# McGovern-Dole Food for Education and Child Nutrition in Kyrgyzstan: Study on Nutritional and Learning Variables, Phase II

***Final Report***

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## Executive summary

In this study, we address three broad research questions on nutrition and education in the context of the McGovern-Dole Food for Education and Child Nutrition Program (FFE) program conducted by Mercy Corps in Kyrgyzstan, thus providing valuable information on the nutritional and educational status of Kyrgyz's students in primary education: 1) How was the status of nutrition in Kyrgyz households with primary grade children and how did it evolve over time? 2) What is the impact of nutritional preferences, knowledge and practices on child health and education among Kyrgyz children? 3) What was the impact of the FFE program on nutrition, health, and education? Given the timing of the study, the report also furnishes crucial insights on how child and household well-being evolved during the COVID-19 pandemic.

The quantitative survey of households and children took place over two phases in which schools and children were selected in a two-stage random sampling process. Overall, the study includes 154 public schools in Kyrgyzstan that are part of the FFE program implemented by Mercy Corps. The phase I survey (baseline) of 3035 students in grades 1 and 2 and their households was conducted between November 2019 and February 2020 in the middle of the 2019/2020 academic year and immediately before the start of the COVID-19 pandemic. The phase II survey (endline) was conducted between June and early September 2021, after the end of the 2020/2021 academic year. This round collected information from 4,523 students (and their households) in grades 1, 2 and 3 in the same schools. About 2,304 students were the same respondents interviewed in phase I of the study. The endline survey also included a school questionnaire to collect more information about school characteristics; the household questionnaire included a module to understand effects of the COVID-19 pandemic.

Our research occurred in the middle of a global health crisis that has heavily affected children's education around the world. We interviewed children and caregivers in Kyrgyzstan before and during the COVID-19 pandemic. The timing of our study places us in a privileged position to study how the current crisis has negatively impacted children's learning and whether the FFE program mitigated the pandemic adverse outcomes.

We use state of the art econometric methods to disentangle the evolution of outcomes over time, and to identify the causal impact of the FFE school feeding program and additional social and behavioral change (SBC) activities on children's nutrition, health, and learning. For identification, we use the panel structure of the data and the variations on program roll-out that resulted in children having different exposures depending on the grade and school they attended. We complement our quantitative findings with qualitative research.

The results indicate that **the FFE program had a positive impact on knowledge, attitudes, and behavior of students and their households**. First, many caregivers have healthy food preferences and prepare diverse meals at home, though some caregivers have limited nutrition knowledge. We observe that diets were better during the Phase 2 survey (which could be related to collecting data in summer time when much cheaper fruits and vegetables are available) and that caregivers increased their nutritional knowledge over time. Both of these outcomes were positively

influenced by the SBC activities. Our analysis suggests that most children possess knowledge on good nutrition and have healthy food preferences, but also tend to eat unhealthy snacks. We observe an increased share of children eating unhealthy snacks in Phase 2 of the study compared to Phase 1, which might be due to the fact the children were on summer holidays during the endline survey time.

Second, many Kyrgyz children display very good "intrapersonal characteristics" that determine learning outcomes, such as good health, low short-term hunger in class, high cognitive function and strong noncognitive skills. At the same time, we find that healthy and diverse nutrition plays a key role and has strong benefits for learning. In the baseline analysis, we show that it is associated with better executive function, literacy and numeracy, especially among grade 2 students. Learning environments at Kyrgyz homes exhibit opportunities for improvement. Many households lack key inputs for children's development such as toys and books, and do not have adequate reading practices. These environments have improved over time thanks to the SBC reading activities.

Third, our impact analysis comparing children in grade two who received school meals since grade one suggests that the program had a positive role fostering learning. Specifically, we document that the learning gap between the two school cohort groups was smaller when both groups received school meals in first grade than when only one group did. Results were robust to different specifications, and similar conclusions appeared when we investigated students exposed to the program during preschool.

Lastly, we collected data before and after two waves of the COVID-19 pandemic, which resulted in school closures and lockdowns. We can thus use the information collected in a questionnaire module on COVID-19 exposure to analyze how the pandemic so far affected children's education and household livelihoods. The first country lockdown resulted in students missing more than two months of in-person instruction during the 2019/2020 academic year that was partly compensated by classes in online mode and through central TV channels. The situation only partially improved in the following academic year. Schools were only fully open for half of a regular academic year, with partial and complete closures affecting schools differently.

Against this background, we document unlearning and learning losses among second and third graders in the program schools during the pandemic, with **adverse learning effects induced by COVID-19 being mitigated by the positive impacts of the FFE program**. Households reported relatively high levels of COVID-19 exposure: one-third of caregivers knew someone who was ill or died from COVID-19 and more than half were very worried about themselves or family getting sick. Accordingly, most respondents were engaging in preventive measures such as wearing masks and avoiding large gatherings. We find that the level of Coronavirus exposure afflicted more households in the 2018 program schools compared to households in the 2019 program schools. We find that when schools were closed, the preparedness of parents for home-schooling was rather low. For example, children received, on average, 2.5 hours of homeschooling per day. Further, a very low percentage of households had access to a computer; instead households had to rely on smartphones to connect to the internet.

Our report identifies the program impact pathways as well as areas for improvement. Potential

continuation of the program should build on these learnings to generate larger impacts. Specifically, we provide the following recommendation for future planning:

- As our study results indicate, the FFE school meal program in Kyrgyzstan has been a success in many respects. This type of intervention is supported by all stakeholders. The broad reach of the program not only to students, but also to households, seem to induce the most striking impacts of the program. While there are funding and implementation difficulties, the funding extensions and institutional and capacity support is likely to result in sustained positive impacts of the school program in Kyrgyzstan.

- The learning environments of a large proportion of households could be improved. Reading at home continues to be a rare practice, and around one in four children in our study do not have any toys. The SBC activities related to promoting reading at home with parents seem to show a lot of promise. Encouraging other family members to engage with children's nutrition and learning - and teaching them the best ways to do it - is crucial for children's development. Overall, delivering information interventions through smartphone apps seem to be a promising area as our study points to growing opportunities to deliver reading interventions through online apps like WhatsApp and Telegram.

- The SBC activities have also positively shaped nutritional and educational behaviors at home. It is important to make sure that such positive impacts reach all members of the community. However, we also found an increase in unhealthy snacking. Strengthening efforts to provide and encourage healthy snacking among children, especially when they are outside school, may be useful.

- Our research confirms significant learning losses due to COVID-19 school closures in Kyrgyzstan. There is a need to identify students where significant losses in learning occurred to target them with remedial education. There seems to be a strong need for additional refreshment classes provided in schools so children in need can catch the learning material they missed due to lack of access to online learning technology or other reasons.

- Students who had attended preschool performed significantly better in grade one and grade two exams than students that did not. Moreover, those who in addition have received the school meal program perform even better. Efforts to expand preschool access should be encouraged as only one half of students attend early childhood education in our sample. Expanding school meals in preschool may be an effective strategy to incentivize attendance and improve learning.

## I. Introduction

School feeding programs are considered a form of in-kind social protection, pronounced in low- and middle income countries. These programs have a robust track record in increasing school participation and addressing short-term hunger. Evidence regarding their impact on learning, on the other hand, is somewhat mixed, seemingly dependent on a country and school contexts, as well as the general degree of food insecurity and malnutrition in a country.

The nation-wide school meal program for primary grade students in Kyrgyzstan has been in place since 2006. This program provided modest rations to children, mainly tea and a bun or a snack. Starting in 2012, the Kyrgyz government expanded its program with the aim to provide hot meals to primary grade students - a program that is planned to be achieved nationwide in 2023. These efforts are supported by international donors, with the key organizations being the UN's World Food Program (WFP) and Mercy Corps.

