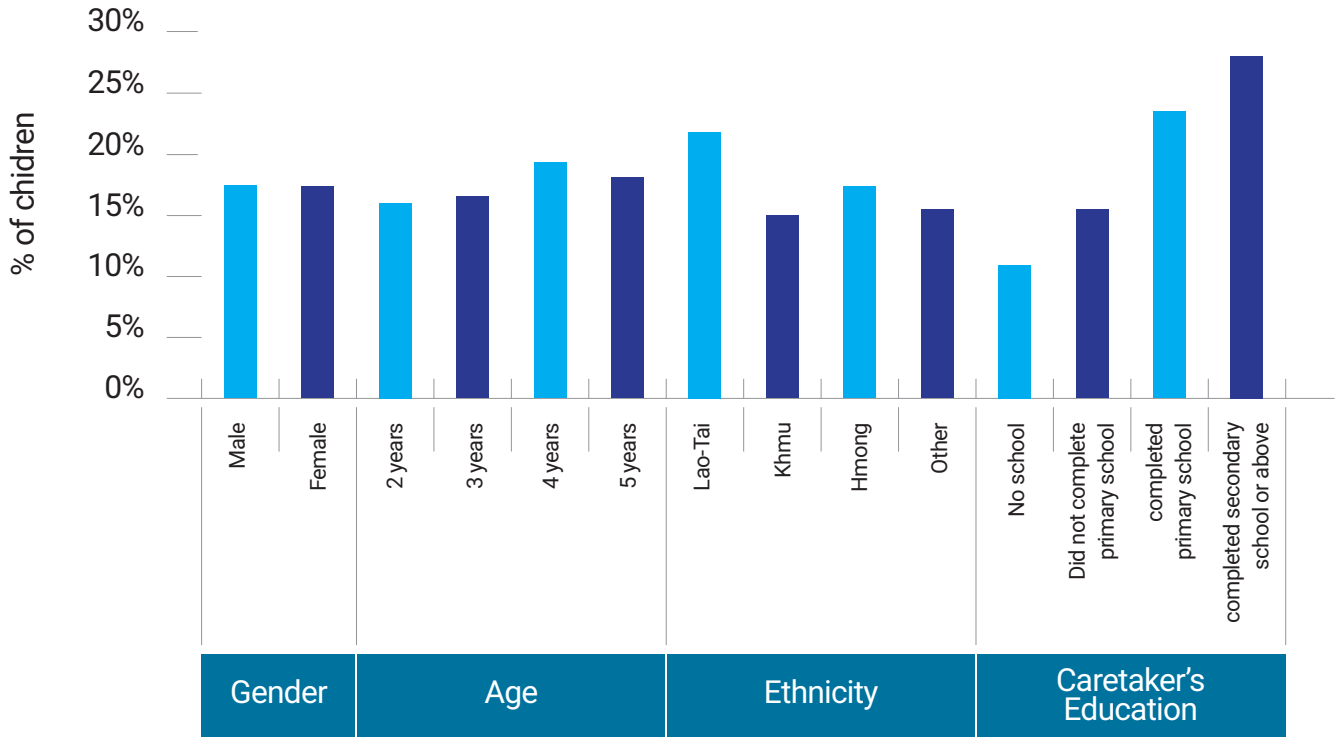
Figure 48:
Caretakers' participation in home learning activities over the last 7 days



For those who did participate in these activities with their child, Figure 48 above shows the frequency with which each of these activities occurred. Evidently, reading a book, telling a story, drawing or listening to music, singing and dancing were activities that parents more commonly did with their children at least once or twice throughout the week. Fewer parents played with toys or games, played outside, or let their child participate in housework.When exploring these patterns of activity further, **Figure 49** shows that that better educated parents and Lao-Tai parents were more likely to have played games with their child in the past week. Parents who had not attended any school were much less likely to have played with their child. Despite these significant main effects, no interaction effects between children's gender, caretaker's education, and children's ethnicity were found.

Figure 49:

Caretakers who had played with toys/a game with their child in the past 7 days



Similarly, **Figure 50** below shows that Lao-Tai parents were more likely to have read a book to their child in the past week, with Hmong parents being the least likely to have engaged in this activity. There is also a strong link between parent's education and whether or not they read to their child, with educated parents reading to their children more than those who had never attended school. Testing using univariate general linear models showed that the relationship between parents' education and engagement in learning activities at home was statistically significant across all seven activities. Again, despite these significant main effects, no interaction effects between children's gender, caretaker's education, and children's ethnicity were found.

Figure 50:
Caretakers who had read a book with their child in the past 7 days

Home Stimulation and Child Development

Each of the seven caretaker-child engagement activities had a significant positive relationship with child's overall development. As shown in **Figure 51** below, the children of caretakers who had read a book to their child, told their child a story, drawn with their child, listened to music, sung or danced with their child, played games with their child, participated in housework with their child, or engaged in outdoor activities with their child in the last seven days all had better development than children whose caretakers had not engaged in these activities with them in the past week. The relationship between each of these stimulation activities and different aspects of child development is further explored below.

Table 16 below presents descriptive analyses as well as results from a univariate general linear model showing the relationship between caretakers having played a game with their child in the past week and children's development. Evidently caretakers playing games with their children had a strong statistically significant relationship with all domains of development, with the magnitude of the relationship largest for children's reading and writing skills, as well as their social and emotional development. This analysis focuses on the development of children whose caretakers played with them at least once in the past week, and so it is likely that the magnitude of this relationship would be larger still for children whose caretakers played them multiple times over a week. This is the case for the following analyses examining parent-child engagement and child development below.

Figure 51:
Relationship between home learning activities and child development

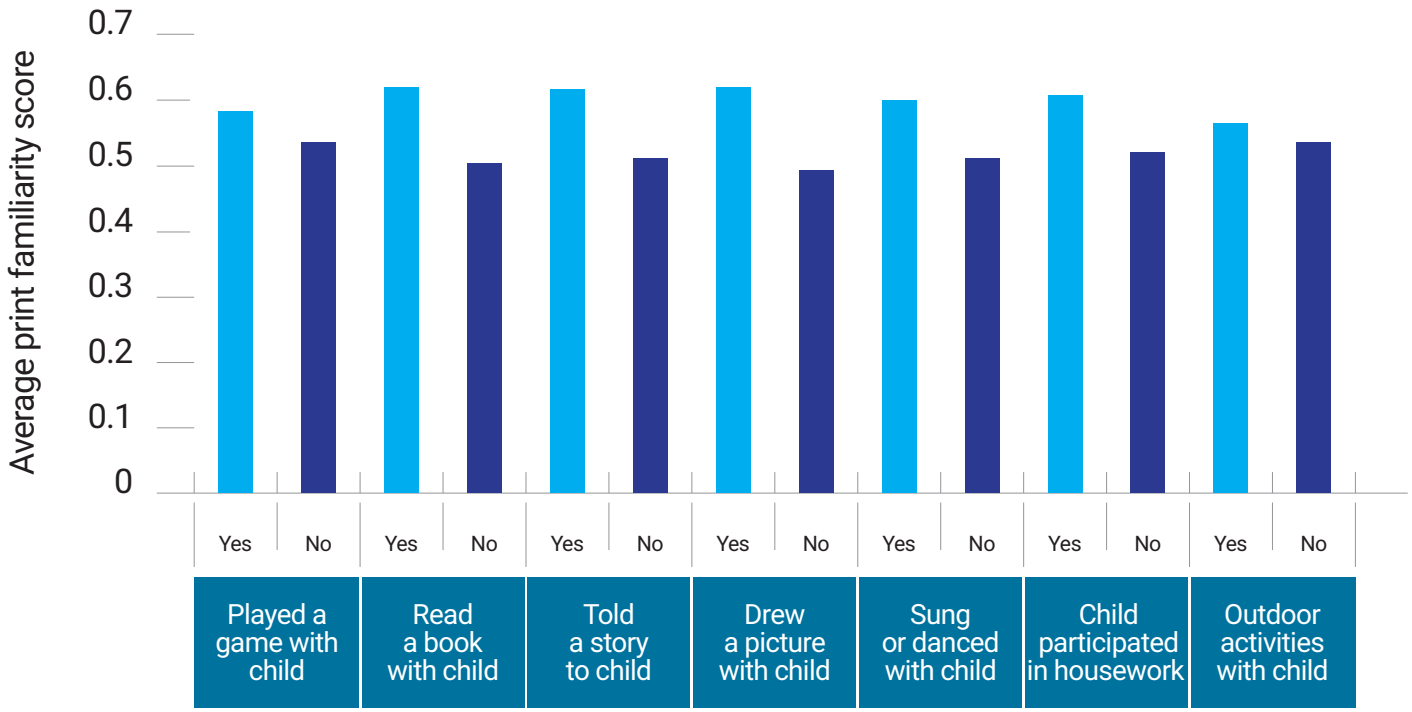


Table 16:

Relationship between caretaker playing a game with their child in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.80	.26	2.25	34.12**
	Did not do	.85	.26		
Approaches to Learning	Did do	.74	.22	8.10	108.05**
	Did not do	.66	.28		
Numeracy and Concepts	Did do	.44	.26	9.25	139.16**
	Did not do	.35	.26		
Literacy (reading and writing)	Did do	.21	.21	8.21	276.32**
	Did not do	.13	.16		
Cultural Knowledge	Did do	.74	.21	1.58	34.57**
	Did not do	.70	.21		
Social and Emotional Skills	Did do	.56	.20	9.01	222.05**
	Did not do	.47	.20		
Perseverance	Did do	.59	.27	1.73	16.01**
	Did not do	.55	.34		
Overall Development	Did do	.58	.15	3.36	126.18**
	Did not do	.53	.16		

Note : *p,.05, **p<.01

Table 17:
Relationship between caretaker reading a book to their child in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.87	.23	2.68	40.74**
	Did not do	.82	.27		
Approaches to Learning	Did do	.75	.22	18.20	247.17**
	Did not do	.64	.29		
Numeracy and Concepts	Did do	.50	.26	54.39	899.51**
	Did not do	.32	.24		
Literacy (reading and writing)	Did do	.24	.21	26.45	969.75**
	Did not do	.11	.14		
Cultural Knowledge	Did do	.77	.18	12.45	281.15**
	Did not do	.68	.22		
Social and Emotional Skills	Did do	.56	.19	16.82	425.50**
	Did not do	.45	.20		
Perseverance	Did do	.59	.31	4.31	39.99**
	Did not do	.54	.33		
Overall Development	Did do	.61	.15	16.15	648.15**
	Did not do	.51	.16		

Note : *p,.05, **p<.01

Table 17 above presents descriptive analyses as well as results from a univariate general linear model showing the relationship between caretakers having read a book to their child in the past week and children's development. Evidently caretakers reading to their children has a strong statistically significant relationship with all domains of development, with the magnitude of the relationship largest for children's reading, writing and maths skills, but also for their social and emotional development.

Table 18 below presents descriptive analyses as well as results from a univariate general linear model showing the relationship between caretakers having told their child a story (without a book) in the past week and children's development. Again, results show that caretakers telling their child a story had a strong statistically significant relationship with all domains of development. Again, the magnitude of this relationship was largest for children's reading, writing and maths skills, then for their social and emotional development.

Table 18:
Relationship between caretaker telling a story to their child in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.88	.22	2.91	44.24**
	Did not do	.83	.27		
Approaches to Learning	Did do	.75	.22	14.86	200.60**
	Did not do	.65	.29		
Numeracy and Concepts	Did do	.49	.27	36.04	572.98**
	Did not do	.33	.25		
Literacy (reading and writing)	Did do	.222	.22	15.17	527.13**
	Did not do	.17	.15		
Cultural Knowledge	Did do	.77	.18	9.50	212.69**
	Did not do	.69	.22		
Social and Emotional Skills	Did do	.55	.19	12.35	307.88**
	Did not do	.46	.20		
Perseverance	Did do	.61	.31	6.89	64.10**
	Did not do	.54	.33		
Overall Development	Did do	.61	.15	12.43	489.34**
	Did not do	.51	.16		

Note : *p,.05, **p<.01

Next the study examined the relationship between caretakers drawing with their child in the past week and child development scores. **Table 19** below presents descriptive analyses and results from a univariate general linear model, showing that caretakers drawing with their children had a strong statistically significant relationship with all domains of development. Again, the magnitude of this relationship was largest for children's reading, writing and maths skills, and then for their social and emotional development.

Table 20 below presents descriptive analyses and results from a univariate general linear model showing the relationship between caretakers having sung or danced with their child in the past week and children's development. Again, results reveal a strong statistically significant relationship with all domains of development, with the magnitude of this relationship largest for children's reading, writing and maths skills, and also for their social and emotional development.

Table 19:

Relationship between caretaker drawing with their child in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.87	.23	2.66	40.39**
	Did not do	.83	.27		
Approaches to Learning	Did do	.76	.21	26.47	364.84**
	Did not do	.63	.29		
Numeracy and Concepts	Did do	.49	.26	49.26	805.57**
	Did not do	.32	.24		
Literacy (reading and writing)	Did do	.24	.21	30.91	1158.43**
	Did not do	.10	.14		
Cultural Knowledge	Did do	.77	.18	12.44	280.89**
	Did not do	.68	.22		
Social and Emotional Skills	Did do	.56	.19	22.43	578.50**
	Did not do	.45	.20		
Perseverance	Did do	.60	.30	6.48	60.25**
	Did not do	.54	.34		
Overall Development	Did do	.61	.14	18.57	755.02**
	Did not do	.51	.16		

Note : *p,.05, **p<.01

Table 20:

Relationship between caretaker singing or dancing with their child in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.85	.24	0.28	4.24**
	Did not do	.84	.26		
Approaches to Learning	Did do	.75	.22	17.31	234.68**
	Did not do	.64	.29		
Numeracy and Concepts	Did do	.47	.27	31.03	488.07**
	Did not do	.33	.25		
Literacy (reading and writing)	Did do	.22	.21	18.13	638.91**
	Did not do	.11	.16		
Cultural Knowledge	Did do	.76	.19	9.13	204.18**
	Did not do	.69	.22		
Social and Emotional Skills	Did do	.55	.19	15.39	387.43**
	Did not do	.45	.20		
Perseverance	Did do	.59	.30	4.74	44.01**
	Did not do	.54	.34		
Overall Development	Did do	.60	.15	11.41	446.56**
	Did not do	.51	.16		

Note : *p,.05, **p<.01

The relationship between children participating in housework in the past week and child development was also examined. **Table 21** below presents descriptive analyses and results from a univariate general linear model, showing that children's participation in housework had a strong statistically significant relationship with all domains of development except for verbal communication. In contrast to the other home stimulation activities, the magnitude of this relationship was largest for children's social and emotional skills and well as their literacy skills.

Table 21:
Relationship between child participating in housework in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.85	.23	0.11	1.71
	Did not do	.84	.26		
Approaches to Learning	Did do	.74	.24	12.25	164.59**
	Did not do	.65	.28		
Numeracy and Concepts	Did do	.45	.26	18.08	276.85**
	Did not do	.34	.25		
Literacy (reading and writing)	Did do	.22	.21	12.90	443.76**
	Did not do	.12	.16		
Cultural Knowledge	Did do	.77	.19	8.25	183.89**
	Did not do	.69	.22		
Social and Emotional Skills	Did do	.58	.20	22.74	587.05**
	Did not do	.45	20		
Perseverance	Did do	.62	.29	12.06	112.89**
	Did not do	.53	.34		
Overall Development	Did do	.60	.15	10.61	413.35**
	Did not do	.52	.26		

Note : *p,.05, **p<.01

Finally, **Table 22** below presents descriptive analyses and results from a univariate general linear model showing the relationship between caretakers having participated in outdoor activities with their child in the past week, and children's development. Results reveal a statistically significant relationship with all domains of development except for cultural knowledge, though the magnitude of these relationships is relatively smaller than was observed across the other six parent-child interaction activities.

Overall, these results make it clear that parental stimulation, engagement and interaction in a range of activities with children at home is very important for child development. In particular, parents reading and drawing with their children was strongly associated with better child development.

Table 22:

Relationship between caretaker participating in outdoor activities with child in the past 7 days and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Did do	.83	.25	0.28	4.26*
	Did not do	.85	.26		
Approaches to Learning	Did do	.73	.24	7.89	105.21**
	Did not do	.66	.28		
Numeracy and Concepts	Did do	.42	.25	5.26	78.49*
	Did not do	.35	.26		
Literacy (reading and writing)	Did do	.18	.19	3.13	102.92**
	Did not do	.13	.17		
Cultural Knowledge	Did do	.71	.20	0.02	0.46
	Did not do	.71	.22		
Social and Emotional Skills	Did do	.52	.20	3.37	81.44**
	Did not do	.47	.20		
Perseverance	Did do	.61	.28	7.10	66.05**
	Did not do	.54	.34		
Overall Development	Did do	.57	.15	2.46	92.08**
	Did not do	.53	.17		

Note : *p,.05, **p<.01

Parenting Practices and Child Development

Parenting behaviours and practices characterise how parents interact with their children every day, and research shows that parenting plays a crucial role in children's development. Nurturing, warm parenting that is sensitive and responsive provides the foundation for a child's wellbeing and healthy development. In contrast, hostile, punitive parenting can contribute to or worsen behavioural problems in children.