Mercy Corps has been working in Kyrgyzstan since 1994 on a variety of humanitarian and development interventions. For over fifteen years, Mercy Corps has been providing nutritional and technical support to public and vocational schools, and kindergartens. Since 2012, Mercy Corps has implemented the United States Department of Agriculture (USDA) McGovern-Dole Food for Education and Child Nutrition program (FFE). This program supports the implementation of the National School Feeding Program developed by the Kyrgyz Government. Mercy Corps supported 356 schools in total in Kyrgyzstan during 2012-2021 with FFE funding. A typical package of the program lasts two years for each participating school and includes provision of food (such as fortified flour, vegetable oil, peas, lentils, and rice); grants to repair school kitchens and school infrastructure, including modern kitchen equipment and sanitation facilities; training to school personnel and cooks; and social and behavior change activities in the communities where program schools are located.

In this study, we analyze nutrition in households, child health and child learning in the context of the FFE program in Kyrgyzstan. Specifically, the study asks three broad research questions: 1) What is the status of nutrition in Kyrgyz households with primary grade children? 2) What is the impact of nutrition on child health and education among Kyrgyz children? 3) What is the impact of the FFE program on nutrition as well as on health and education among Kyrgyz children?

The study explores the difference in the exposure to the FFE program of two cohorts of schools that entered the program with one year difference, in 2018 and 2019. The study sample includes 154 schools equally divided into 2018 and 2019 program cohorts. In the Phase I of the study, we conducted a quantitative baseline survey of over 3000 children in grades 1 and 2 and their households which took place at the end of 2019. In the Phase II of the study, we conducted a similar quantitative endline survey in the same schools in summer 2021 for over 4500 students in grades 1, 2, and 3. Most of the children (75%) in grades 2 and 3 interviewed in Phase II (endline) were the same ones we surveyed in Phase I (baseline). The study uses a mixed methods approach, with quantitative and qualitative research applied to gain deeper insights. As our research occurred in the middle of a global health crisis that has heavily affected children's education around the world,

we interviewed children and caregivers in Kyrgyzstan before and during the COVID-19 pandemic to shed more light on effects on learning, coping strategies, and livelihoods.

The remainder of our report is divided into ten sections as follows:

- Section II discusses the research design, the data collection and the specifics of the FFE program,
- Section III provides descriptive statistics of the households and schools in our sample,
- Section IV studies the adverse effects of the COVID-19 pandemic on education access and the resilient strategies of families and schools,
- Section V explores the program participation and expansion between surveys,
- Sections VI, VII, and VIII study the current status, and the evolution over time, of nutrition, learning environments, and learning outcomes, respectively,
- Section IX, the core of the report, presents the estimated causal impacts of the FFE program,
- Section X discusses the results, and
- Section XI concludes.

The Annex provides some additional material.

## II. Research design

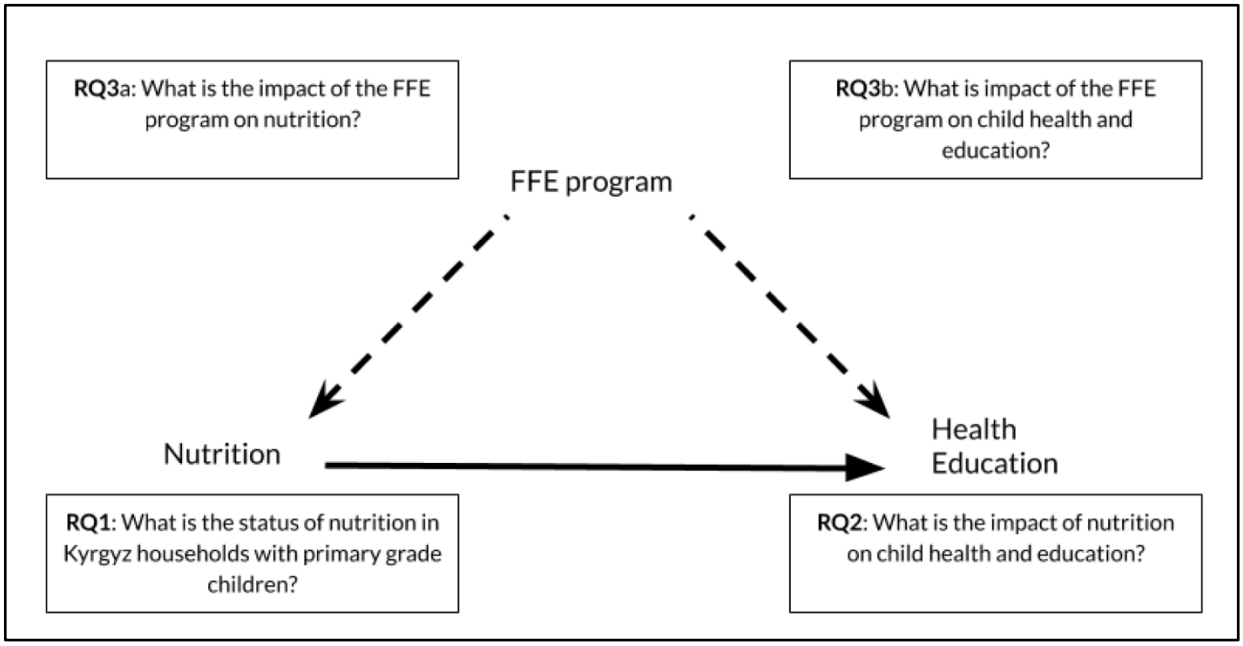
The research design process was guided by the USDA Learning Agenda, Mercy Corps Kyrgyzstan, statistical and practical considerations, and the existing academic literature. Informed by the Terms of Reference (ToR) for this assignment, it was built on extensive consultations with Mercy Corps staff and relevant stakeholders. During the consultations, we placed a strong emphasis on understanding the details and nuances of the school selection process, the intervention packages and implementation practice, and the mechanisms of impact. We prioritized an overview that takes into account past practices and potential future implementations.

### Research questions and framework

We study three broad research questions: 1) What is the status of nutrition in Kyrgyz households with primary grade children? 2) What is the impact of nutrition on child health and education among Kyrgyz children? 3) What is the impact of the FFE program on nutrition as well as on health and education among Kyrgyz children?

In the inception phase, we have established a broad research framework and specific research questions for the project. Figure 1 below illustrates the basic framework adopted for this research.

***Figure 1: Research questions***




## Indicators and measures

Figure 2 provides an overview of the key outcomes we propose to analyze. To investigate nutrition (RQ1), we will study two groups of immediate outcomes: children's nutritional behaviors and nutrition at home.

***Figure 2: Key study indicators.***

| **Research question 1 (RQ1)** |
|---|
| *Immediate outcomes - level 1: children's nutritional behaviors*<br>• Child's nutrition practices<br>• Child's nutrition preferences and knowledge<br>*Immediate outcomes - level 2: nutrition at home*<br>• Dietary diversity at home<br>• Primary caregiver's nutrition access, preferences and knowledge |
| **Research question 2 (RQ2)** |
| *Intermediate outcomes: health and other intrapersonal foundations of learning*<br>• School attendance<br>• Child health<br>• Cognitive skills<br>• Non-cognitive skills<br>*Ultimate outcome: learning*<br>• Literacy measures<br>• Numeracy measures |

| **Research question 3 (RQ3)** |
| --- |
| *FFE program indicators: child level*<br>• School meal provision over the past year (FFE cohort)<br>• School meal provision taken up by child<br>*FFE program indicators: caregiver level*<br>• SBC activities in community offered to primary caregiver<br>• SBC activities in community taken up by primary caregiver<br>• SBC spots seen on TV by primary caregiver<br>*Social behaviors and relations*<br>• Social behaviors and relations at home<br>• Social behaviors and relations outside homes<br>*COVID-19 exposure*<br>• Personal COVID-19-related experiences<br>• External information on the nature and intensity of the disease and countermeasures |

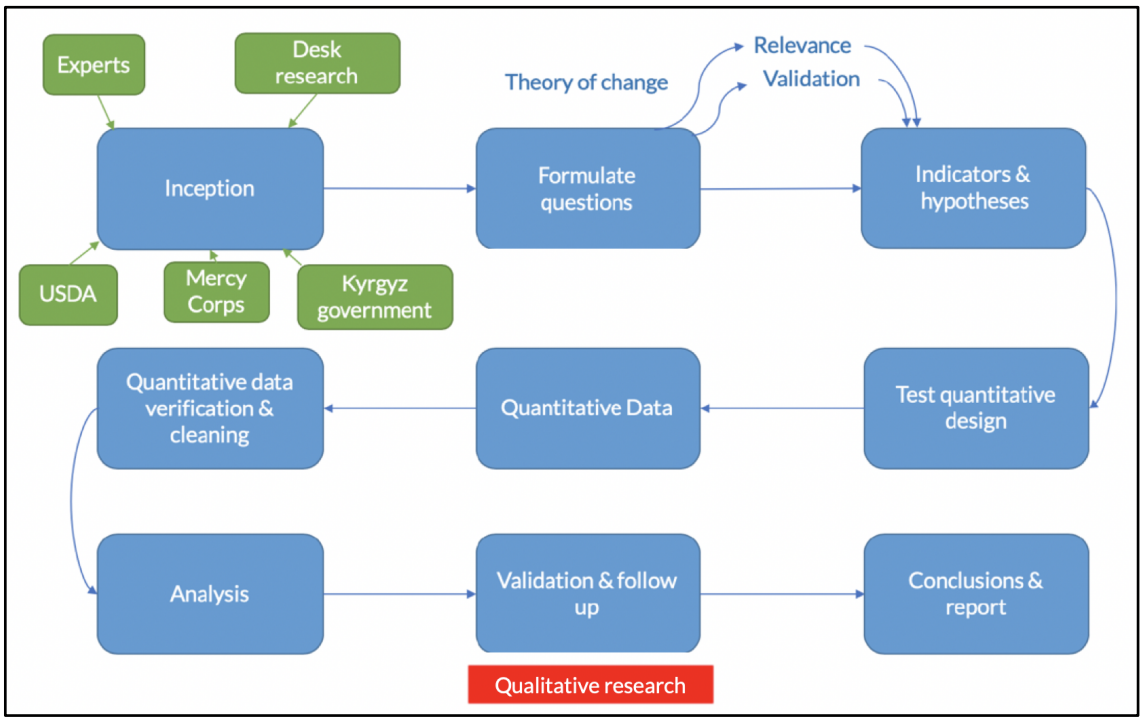
To assess net impacts and impact channels related to RQ2, we study additional groups of intermediate outcomes — related to health and other intrapersonal foundations of learning — and ultimate outcomes — related to learning.

Lastly, we analyze four additional groups of intervention and social indicators to study net impacts and impact channels related to RQ3: FFE program indicators at the child level, FFE program indicators at the caregiver level, social behaviors and relations, as well as measures of COVID-19 exposure.

### Combining qualitative and quantitative research

To maximize learning from the study, we developed an innovative mixed-method approach that combines quasi-experimental quantitative research with in-depth anthropological insights. The qualitative research was conducted in two waves, as illustrated in Figure 3. The first wave of qualitative data was critical at an early stage to refine our specific hypotheses, assess their validity, determine their relevance in the local context, and inform the design of the quantitative survey. A final wave of qualitative research took place after the statistical analysis of the endline survey data was completed. The purpose of this wave was to complement and guide interpretation of the quantitative findings, and specifically to validate causal mechanisms.

*Figure 3: Overview of different stages of the proposed research process.*




## Quantitative sample

Schools and children were selected in a two-stage random sampling process. The sampling design in the baseline and the endline aimed to balance the multiple purposes of the study. Aim 1 was to produce descriptive statistics on children's nutrition and learning outcomes and their relationships, representative of children in 2019 FFE schools. Aim 2 was to build a valid panel data set for an impact evaluation based on the baseline data and endline data collected one year apart. Aim 3 was to produce insights into program impacts from comparisons with 2018 FFE schools based on the baseline data and the variations in outcomes evolution across time using the endline data.

To achieve these goals, we randomly selected 77 schools out of all 2019 FFE schools (138), stratified by oblasts to represent the spread across oblasts in the universe in the sample. Second, we randomly selected 77 schools out of all 2018 schools (218) imposing the same distribution of schools across oblasts. We stratified by SBC implementation status[1] among 2018 FFE schools to the extent possible to facilitate statistically meaningful comparisons by schools with and without SBC components. Then, we randomly selected 20 children for each school (or the maximum number available if less than 20), stratified by grade and gender.

Table 1, shows the summary of the quantitative data collection. Supported by Erfolg Consult, we surveyed 3035 grade 1 and grade 2 students (and their primary caregivers) from 154 FFE program schools in Phase I (baseline). One year and a half later, we interviewed 4523 grade 1, grade 2, and

[1] Not all 2018 schools received SBC activities at the time of the sampling. We selected schools with SBC and without SBC status to be included in the study.

grade 3 students (and their primary caregivers) from the same schools in Phase II (endline). The baseline interviews took place between November 2019 and February 2020, during the middle of the 2019/2020 academic year. The endline survey took place between June and September 2021, after the 2020/2021 academic year[2].

During the two phases of the study, we completed 7,558 interviews with children (and their caretakers) in grades 1, 2, and 3 from 154 FFE program schools. In the endline, we intended to survey all students who participated in our study in Phase I, but we could not track 24% (731) of them. We replaced missing students with randomly selected children from the same schools and grades (More details about survey dropouts in the appendix).

***Table 1: Quantitative survey summary***

| | Survey phase | | |
|---|---|---|---|
| | **Phase 1** | **Phase 2** | **Total** |
| | N | N | N |
| **Grade** | | | |
| Grade 1 | 1509 | 1516 | 3025 |
| Grade 2 | 1526 | 1498 | 3024 |
| Grade 3 | 0 | 1509 | 1509 |
| **Total** | 3035 | 4523 | 7558 |
| **Panel observation** | | | |
| No | 731 | 2204 | 2935 |
| Yes | 2304 | 2319 | 4623 |
| **Total** | 3035 | 4523 | 7558 |

## Qualitative sample

Qualitative fieldwork took place in October 2021. In total, ten schools were visited, five in the Chuy oblast and five in the Osh oblast. Schools were selected based on the preliminary analysis of the endline data. The relevant selection criteria were school participation in nutrition- and reading-related events, literacy and numeracy exam performance, and whether a school belongs to the 2018 or 2019 cohort. This created a balanced sample of schools across regions, student academic performance, and program cohorts.

A total of 50 interviews were conducted using a guideline of questions developed and tested prior to fieldwork. In each school, one interview was conducted with a school representative (Principal or Vice-Principal), one with a primary grade teacher, and three with caregivers. Following their consent, interviews were recorded and later translated from Kyrgyz into English. For analysis, the interview data was coded and analyzed using MAXQDA software.

[2] Our initial plan was to conduct both phases at the same time in the school year, but the endline data collection was delayed due to the COVID-19 pandemic.

## Program background and timeline

Kyrgyzstan had 2296 public schools in 2020 (NSC, 2021). All of them provide primary education (grades 1-4), and the absolute majority provide education up to grade 9 or 11 with only a few exclusively primary grade schools. The nationwide school meal program for primary grade students has been in place since 2006, and provided modest rations to children, mainly tea and a bun/snack. Starting in 2013, the Kyrgyz government expanded its program with the aim to provide hot meals to all primary grade students - a goal that is planned to be achieved in 2023. These efforts are supported by international donors, with the key organizations being the WFP and Mercy Corps.