Caretakers responded to questions designed to measure their parenting practices. **Figure 52** below presents average scores on four dimensions of parenting: warmth, consistency, hostility, and hostile parenting, with scores ranging from 0-5, 5 being the highest. Across the whole sample, parents scored highest on the warmth dimension. When examining parenting practices across gender, age, ethnicity and family background, significant differences between groups could only be seen on parental warmth. As Figure 53 below shows, parents of Hmong children showed less parental warmth than those of other ethnicities, and more educated parents received higher scores on the warmth scale than parents who did not attend school or complete primary school. Despite these significant main effects, no interaction effects between children's gender, caretaker's education, and children's ethnicity were found.

Figure 52:
Average parenting practices across whole sample

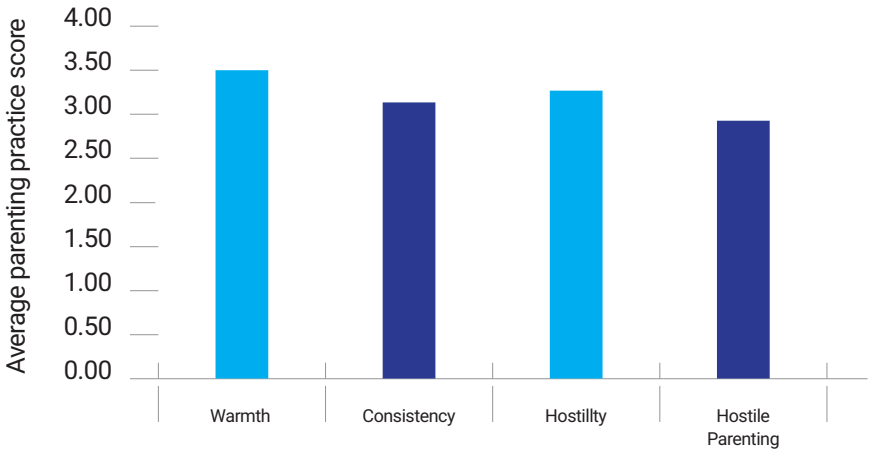
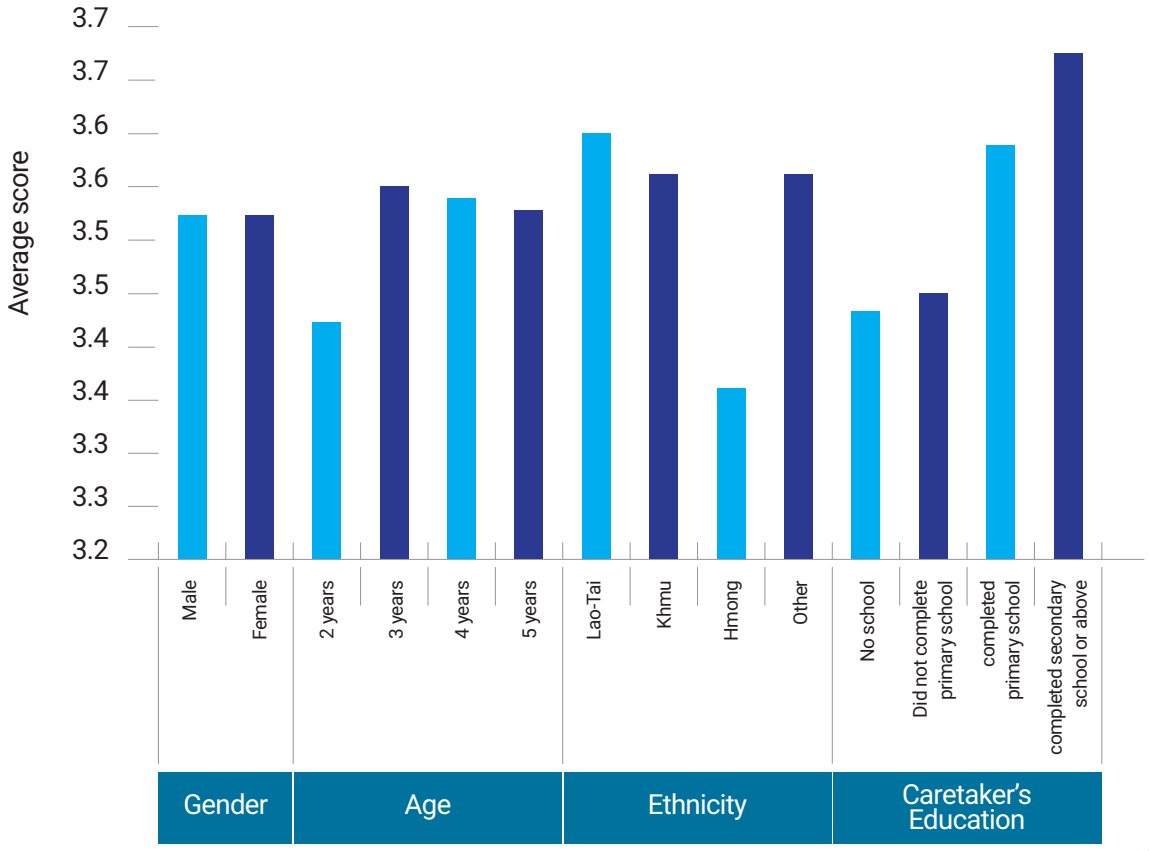


Figure 53:
Parental warmth across child gender, age, ethnicity and caretaker's education



Relationship Between Parenting Practices and Child Development

The relationship between parenting practices and children's development was also examined. Of the four parenting practices measured, parental warmth had the strongest correlation with overall child development scores as shown in **Table 23** below (r = .32). Parental warmth and consistency had weak to moderate relationships with overall child development, while the relationships between hostility and hostile parenting and child development were weak. Hostile parenting was the only practice negatively correlated with child development, indicating that increases in hostile parenting are associated with decreases in overall child development scores. Subsequent regression analysis confirmed that parental warmth had the strongest relationship with children's development.

Table 23:

Relationship between parenting practices and overall child development

PARENTING PRACTICE	OVERALL DEVELOPMENT			
	r	B	SE B	β
Warmth	.32	.065	.003	.247**
Consistency	.24	.030	.004	.103**
Hostility	.14	.023	.004	.059**
Hostile Parenting	-.15	-.019	.003	-.083**
R^2		.123		
F		262.88**		

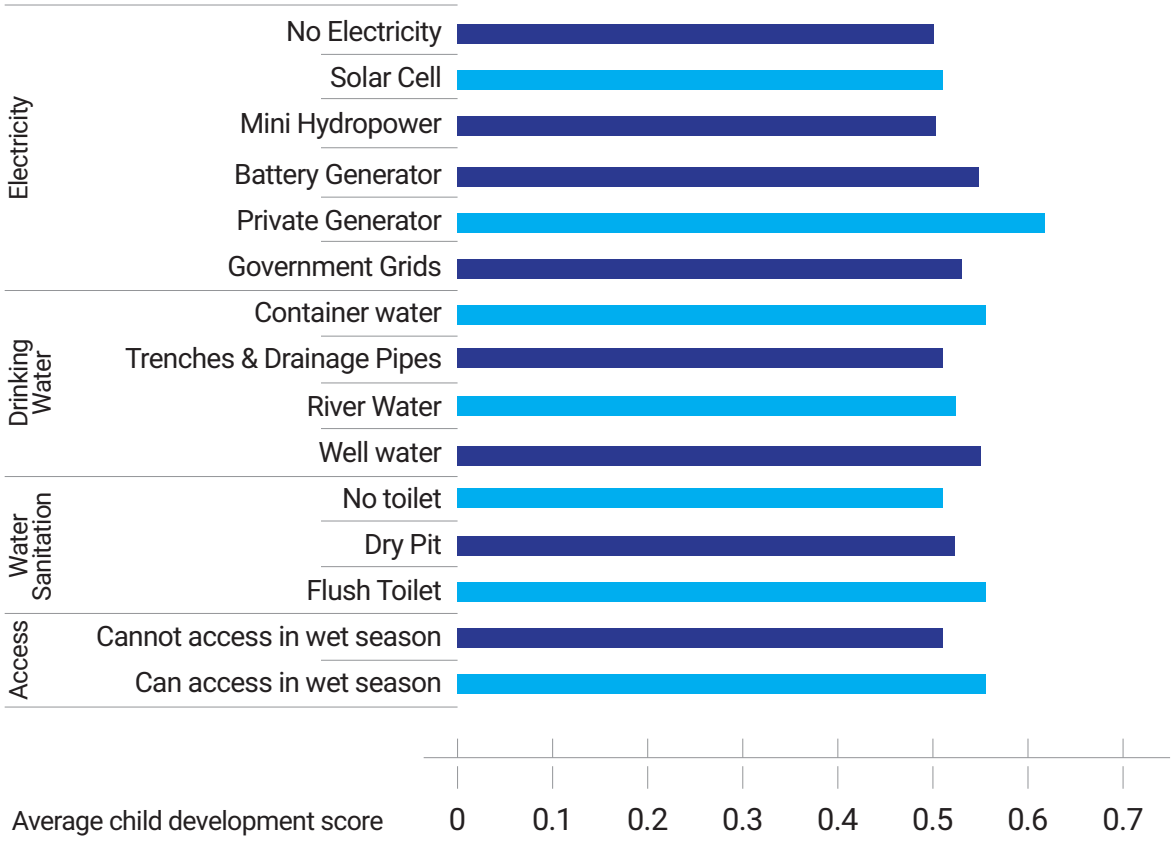
Note : *p,.05, **p<.01

Village Amenities and Child Development

Village access and amenities are important for basic health and hygiene of the population, and are likely to influence the development of children in the village. As discussed, the villages in the study were relatively remote, and while almost all could be accessed by car in the dry season (97%), only just over half could be accessed by car in the wet season (53%). More than half of the villages accessed electricity from government electrical grids (55%), and only a small number of villages (4%) did not have access to electricity from any source. The majority of villages were using drinking water from trenches/drainage pipes (90%), but many also had some households using river water for drinking (39%). Villages often used a combination of water sanitation processes; most villages had some households using pit toilets with a water flush (93%), although some villages had households that were still using dry pits (21%).

Figure 54 below indicates the relationship between village access, electricity, water and sanitation with child development. The results show that children living in more accessible villages that utilize more sophisticated electricity and sanitation processes are developing better than children from villages with poor access, that do not have electricity and that do not use toilets.

Figure 54:
Relationship between village amenities and child development



Of these variables, sanitation and electricity appear to be particularly important for child development scores and so these relationships were further explored. Testing using a univariate general linear model (as presented in **Table 24** below) demonstrates that having no toilet at all has the strongest relationship with poor overall child development scores. As presented in **Table 25**, children living in households with a private generator were found to have a better overall development score than children from households using other electricity sources, and testing using a univariate general linear model determined that this result was statistically significant. These results are unsurprising, as having a toilet and a private generator are most likely associated with lower levels of poverty and thus better child development scores.

Table 24:
Relationship between parenting practices and overall child development

SANITATION PROCESS		OVERALL DEVELOPMENT			
		Mean	SD	Mean Sq	F
Flush Toilet	Yes	.54	.16	1.47	55.23**
	No	.48	.15		
Dry Pit	Yes	.62	.32	1.54	57.35**
	No	.53	.16		
No Toilet	Yes	.52	.16	3.89	146.59**
	No	.57	.17		

Table 25:
Relationship between parenting practices and overall child development

ELECTRICITY SOURCE	OVERALL DEVELOPMENT			
	Mean	SD	Mean Sq	F
Government grids	.56	.16		
Private generator	.61	.15		
Battery generator	.55	.15	1.10	41.64**
Mini hydropower	.51	.16		
Solar cell	.52	.15		

Note : *p,.05, **p<.01

Health and Education Services and Child Development

Universal healthcare and education coverage is crucial for supporting the health and development of a nation. Access to quality healthcare services, as well as the opportunity to participate in quality ECE, gives children the best start in life and the foundation they need to enjoy learning at school.

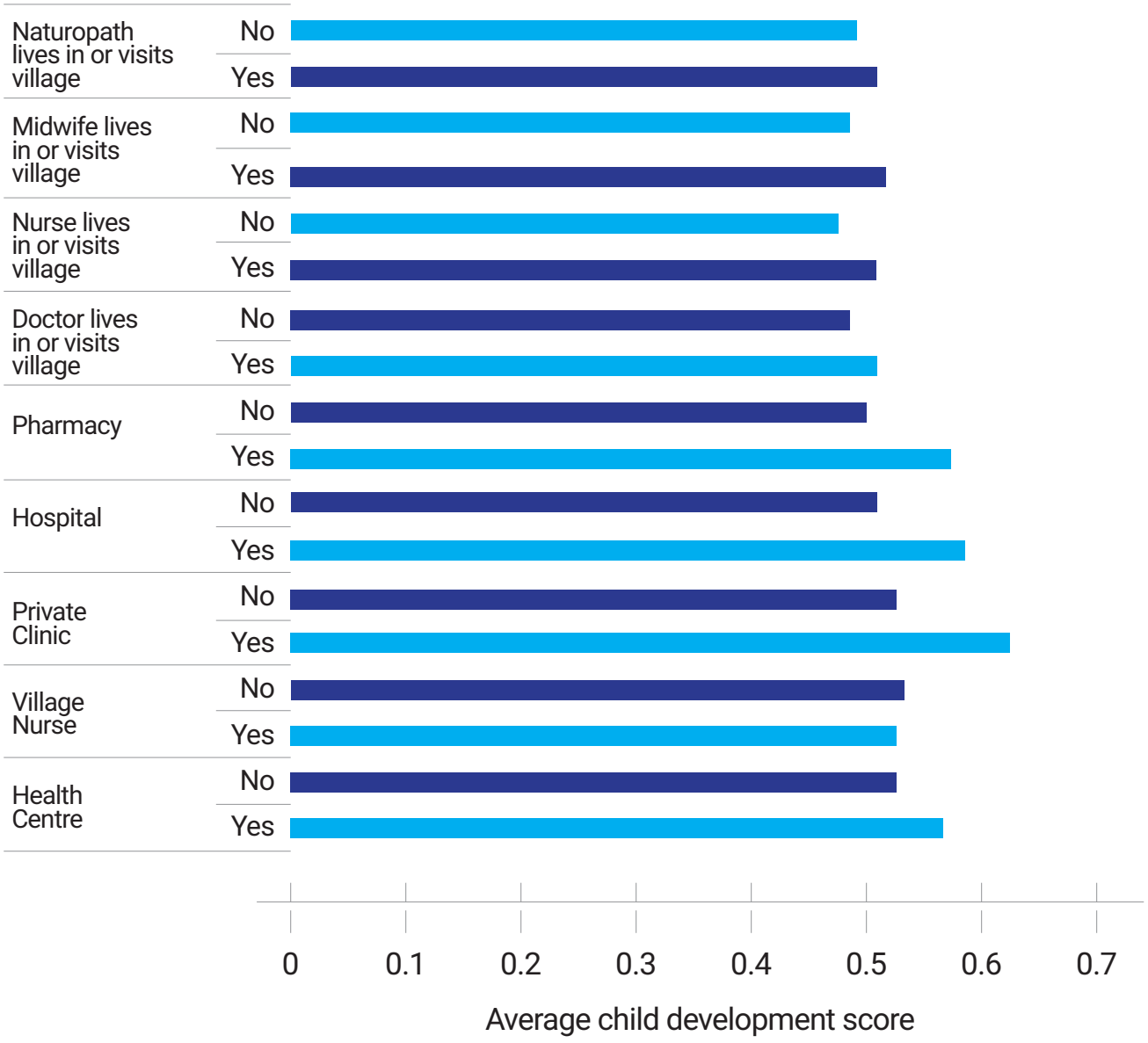
Health Care Services

Caretakers reported that 22% of children had received some form of health service in the past month – most often a health check-up, treatment or vaccination. Only 13% of children had visited a health center, 9% a district hospital, 1% a provincial hospital, and less than 1% had visited a private clinic, traditional healer or village health volunteer. **Figure 55** below shows that fewer Hmong children had received a health service compared to children of Lao-Tai, Khmu and other ethnicities, though disparities across age and caretaker's education are less clear.

Figure 55:
Children who received a health service in the past month by gender, age, ethnicity and caretaker's education

In the past 12 months, 38% of children had their weight measured – the majority of whom had this done at a health centre (14%) or by a mobile medical team (12%), while others were weighed by a midwife (4%), at a hospital (7%), or at school or child care (2%). In the past 12 months, 27% of children were reported to have taken Vitamin A supplements, the majority of whom received the supplements from a mobile medical team (11%) or health centre (9%), while some also received Vitamin A from a midwife (2%), at a hospital (4%), or at school or child care (2%). Just 33% of children had received a health check in the past 12 months, the majority of whom received the check at a health centre (13%), hospital (9%) or from a mobile medical team (8%), with the remaining children receiving their health check from a midwife (2%) or at school or child care (1%).

Figure 56:
Relationship between health service availability and child development



The availability of health services was shown to have a positive relationship with child development – that is, increased availability of health services was linked to improved child development, as shown in **Figure 56** above.