Mercy Corps has been working in Kyrgyzstan since 1994 on a variety of humanitarian and development interventions. For over fifteen years, Mercy Corps has been providing nutritional and technical support to public and vocational schools and kindergartens. Between 2012 and 2018, Mercy Corps supported 154 public schools and 481 kindergartens across the country by providing over 2,000 metric tons of supplementary commodities (enriched flour, rice, split peas, and vegetable oil). Over 55 million hot meals were prepared for more than 32,000 primary grade students and 50,000 children in kindergartens.

Since 2012, Mercy Corps has implemented the United States Department of Agriculture (USDA) McGovern-Dole Food for Education and Child Nutrition Program. This program supports the National School Feeding Program developed by the Kyrgyz Government. Mercy Corps supported a total of 510 public schools in Kyrgyzstan between 2012 and 2021 with two rounds of McGovern-Dole funding. A typical package of the program includes rehabilitation of physical infrastructure (kitchen equipment, water, and sanitary systems), provision of stable food products (such as vitamin-enriched oil and fortified flour), training to school cooks, management and process capacity building to school administrators, and an array of social and behavior change (SBC) activities, such as training on and dissemination of information on balanced nutrition, good hygiene practices and healthy behavior. Mercy Corps provides support to the schools for two years, after which they are expected to 'graduate' and continue their school feeding program with public and local funding.

Within the two years of engagement, Mercy Corps provides fortified flour, vegetable oil with vitamin A, peas, lentils, and rice to the program schools. Rehabilitation of school kitchens and purchasing new kitchen equipment enables schools to serve full hot meals to primary grade students on a regular basis. Mercy Corps also provides a number of infrastructure grants based on school needs, including construction or repair of sanitation and handwashing facilities, installation of heating systems and window replacement to improve insulation. All infrastructure grants and kitchen rehabilitation are supported by local community contributions (up to 30% of the total project cost on average).

Starting in 2018, Mercy Corps has strengthened the programmatic focus on improving WASH conditions in schools in response to acute needs for reliable access to potable water, functioning handwashing facilities, and improved latrines both inside and outside of school buildings.

Aside from providing commodities and infrastructure support for a successful school feeding program, Mercy Corps also builds and improves capacity of key stakeholders through a series of workshops and training on program management for members of school administrations, local government, and other beneficiaries. Moreover, Mercy Corps works with parents of primary school children to improve nutrition and hygiene behaviors at home through a network of trained community-based Change Agents. Last but not least, all cooks working in the target schools attended professional courses to upgrade their skills with a focus on child nutrition and learn safe food preparation and storage methods.

This study is based on the last two cohorts of schools that received support from Mercy Corps. The first cohort included 154 schools from 2012 through 2017, the second wave started in 2018 and included 138 schools, and the third cohort started in 2019 and included 218 schools. This study exploits the differing exposure of primary grade students to the school meal program in "2018" and "2019" cohort schools to understand the program impacts. We refer to these two groups of schools as the FFE 2018 school cohort and the FFE 2019 school cohort.

***Figure 4: FFE 2018 and 2019 school cohorts program and surveys timeline***

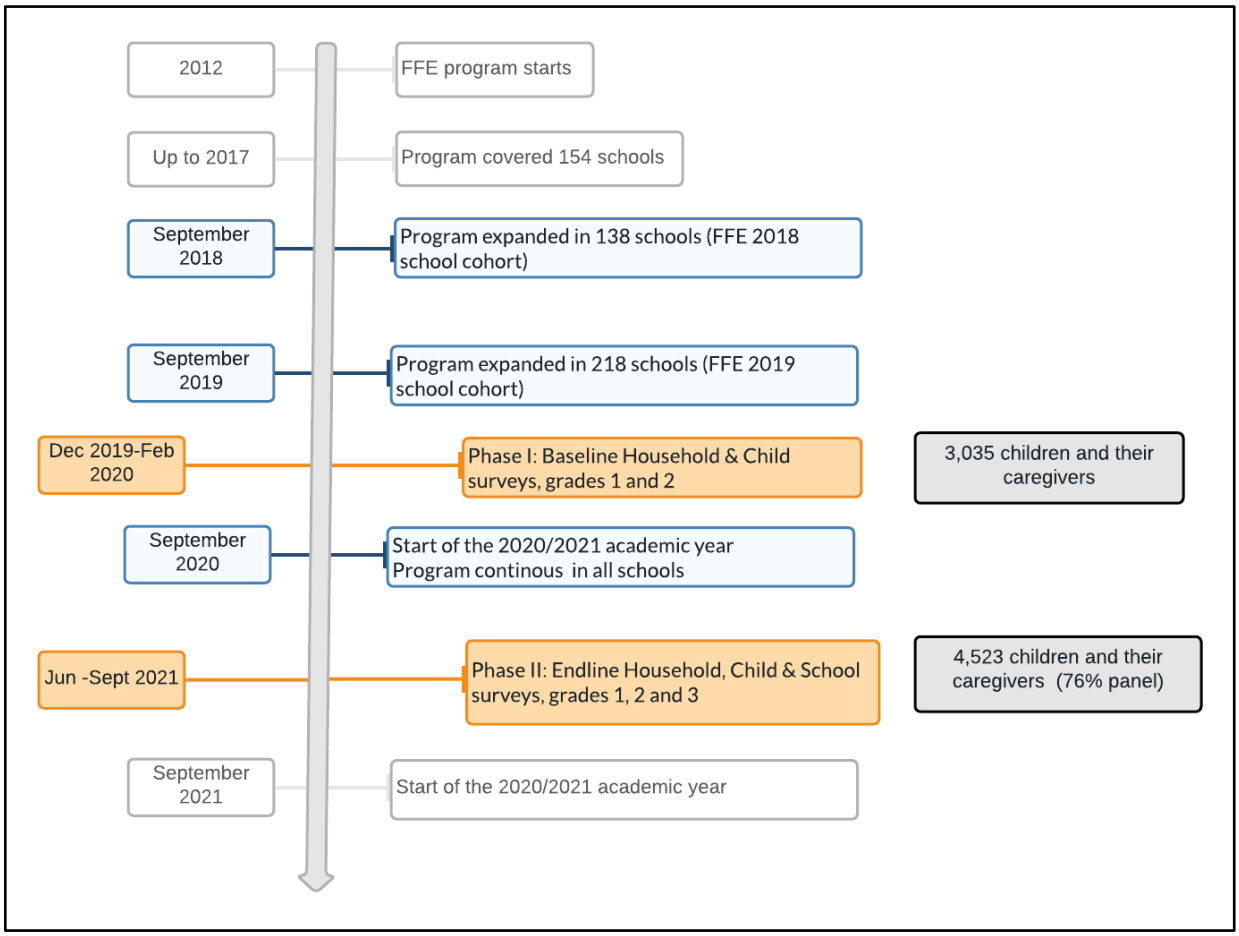
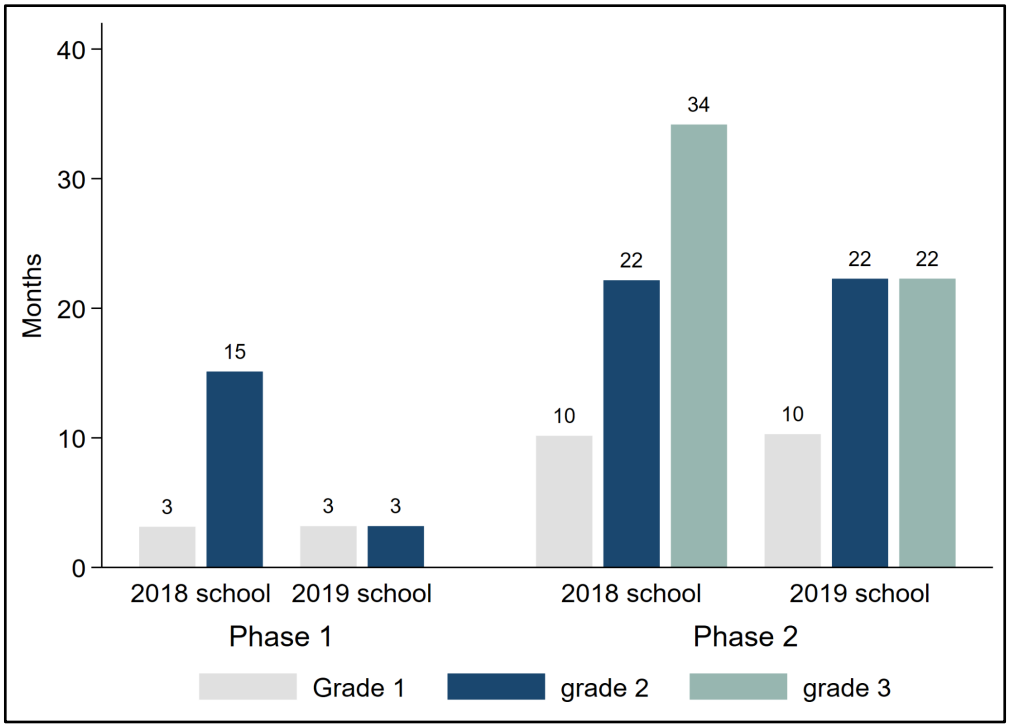



Figure 5 shows the estimated time children were exposed to the FFE program depending on the year it was rolled out in their schools, the survey phase, and the grade they were at data collection. Under the assumption that students started receiving school meals only in first grade, grade 2 students would have been exposed to the program for about 15 months if they were enrolled in

schools where the program started in 2018, but only for 3 months if they were enrolled in schools where the program started in 2019.

***Figure 5: Months exposed to the program by school cohort, grade, and survey phase***

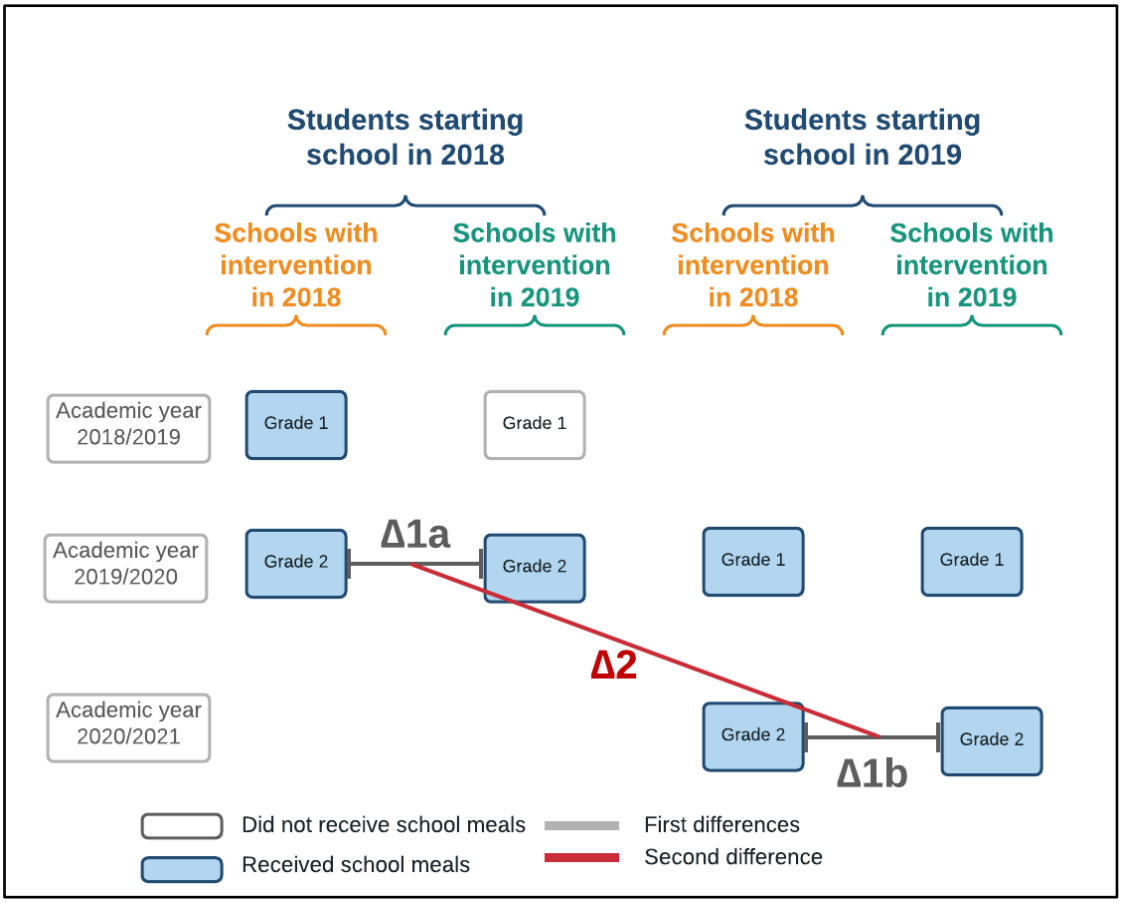



## FFE school meals: Impact evaluation design

The panel structure of the data facilitates impact analyses based on comparisons between the same groups over time. It eliminates issues complicating causal inference relying only on cross-sectional data. As with any impact analysis, our evaluation rests on certain assumptions, but together with the initial insights from this baseline study, the endline impact evaluation will provide a compelling set of evidence of causal impacts of the FFE program. It will thus be a relevant source of novel research and learning.

Figure 6 illustrates the basic idea of the proposed quasi-experimental quantitative design to study the impacts of the FFE program. Initially, second graders in the baseline who were in the 2019 FFE group were not exposed to the FFE program in first grade, while those in the 2018 FFE group were. Subsequently, all second graders in the endline were exposed to the FFE program during first grade. Since both groups are from the same schools and communities, we can compare the evolution of learning outcomes in second grade by FFE group between the two survey phases. Our primary assumption is that second graders' learning outcomes in both groups would have evolved similarly if all students had received the program in first grade. Under that assumption, we can conclude that the variation in program status during first grade was the cause of any change in outcome trajectories.

*Figure 6: Quasi-experimental quantitative design.*




During the first phase of the study (baseline), we conducted $\Delta 1a$ . We collected and analyzed data from grade 2 students in both 2019 program schools and 2018 program schools. The comparison exploits the fact that students in 2018 schools had received the program in the school year before the survey, while those in 2019 schools had just started receiving the program. The critical issue here is: were the group of grade 2 students from each school cohort comparable, or were there systematic differences unrelated to the program between them? (Our analysis in the appendix shows that there are systematic differences in household characteristics of students who attend each FFE school group).

$$\Delta 2 = \Delta 1b \ - \Delta 1a \ (1)$$

Therefore, our study collects endline data that facilitate impact analyses based on $\Delta 2$ comparisons (Equation 1). For these comparisons, we draw on outcomes among students in 2019 schools, where the program only started at the time of the baseline. Specifically, we compare outcomes from children who had just started grade 2 at baseline with those from children who just finished grade 2 now, at endline (Phase II). The latter group received the program in the last school year and are the grade 1 students we surveyed in the baseline sample. Such a longitudinal design that

collects data from the same individuals at different points in time makes the analysis even more powerful.

The critical issue here is: are children of the same grades in the same schools comparable over time, or are there systematic "time-based differences"? In this regard, we face one particular challenge. The COVID-19 pandemic has differently disrupted every aspect of children's lives, including schooling and interactions with parents. From an evaluation perspective, our multiple grade and school cohort sub-samples have several benefits that will help us account for this and other issues. First, it helps to test and account for school-/community- and time-based differences that are crucial for establishing valid causal effects ($\Delta 1a$ and $\Delta 1b$). Second, as we now track the full baseline sample of students, the resulting larger panel dataset strengthens both the database and the power of the analytical methods to estimate program impacts. Because we also survey grade 2 students from 2018 schools at the endline, we can use a full panel-based combination of $\Delta 1$ and $\Delta 2$-type comparisons to convincingly estimate the causal effect of the FFE program. Moreover, thanks to the timing of the study, we can estimate the effects of the COVID-19 disruption on children's education.