Relationship Between Child Health and Development

As discussed, a child's health status - and in particular the extent to which they experience undernutrition - can hinder early development and go on to have detrimental consequences throughout their life. **Table 26** below presents descriptive analyses showing the relationship between children's stunting status (severely stunted, stunted, or not stunted) and child development scores. As expected, stunting is associated with poorer development. Subsequent testing of this relationship using a univariate general linear model **(Table 27)** demonstrated that stunting has a statistically significant relationship with all domains of development except perseverance, with the magnitude of the relationship especially high for numeracy skills. Unsurprisingly, this effect was stronger when comparing development scores of severely stunted children with children who were not stunted, and this is presented in **Figure 57** below also.

Table 26:
Relationship between stunting and child development

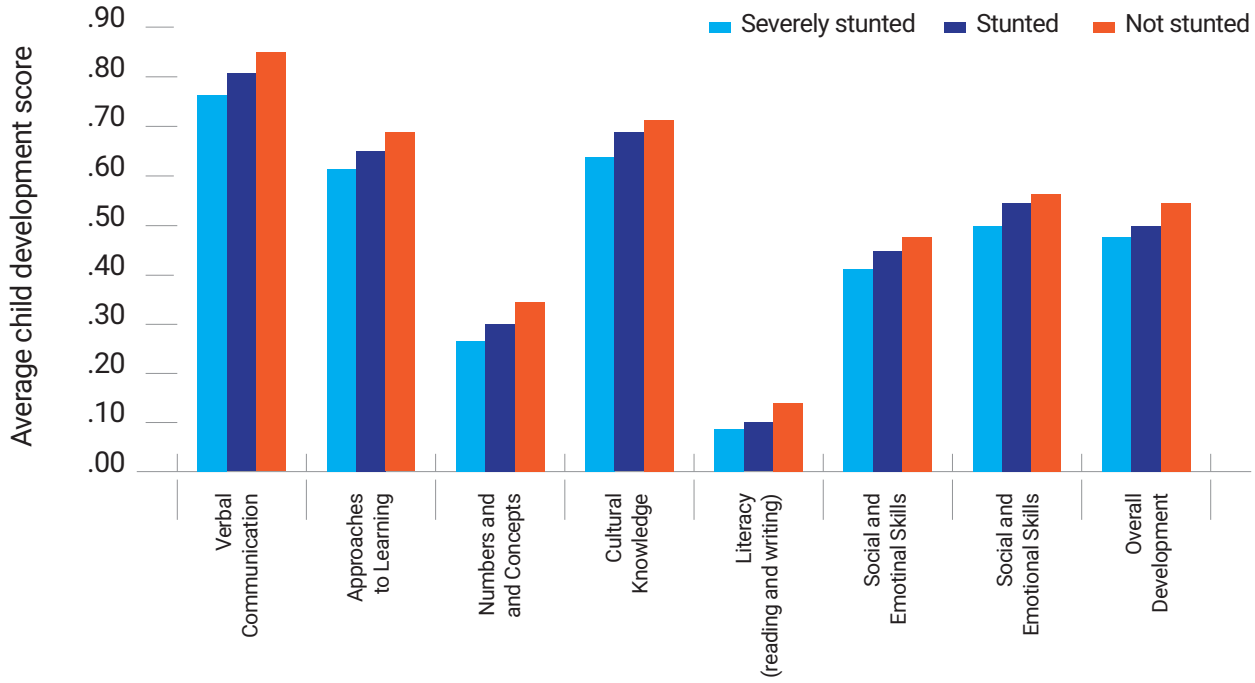
DOMAIN	SEVERELY STUNTED		STUNTED		NOT STUNTED	
	Mean	SD	Mean	SD	Mean	SD
Verbal Communication	.78	.30	.81	.28	.84	.25
Approaches to Learning	.61	.29	.64	.28	.67	.27
Numeracy and Concepts	.30	.23	.30	.24	.35	.25
Literacy (reading and writing)	.09	.13	.10	.13	.13	.16
Cultural Knowledge	.64	.24	.67	.23	.71	.21
Social and Emotional Skills	.42	.20	.45	.20	.47	.20
Perseverance	.50	.34	.53	.34	.54	.32
Overall Development	.47	.16	.50	.16	.53	.16

Table 27:
Relationship between stunting and child development

DOMAIN	SEVERELY STUNTED		STUNTED	
	Mean Square	F	Mean Square	F
Verbal Communication	3.11	44.36**	1.14	16.16**
Approaches to Learning	2.89	37.39**	1.18	15.18**
Numeracy and Concepts	5.96	101.38**	3.70	62.63**
Literacy (reading and writing)	1.21	55.32**	1.29	59.30**
Cultural Knowledge	4.32	92.85**	1.70	36.24**
Social and Emotional Skills	2.32	59.61**	0.66	16.87**
Perseverance	2.16	19.89**	0.06	.51
Overall Development	2.98	120.41**	1.17	46.73**

Note : *p,.05, **p<.01

Figure 57:
Average child development scores by stunting status



Next the relationship between children's wasting status (severely wasted, wasted, not wasted) and child development scores was explored. Again, wasting was associated with poorer development scores **(Table 28)**.However, further testing using a univariate general linear model (Table 29) demonstrated that this relationship was not statistically significant. **Figure 58** below shows that in terms of overall development scores, there is almost no difference between children who are severely wasted, wasted and not wasted.

Table 28:
Relationship between stunting and child development

DOMAIN	SEVERELY STUNTED		WASTED		NOT STUNTED	
	Mean	SD	Mean	SD	Mean	SD
Verbal Communication	.79	.27	.82	.27	.83	.27
Approaches to Learning	.63	.27	.63	.27	.66	.28
Numeracy and Concepts	.32	.25	.34	..25	.33	.24
Literacy (reading and writing)	.13	.17	.12	.15	.12	.15
Cultural Knowledge	.70	.21	.70	.21	.69	.22
Social and Emotional Skills	.44	.20	.45	.19	.46	.20
Perseverance	.53	.32	52	.33	.54	.33
Overall Development	.51	.15	.51	.16	.52	.16

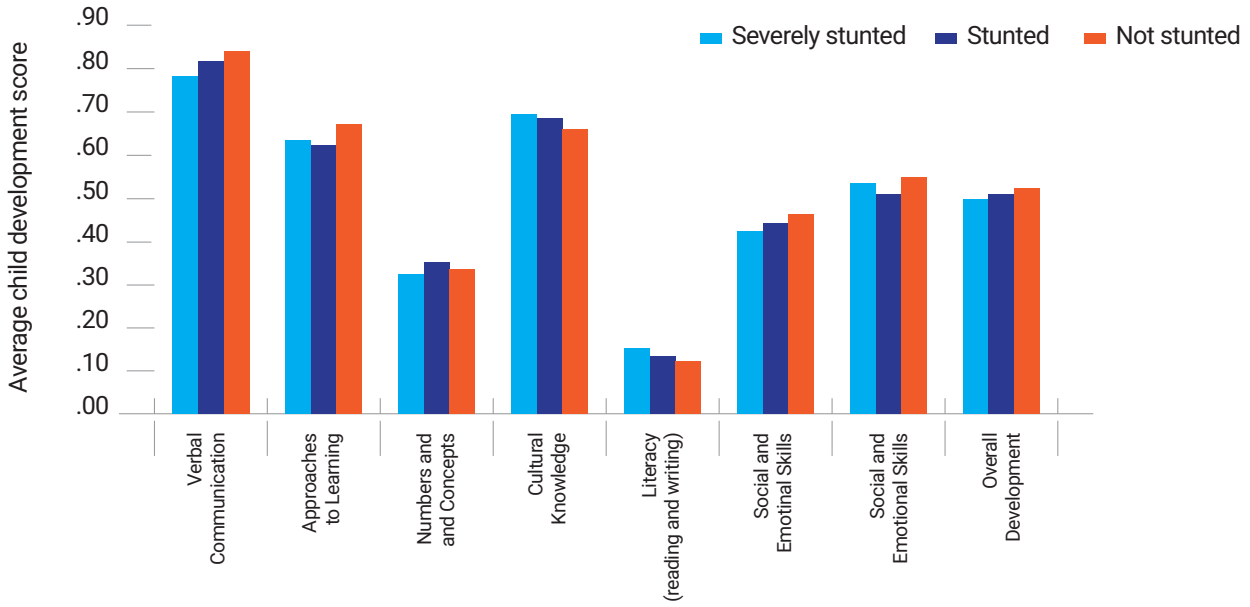
Note : *p,.05, **p<.01

Table 29:
Relationship between wasting and child development

DOMAIN	SEVERELY WASTED		WASTED	
	Mean Square	F	Mean Square	F
Verbal Communication	0.20	2.75	0.08	1.08
Approaches to Learning	0.07	0.87	0.42	5.43*
Numeracy and Concepts	0.02	0.29	0.05	0.81
Literacy (reading and writing)	0.05	2.44	0.01	0.36
Cultural Knowledge	0.02	0.43	0.04	0.86
Social and Emotional Skills	0.09	2.23	0.09	2.14
Perseverance	0.01	0.06	0.24	2.24
Overall Development	0.01	0.56	0.03	1.16

Note : *p,.05, **p<.01

Figure 58:
Average child development scores by wasting status



The relationship between children's underweight status (severely underweight, underweight, and not underweight) and child development scores was also examined. Again, data showed that being underweight was associated with poorer development scores **(Table 30)**. Further testing using a univariate general linear model **(Table 31)** demonstrated that this relationship was statistically significant, with being underweight having a particularly negative effect on children's numeracy skills and approaches to learning. This relationship is also demonstrated by **Figure 59** below.