## III. FFE schools and households sociodemographic characteristics

In this section we present the sociodemographic characteristics of schools, households and children in our sample. The school questionnaire was collected only in Phase II as we wanted to obtain more information about school characteristics, but also to collect information on school-level exposure to COVID. In Phase I we used information about school size and location from the program data.

### Schools characteristics

Table 2, column 3, shows the main characteristics of schools in our study. The average school in our sample started offering two years of preschool education around five years ago; it offers up to 11 grades, has on average about 500 students, is gender-balanced and has low levels of primary dropouts. In respect to quality indicators, it has on average 13 students per teacher, most of its teachers hold at least a diploma degree (84%), and its student-classroom ratio is about 28 in grades 1 to 3 which seems to be on a higher end if to compare to average teacher-students ratio nationally which is around 25 (in 2018)[3]. For comparison, the average teacher-student ratio in primary grades in the OECD countries is about 15[4]. The national exam scores obtained by the program schools were around 103 points which is lower than the national average of 120-123 points in the period 2019-2021[5]. Even the scores of the top performing students from the program schools who

[3] Source: World Bank (2021), https://data.worldbank.org/indicator/SE.PRM.ENRL.TC.ZS?locations=KG. Retrieved December 14, 2021.
[4] Source: OECD, (2020): Education at a Glance 2019; www.oecd-ilibrary.org/sites/a1ef3bfe-en/index.html?itemId=/content/component/a1ef3bfe-en.
[5] Source: Center for Educational Assessment and Teaching Methods (2021): Republican testing results in 2021; http://testing.kg/media/uploads/files/ORT_Report2021_russ.pdf.

obtained 146 points on average look quite modest compared to the max points of 232 obtained in 2021. However, these top performers scored similar to those test takers who were accepted to study at universities without tuition fees (so called government "budget seats").

***Table 2. Schools characteristics***

| Variable | (1) 2018 school Mean/SD | (2) 2019 school Mean/SD | (3) Total Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|---|
| Years of preschool offered | 1.91 (1.50) | 1.92 (1.53) | 1.92 (1.51) | 0.01 |
| No. of years since preschool is offered | 5.21 (1.71) | 5.30 (1.45) | 5.26 (1.58) | 0.09 |
| School offers up to 11 grade | 0.92 (0.27) | 0.86 (0.35) | 0.89 (0.31) | -0.06 |
| Morning shift | 0.32 (0.47) | 0.30 (0.46) | 0.31 (0.46) | -0.03 |
| Afternoon shift | 0.08 (0.27) | 0.18 (0.39) | 0.13 (0.34) | 0.10* |
| Both shifts | 0.60 (0.49) | 0.52 (0.50) | 0.56 (0.50) | -0.08 |
| Total students 20/21 | 572.70 (385.07) | 425.47 (389.33) | 499.08 (392.94) | -147.23** |
| Share female students 20/21 | 0.49 (0.04) | 0.48 (0.06) | 0.48 (0.05) | -0.01 |
| Grade 2 (20/21)-Grade 1 (19/20) ratio | 1.00 (0.10) | 1.01 (0.12) | 1.00 (0.11) | 0.01 |
| Grade 5 (20/21)-Grade 1 (19/20) ratio | 0.91 (0.30) | 0.92 (0.41) | 0.92 (0.36) | 0.01 |
| Students-teacher ratio | 14.41 (5.28) | 13.09 (4.51) | 13.75 (4.94) | -1.32* |
| Teachers with a diploma (%) | 0.86 (0.18) | 0.83 (0.16) | 0.84 (0.17) | -0.02 |
| Avg. student-classroom ratio grade 1-3 | 29.48 (12.00) | 26.81 (13.27) | 28.15 (12.68) | -2.67 |
| Top score national exam | 146.95 (52.32) | 144.14 (55.36) | 145.55 (53.70) | -2.80 |
| Average score national exam | 104.14 (37.06) | 102.76 (38.78) | 103.45 (37.81) | -1.38 |
| Estimated university admition rate | 0.49 (0.24) | 0.48 (0.26) | 0.48 (0.25) | -0.01 |
| N | 6 77 | 77 | 154 | |

### Sociodemographic status and evolution over time

Table 3 provides sociodemographic background information on our study panel sample by survey phase. In Phases I and II, children were mostly 7-9 years old, 50% were girls, and 50% attended FFE 2018 program schools (and the other 50% FFE 2019 schools). The average child lived with about five more people and had around two siblings; their mother and father were about 35 and 39 years old, respectively.

Half of the children in our sample attended pre-school education. Around 40% of the mothers and 30% of the fathers had post-secondary education. Household expenditures in education were about 5% of their income in Phase I and 4% in Phase II.

Table 3 shows that the average nominal monthly income per capita reported increased between surveys. It also evidences an increased number of assets at home (tables in the annex show which assets). Now almost all households own a smartphone, but a very low proportion has a computer.

***Table 3: Household Socio-demographics by survey phase***

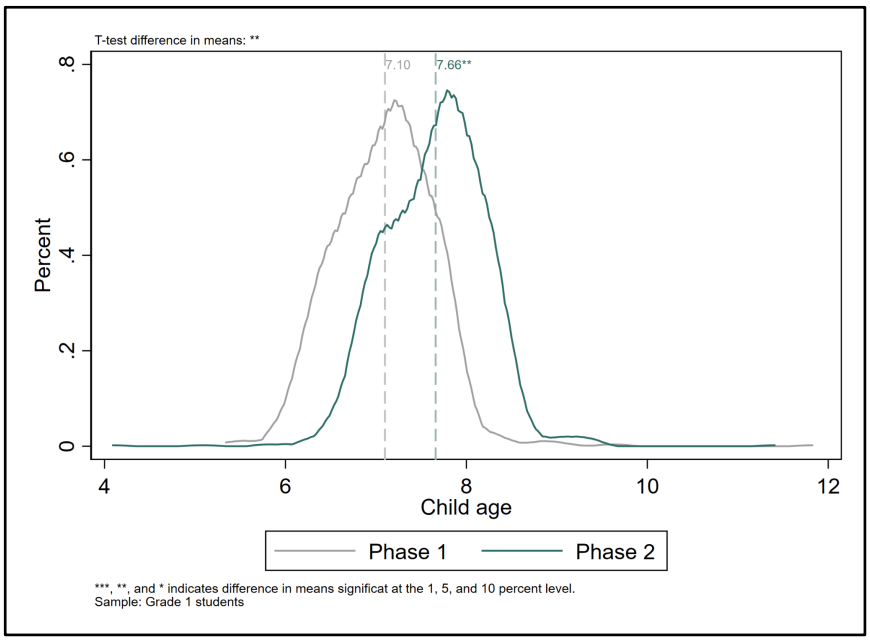
| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Child age | 7.11 (0.76) | 8.70 (0.82) | 1.58*** |
| Child is a girl | 0.49 (0.50) | 0.50 (0.50) | 0.00 |
| Child attended preschool | 0.48 (0.50) | 0.49 (0.50) | 0.01 |
| Asset index | 7.22 (2.00) | 7.66 (1.90) | 0.43*** |
| Main language at home is Kyrgyz | 0.83 (0.38) | 0.82 (0.38) | -0.00 |
| Main language at home is Russian | 0.08 (0.27) | 0.08 (0.27) | 0.00 |
| Household size | 5.98 (1.71) | 6.05 (1.79) | 0.07 |
| No. of parents | 1.69 (0.66) | 1.72 (0.62) | 0.04* |
| No. of siblings | 2.29 (1.29) | 2.27 (1.44) | -0.02 |
| Mother's age | 34.42 (5.70) | 35.99 (5.74) | 1.57*** |
| Father's age | 38.51 (6.00) | 40.49 (19.66) | 1.98*** |
| Mother has tertiary education | 0.41 (0.49) | 0.37 (0.48) | -0.03** |
| Father has tertiary education | 0.32 (0.47) | 0.27 (0.45) | -0.04*** |
| Avg. nominal monthly income per capita (SOM) | 3113.63 (2683.56) | 5632.20 (11873.83) | 2518.57*** |
| Share expenditures in child education | 0.05 (0.05) | 0.04 (0.06) | -0.00* |
| N | 2304 | 2319 | |

*Notes*: Panel sample The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

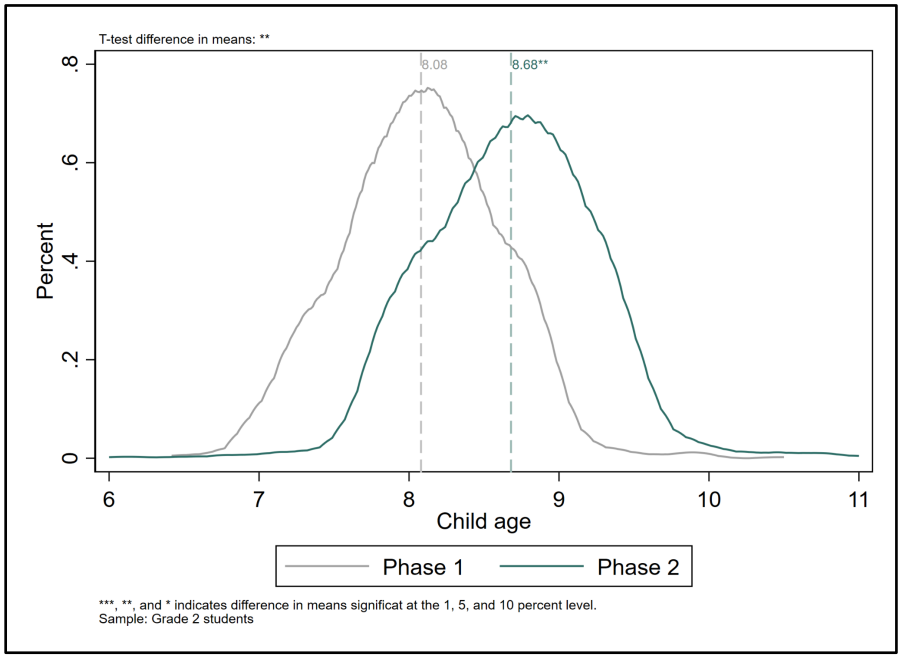
Figure 7 visualizes the distribution of child age by grade and survey in our sample. Since surveys occurred at different times of the academic year, second (first) graders in the endline were, on average, 0.5 years older than second (first) graders in the baseline.

***Figure 7: Age distribution of students in first and second grade by survey phases***

***A. Grade one***




***B. Grade two***



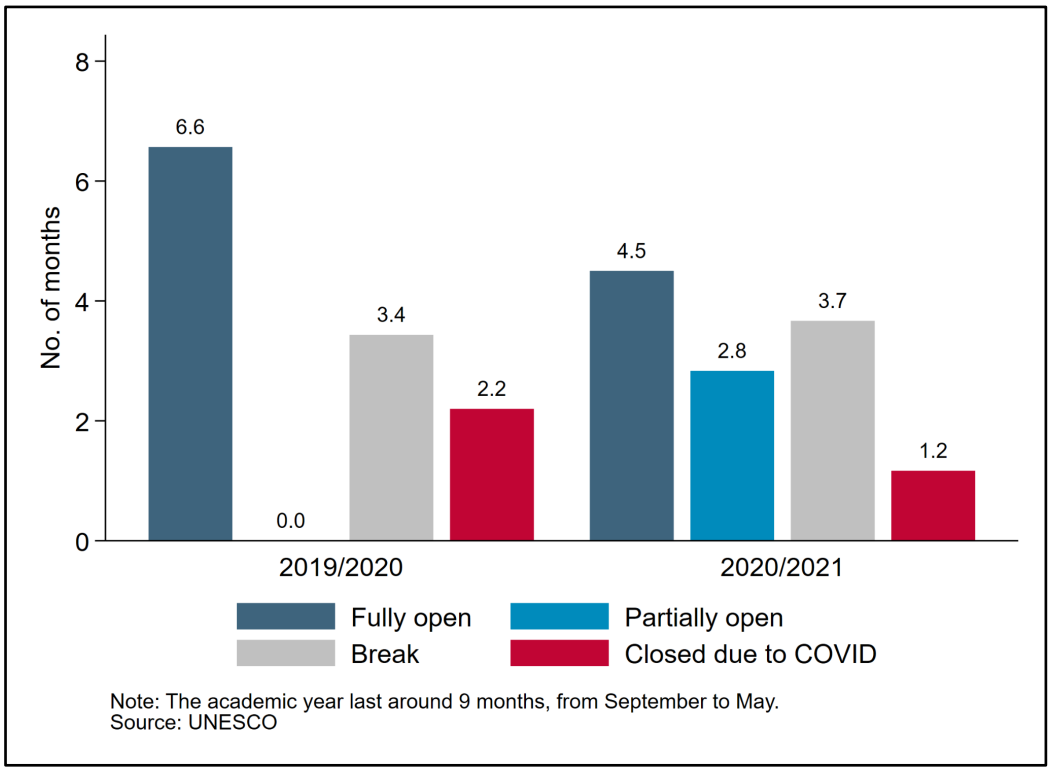
## IV. The COVID-19 disruption

Like in many other nations globally, the Kyrgyzstan Government implemented strict measures to mitigate the spread of the Coronavirus. Lockdowns, curfews, and school closures, among others, were executed across the country starting from March 2020.

Kyrgyz students' education has suffered substantially from the corona counter-measures. The first country lockdown resulted in students missing more than two months of in-person instruction during the 2019/2020 academic year. Since the Government closed all schools in mid-March 2020 till May, the classes continued in online mode and through the central TV channels. The situation only partially improved in the following academic year. In September 2020 the Government eased some restrictions, though allowing only the first-grade students to study in offline mode. From November 2020, the schools were given the decision power to open in-person classes to all students based on the number of infections in their communities. From end-January 2021 the restrictions were lifted and all schools reopened.

The pandemic undermined children's learning and led to the interruption of the school meals program. Data from UNESCO estimates that schools were fully open only for half of a regular academic year (Figure 8). Moreover, our data in the next subsection reveal that partial and complete school closures affected schools differently, depending on the virus incidence levels in each community.

***Figure 8: Schools status in Kyrgyzstan during the 2019/2020 and 2020/2021 academic years***



## School status in Kyrgyzstan during the pandemic

The second phase of the household and school surveys included a module on COVID exposure and homeschooling. Our aim was to understand how families and schools experienced and coped with the pandemic; and how the school closures affected children's education. This section describes school closures in Kyrgyzstan, principals' perceptions of the effects of the pandemic in learning, and households' corona exposure and homeschooling experiences. We pay particular emphasis on the different experiences between 2018 FFE and 2019 FFE school groups.

## FFE schools resilience during closures

Principals from all schools in our sample (77 in total) answered our school-level endline quantitative survey. This section analyzes how schools responded to the pandemic shock, we base our conclusions on the results shown in Table 4.

The majority of school closures happened in the first semester of the 2020/2021 academic year. Our data reveal that between September 2020 and May 2021, the average school was closed or partially closed for 11 weeks - around 30% of a regular academic year. However, not all schools experienced the closures similarly. While some of our sampled schools were never closed during this period, others were fully or partially closed for up to 30 weeks.