Overall, these results demonstrate that of all forms of undernutrition examined, stunting is the most detrimental to children's development. Half of the children for which data were collected were stunted; this is a serious public health concern that is having a negative effect on their development. Efforts need to be made in order to reduce the prevalence stunting in children in northern Lao PDR, so that they are able to develop to their full potential.

Table 30:

Relationship between being underweight and child development

DOMAIN	SEVERELY UNDERWEIGHT		UNDERWEIGHT		NOT UNDERWEIGHT	
	Mean	SD	Mean	SD	Mean	SD
Verbal Communication	.80	.29	.81	.28	.83	.26
Approaches to Learning	.63	.29	.63	.28	.66	.28
Numeracy and Concepts	.30	.24	.31	.24	.33	.25
Literacy (reading and writing)	.11	.14	.11	.14	.12	.15
Cultural Knowledge	.67	.24	.68	.23	.69	.21
Social and Emotional Skills	.43	.20	.45	.19	.46	.20
Perseverance	.52	.34	.54	.34	.54	.33
Overall Development	.49	.16	.51	.16	.52	.16

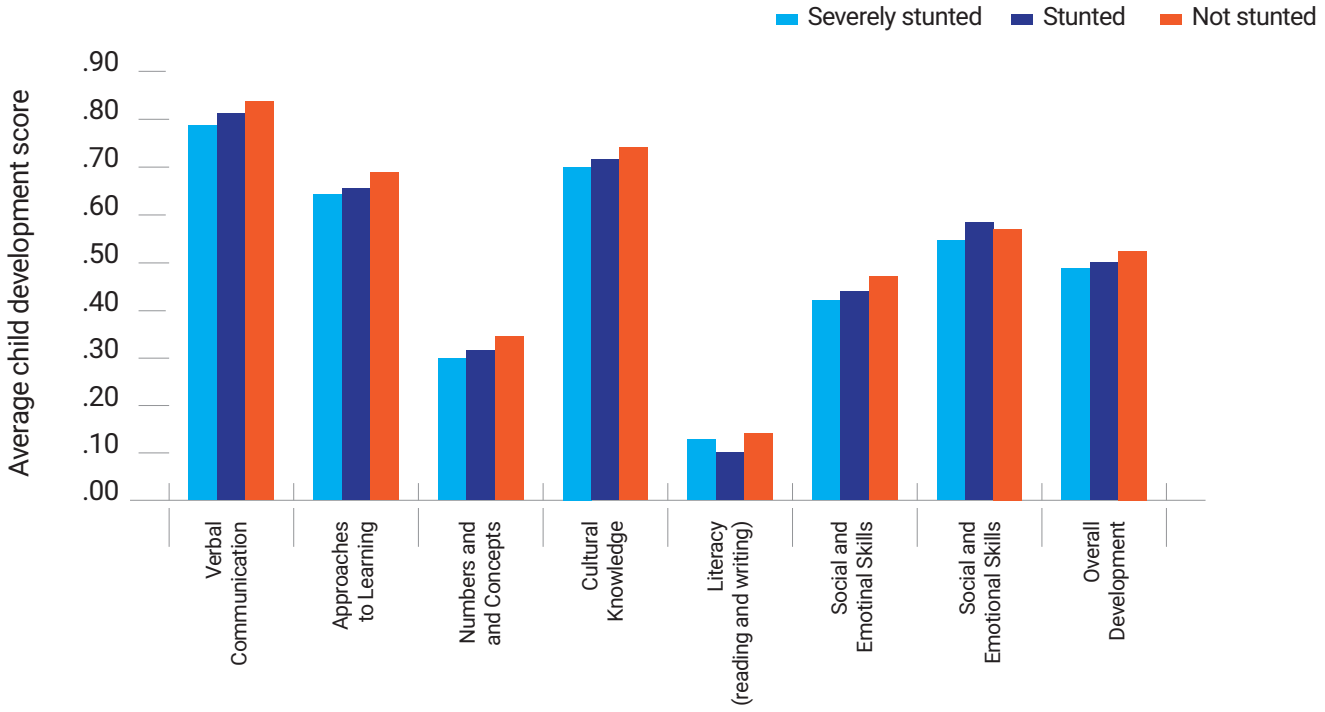
Table 31:

Relationship between being underweight and child development

DOMAIN	SEVERELY UNDERWEIGHT		UNDERWEIGHT	
	Mean Square	F	Mean Square	F
Verbal Communication	0.39	5.42*	0.52	7.31*
Approaches to Learning	0.31	4.00*	1.02	13.07**
Numeracy and Concepts	0.42	6.99*	0.63	10.50**
Literacy (reading and writing)	0.01	0.41	0.11	5.12*
Cultural Knowledge	0.12	2.45	0.22	4.70*
Social and Emotional Skills	0.32	8.17*	0.16	3.99*
Perseverance	0.12	1.11	0.00	0.01
Overall Development	0.21	8.12**	0.28	10.99**

Note : *p,.05, **p<.01

Figure 59:
Average child development scores by underweight status



Early Childhood Education Services and Child Development

Despite the fact that 97% of caretakers agreed that children who attend some form of ECE will do better in school, just 25% of children had done so at some point in their lives – either a baby care center (<1%), group learning through play (<1%), kindergarten (23%) or pre-primary class (1%). As Figure 59 below shows, more older children had attended some form of ECE. Further, it shows that significantly more Lao-Tai children had attended ECE than Khmu, Hmong or children of other ethnicities. Surprisingly, there was no clear pattern between caretaker's education and their children's ECE attendance.

Although ECE attendance is low, results show that children who had attended ECE were developing better across all domains of development when compared to children who had never attended, which is consistent with the international literature on the impact of ECE on child development. **Table 32** below presents descriptive analyses as well as results from a univariate general linear model. Evidently, ECE attendance has a statistically significant relationship with all domains of development, with the magnitude of this relationship largest for children's reading, writing and early maths skills. This relationship is also depicted in **Figure 60 and 61** below. Despite these significant main effects, no interaction effects between children's gender, caretaker's education, and children's ethnicity were found.

Again, these results are to be expected considering low levels of caretaker literacy and education, coupled with the notion that these more formal aspects of development (maths, reading and writing) are fostered in early childhood education. It is important to note that this does not take into account how much ECE children have attended. It is likely that the amount of time children attend ECE would have an impact on their development. The graph below shows whether a child had attended any ECE at all, and does not take into account the "dose" or length of time that he/she might have attended.

Figure 60:
ECE attendance by gender, age, ethnicity and caretaker's education

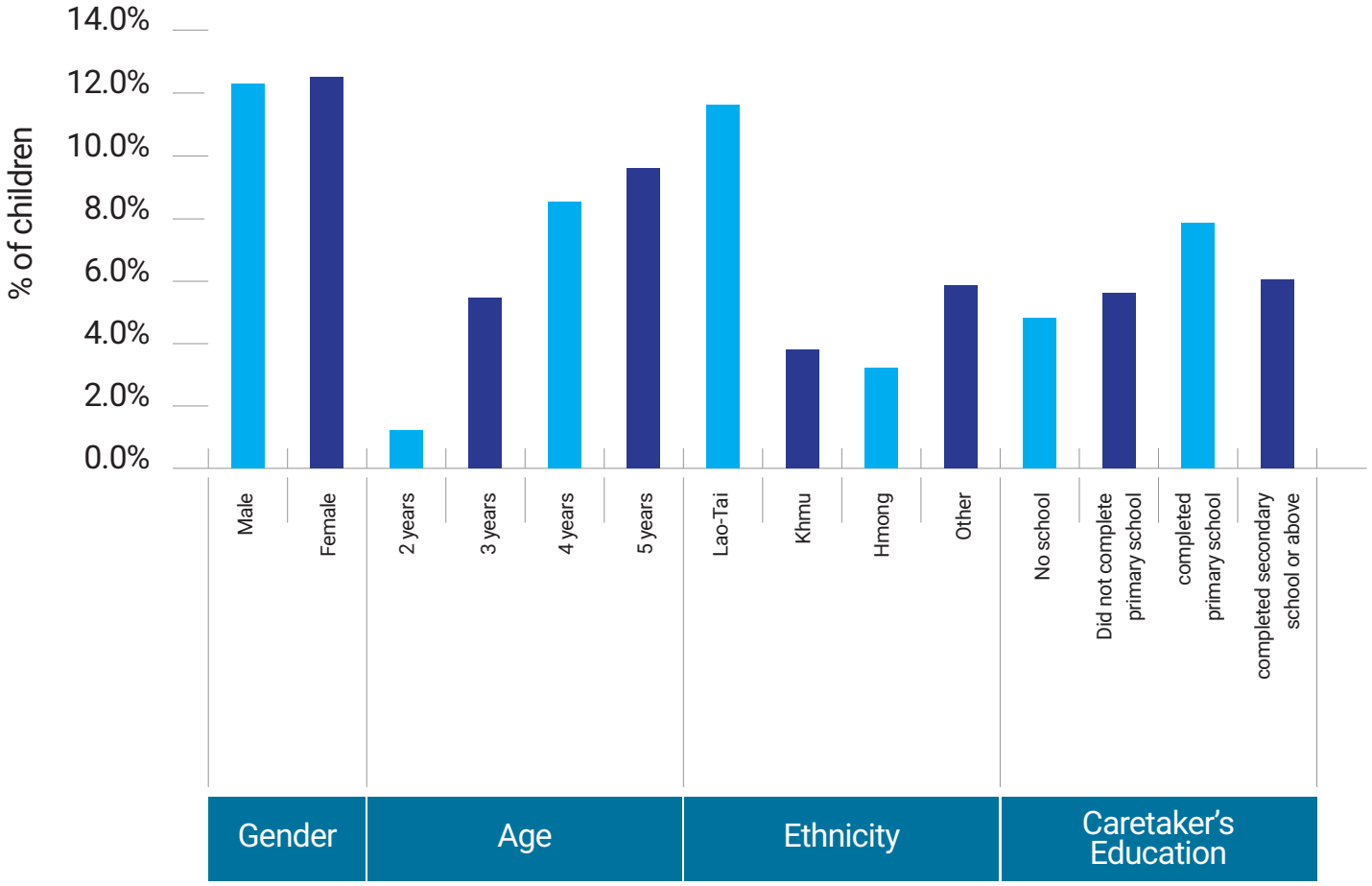
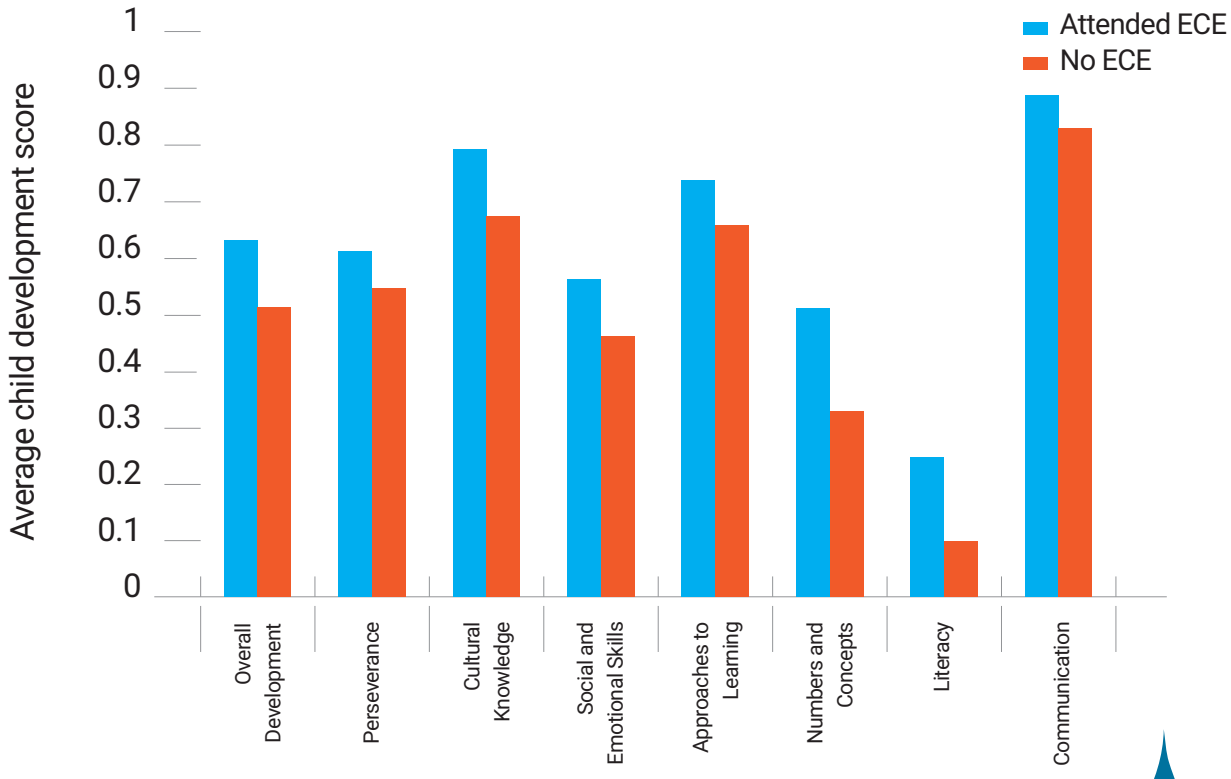


Table 32:
Relationship between ECE attendance and child development

DOMAIN		MEAN	SD	MEAN SQ	F
Verbal Communication	Attended	.89	.21	6.71	102.69**
	Did not attend	.82	.27		
Approaches to Learning	Attended	.73	.23	9.12	121.87**
	Did not attend	.65	.29		
Numeracy and Concepts	Attended	.51	.26	45.92	745.87**
	Did not attend	.32	.24		
Literacy (reading and writing)	Attended	.26	.21	32.03	1207.14**
	Did not attend	.11	.14		
Cultural Knowledge	Attended	.79	.21	17.23	394.70**
	Did not attend	.68	.22		
Social and Emotional Skills	Attended	.56	.20	16.24	410.11**
	Did not attend	.46	.20		
Perseverance	Attended	.61	.30	6.23	57.94**
	Did not attend	.54	.34		
Overall Development	Attended	.62	.15	16.84	678.37**
	Did not attend	.51	.16		

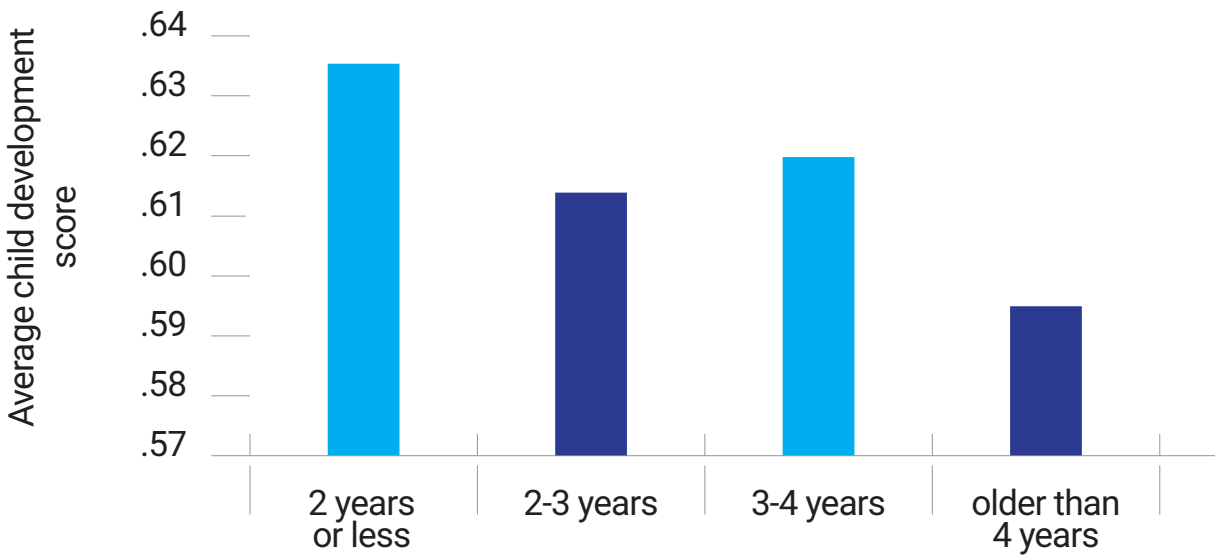
Note : *p,.05, **p<.01

Figure 61:
Relationship between ECE attendance and child development



As the number of caretakers who responded regarding their children attending baby care centers, group learning through play and pre-primary class was too small, only kindergarten attendance could be explored in more detail. Of the 23% of children who had attended kindergarten, 4% started attending at age two or younger, 13% started attending between the ages of 2-3, 6% between 3-4, and the remaining 1% started attended after the age of four. Consistent with the research into the influence of ECE attendance on child development, **Figure 62** below shows a relationship between when children started attending kindergarten and their development, with children attending kindergarten earlier (at age two or younger) receiving significantly better development scores than children who started going to kindergarten from when they were older than two.

Figure 62:
Relationship between age children started kindergarten and child development



The majority of children (19%) attended kindergarten at least once per week, while some attended 2-3 times per month (1%), or less than once every three months (2%). Each time they went to kindergarten, the majority of children (20%) attended for more than three hours, while 1% attended for 2-3 hours and under 1% attended for less time than this. For children who had attended kindergarten but stopped going, or had never attended kindergarten, caretakers were asked why they stopped or had never used the service. Responses were received from 18% of caretakers, most of whom explained that this was because their child was still young (12%). Others said it was because the kindergarten was too far (2%), because the caretakers were too busy (1%), because the child was too old (1%), because the child did not like to attend (1%), because they did not have enough money to pay for attendance (<1%), because there were not enough teachers (<1%), or because of child health or disability issues (<1%).

Overall, results indicate that ECE coverage in northern Lao PDR is insufficient. Encouragingly, where there are kindergartens available, results show that families are utilising them and that they are having a positive influence on children's early development. Work is needed in order for Lao PDR to achieve access to quality ECE for all children, as per SDG 4.

Which Factors Have the Strongest Relationship with Child Development?

Findings throughout this report have highlighted a range of factors that are influencing children's early development in northern Lao PDR. A series of multiple regression analyses were conducted in order to determine which of these factors have the strongest relationship with child development. **Table 33** below presents the range of variables shown to best predict overall child development scores, all of which are highly statistically significant. Naturally, children's age was the strongest predictor, followed by caretaker warmth, severe stunting, and a range of parent-child engagement activities. Caretaker consistency was also a significant predictor, and a caretaker's literacy level had a stronger relationship with child development than their education level. These results (and those presented throughout the report) demonstrate that children's development in northern Lao PDR is being influenced by a variety of factors at both the individual level and the level of the broader environment.

Table 33:
Strongest predictors of child development

VARIABLES	OVERALL DEVELOPMENT		
	B	SE B	β
Caretaker's education level	.002	.001	.029**
Caretaker's literacy level	.020	.004	.063**
Child's age	.071	.002	.407**
Read books with child	.020	.005	.055**
Told stories to child	.018	.005	.047**
Drew with child	.025	.005	.071**
Child participates in housework	.033	.004	.089**
Child is severely stunted (-3SD)	.036	.004	.094**
No toilet	-.013	.004	-.039**
Caretaker warmth	.053	.003	.206**
Caretaker consistency	.023	.003	.081**
Caretaker hostility	.013	.004	.034**
R^2		.365	
F		287.882**	

Note : *p,.05, **p<.01

PART FOUR:
SUMMARY OF KEY FINDINGS

The results presented in this report indicate that overall, children in northern Lao PDR have poor health and development. Encouragingly however, the data also demonstrates that there are a range of factors which are having a significantly positive influence on children's development. With the implementation of the ECE Project underway, the government and non-government service providers have the potential to improve these results and the lives of young children in Lao PDR through the positive factors identified.

Child Development

Overall, children in northern Lao PDR are developing poorly, with disparities in child development across different ethnic groups and family backgrounds. In particular, Lao-Tai children are developing better than Khmu and Hmong children, and children of parents with some education have better development than children of parents who have never gone to school. While children's communication skills and knowledge of culture appear to be developing well, their early literacy and numeracy skills are particularly poor. This appears to be influenced by a combination of poor health and nutrition; very low ECE attendance; lack of parental education and understanding of how to promote good child health and development; and very low levels of parental stimulation in the home environment.

Child Health and Nutrition

Children are not receiving the services and nutrition they need for good health. Despite meeting the WHO global target for exclusive breastfeeding until six months of age, there is still significant room for improvement in the breastfeeding rates in northern Lao PDR. The prevalence of stunting amongst children is of high public health significance, and this is having a significant negative impact on children's development and ability to learn. Additionally, the rates of immunization are well below international standards. It is also important to note that results reflect the notion that caretakers believe their children are healthy, which points to a lack of understanding around what exactly good child health looks like. Evidently, poor parental knowledge and understanding around what is required for optimal child health, coupled with inadequate health care services coverage is leading to poor health outcomes for children in northern Lao PDR. Furthermore, the relationships observed between children's health and development outcomes highlight the need for integrated approaches inclusive of both health and education services, in order to effectively promote the holistic development of children.

Early Childhood Education

Results indicate that, despite significant improvements in the access and quality of education services, ECE coverage in northern Lao PDR is insufficient. This is evident from the finding that while all caretakers agreed that ECE was important for their children's learning, ECE attendance was very low. Despite these low attendance rates, the children who had attended ECE had better scores across all domains of development compared to children who had never attended. Furthermore, results show that the earlier children participated in ECE, the greater positive influence ECE had on their development. These findings are consistent with international literature about the positive impacts of ECE on children's early development, and they demonstrate that further work is needed in order for Lao PDR to achieve universal access to quality ECE for all children.

Home Stimulation

Compared to other countries, children in northern Lao PDR are receiving very low levels of stimulation and support for their development in their home environments, and this is having a significant negative impact on their learning and development. Children whose parents engaged in simple yet stimulating activities with them, such as storytelling, drawing, reading, and playing, were developing better than children whose parents had not been interacting with them at home. The great importance of these parent-child interactions is highlighted by the fact that these activities were associated with increases in children's development almost as large as the influence ECE attendance had on development. These findings are consistent with the international evidence regarding the importance of providing a stimulating home environment for the promotion of children's early development. Results also highlight that providing a warm, nurturing environment for children is strongly related to positive development. Despite low levels of parental engagement, caretakers expressed that they believe it is important to provide a stimulating home environment for their children. However, almost half of all households did not have any children's books. It appears parents want to support the learning and development of their children, but that they require guidance around how to do so effectively, as well as assistance with learning materials to further promote activities at home.

Next Steps for the ECE Project

The ECE Project has the potential to support improvements in child health and development in Lao PDR through a number of mechanisms. The project will considerably increase coverage of ECE services through the construction of pre-primary classrooms, as well as through the establishment of Community Child Development Groups that will provide a separate, more informal learning environment for younger children before they begin pre-primary. This will aim to support increased ECE attendance across northern Lao PDR and the positive effect on children's development that is associated with ECE.

Next, the project will deliver a community awareness campaign in order to engage parents in parental education, and to increase the knowledge and understanding of community members about the importance of early child development and the first 1,000 days of a child's life. The campaign will cover appropriate parenting skills and early stimulation required for children's learning and development, good health and nutrition, hygiene, immunization, and childhood disability awareness. This caretaker education component of the project will aim to support children's overall health and development by guiding caretakers through what their child needs to develop well, and how they can meet those needs for their children. Results show that home stimulation is a mechanism through which children's development could be improved significantly. As such, the project will also support the provision of toy libraries in each village, designed to enable parents to stimulate and promote their children's learning and development by providing toys and age appropriate books which families otherwise would not have access to.

Finally, the ECE project will also implement complementary support services such as disability screening and the provision of school meals to children at primary school to encourage the attendance of boys and girls in remote rural communities, and to provide children with nutritious meals in order to facilitate healthy balanced diets and concentration in class.

For these interventions to be successful, it will be extremely important that the education of parents, teachers and community members is implemented effectively, and that the key messages around improving child development are delivered clearly and successfully to families living in the communities of northern Lao PDR.

In 2018/2019, endline data will be collected in order to re-assess how well children in target villages have developed in comparison to children in villages without the ECE project interventions. It is expected that after the project interventions have been implemented for around two years, children will have improved their health and development status, skills and knowledge. The success (or failure) of the different project modalities to improve early childhood developmental outcomes will be evaluated by comparing key outcomes of the children living in target villages, with outcomes of children living in other similar villages where the project has not been implemented. Learnings from the impact evaluation will inform the Government of Lao PDR about what works, and what does not work, to support child health and development. Furthermore, results will help inform future ECE policy and program decisions so that resources are used effectively and have the maximum positive impact on children's outcomes in Lao PDR.

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