Principals graded their school educators' capacity to provide effective online teaching as medium: 6.7, on average, on a scale from 1 (low) to 10 (high). Moreover, principals perceived that the learning of first-graders was more affected by the pandemic compared to second and third graders (something our findings in the next section dispute). Around one-fourth of the principals reported that first graders covered less educational material in the 2020/2021 academic year compared to the previous academic year. The same share was higher for second and third graders (31% and 29%, respectively). During the 2020/2021 academic year, principals reported an average increase of 5 percentage points in the student population - even higher than the year before - suggesting little or no pandemic effects in dropouts for this group of schools.

***Table 4: Schools during the COVID-19 pandemic***

| Variable | (1) 2018 school Mean/SD | (2) 2019 school Mean/SD | (3) Total Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|---|
| Change in student population (20/21)-(19/20) | 0.05 (0.08) | 0.05 (0.08) | 0.05 (0.08) | 0.00 |
| Change in student population (19/20)-(18/19) | 0.03 (0.07) | 0.03 (0.07) | 0.03 (0.07) | -0.01 |
| No. of weeks closed due to COVID | 10.70 (6.48) | 12.16 (6.20) | 11.43 (6.36) | 1.45 |
| Preparness online teaching primary (subjective) | 0.69 (0.19) | 0.65 (0.19) | 0.67 (0.20) | -0.04 |
| Preparness online teaching secondary (subjective) | 0.70 (0.20) | 0.62 (0.23) | 0.66 (0.22) | -0.08** |
| Less material covered last year grade 1 | 0.18 (0.39) | 0.30 (0.46) | 0.24 (0.43) | 0.12* |
| Less material covered last year grade 2 | 0.30 (0.46) | 0.32 (0.47) | 0.31 (0.46) | 0.03 |
| Less material covered last year grade 3 | 0.30 (0.46) | 0.29 (0.45) | 0.29 (0.46) | -0.01 |
| Less learning last year grade 1 | 0.23 (0.43) | 0.38 (0.49) | 0.31 (0.46) | 0.14* |
| Less learning last year grade 2 | 0.35 (0.48) | 0.36 (0.48) | 0.36 (0.48) | 0.01 |
| Less learning last year grade 3 | 0.31 (0.47) | 0.39 (0.49) | 0.35 (0.48) | 0.08 |
| N | 77 | 77 | 154 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

In the qualitative survey, most caregivers mentioned that during lockdowns schools organized online events in which they and their children could participate together. These events were generally depicted as enjoyable and furthering the interaction between caregivers and their children during pandemic times.

*'During the pandemic, we organized some events online. They had to do videos in family theaters. It was very interesting. In videos, they showed how they are studying with their children. They acted like characters in the stories (Vice-Principal, Osh oblast).*

### Households Corona exposure

Regarding the COVID exposure, Table 5 shows that caregivers were mostly confident they haven't had the coronavirus (57% are certain they haven't had it). However, our analysis suggests that one-third of the caregivers knew someone who was ill or died because of it.

From the respondents, more than half were very worried about themselves (51%) or their family (59%) getting sick. As preventive behavior, a big majority of households were regularly wearing a

mask (85%) and avoiding large gatherings (73%). Nevertheless, the average respondent met 11 friends during the two weeks previous to the survey.

In terms of economic shocks, 48% of the households reported suffering an income shock since the start of the pandemic, and one-third reported receiving financial help, mostly from the Government.

***Table 5: Households' corona exposure and homeschooling***

| Variable | (1) 2018 school Mean/SD | (2) 2019 school Mean/SD | (3) Total Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|---|
| Know someone who was ill or died from COVID | 0.39 | 0.32 | 0.35 | -0.07*** |
| | (0.49) | (0.47) | (0.48) | |
| Certain that didn't have COVID | 0.56 | 0.57 | 0.57 | 0.01 |
| | (0.50) | (0.49) | (0.50) | |
| Very worried of getting sick with COVID | 0.50 | 0.52 | 0.51 | 0.02 |
| | (0.50) | (0.50) | (0.50) | |
| Very worried of family getting sick with COVID | 0.57 | 0.61 | 0.59 | 0.03** |
| | (0.49) | (0.49) | (0.49) | |
| Has weared mask in last two weeks | 0.85 | 0.87 | 0.86 | 0.01 |
| | (0.36) | (0.34) | (0.35) | |
| Has avoided large gatherings | 0.73 | 0.72 | 0.73 | -0.01 |
| | (0.44) | (0.45) | (0.45) | |
| Friends met last week | 11.89 | 11.55 | 11.72 | -0.34 |
| | (44.02) | (37.22) | (40.76) | |
| Income decreased since the start of the pandemic | 0.51 | 0.46 | 0.48 | -0.04*** |
| | (0.50) | (0.50) | (0.50) | |
| Received financial help since start of the pandemic | 0.35 | 0.28 | 0.32 | -0.07*** |
| | (0.48) | (0.45) | (0.46) | |
| Tension in the house (%) | 0.35 | 0.33 | 0.34 | -0.02*** |
| | (0.28) | (0.27) | (0.27) | |
| Received home schooling when schools closed | 0.93 | 0.95 | 0.94 | 0.03*** |
| | (0.26) | (0.21) | (0.24) | |
| Hours homeschooling per day | 2.51 | 2.53 | 2.52 | 0.02 |
| | (1.33) | (1.31) | (1.32) | |
| Household level of preparness for home schooling (%) | 0.60 | 0.59 | 0.59 | -0.01 |
| | (0.31) | (0.32) | (0.32) | |
| Used books for homeschooling | 0.84 | 0.90 | 0.87 | 0.06*** |
| | (0.36) | (0.30) | (0.33) | |
| Used internet for home schooling | 0.72 | 0.74 | 0.73 | 0.02* |
| | (0.45) | (0.44) | (0.45) | |
| Used computer (offline) for home schooling | 0.05 | 0.04 | 0.04 | -0.01* |
| | (0.21) | (0.19) | (0.20) | |
| Used mobile device for home schooling | 0.77 | 0.79 | 0.78 | 0.03** |
| | (0.42) | (0.41) | (0.41) | |
| Seen TV show TeleKlinika during the pandemic | 0.51 | 0.44 | 0.47 | -0.07*** |
| | (0.50) | (0.50) | (0.50) | |
| Sent child back to school when schools reopened | 0.80 | 0.87 | 0.83 | 0.07*** |
| | (0.40) | (0.34) | (0.37) | |
| N | 2264 | 2259 | 4523 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Our qualitative research confirmed the pandemic negative shocks on households' wellbeing. In regards to the household budgets during pandemic times, it was noticeable that only few respondents expressed to be very negatively affected (which contradicts other such data on Kyrgyzstan). The following quote thus represents an exceptional case:

*'We were not able to cook bread or manty. Because we didn't have enough money. We cut off the meat from the budget. If we had savings, then we spent it all.' (Caregiver, Chuy oblast)*

*'Yes, the pandemic affected us [financially]. At that time we were not working but sitting at home. It was a difficult time.' (Caregiver, Osh oblast)*

In regards to their diets during pandemic times, households expressed to have encountered increased food expenses. This was related to more family members being at home during lockdowns and to generally rising food prices. But many respondents also noted that they tried to provide 'strong food', which usually referred to adding vitamin, meat or soups to the dietary schedule.

*'We focused on vitamins and vegetables. We also tried to eat more meat and soup.' (Caregiver, Chuy oblast)*

*'Parents knew that they should provide [their children] with vitamins. They knew that [during the pandemic] health must be number one priority. They were buying fruits and vegetables rather than "kooksi" (instant noodles).' (Teacher, Osh oblast)*

### *Homeschooling during school closures*

Our quantitative survey shows that when schools were closed, children received, on average, 2.5 hours of homeschooling per day. Most respondents reported using books (87%), and a very low percentage of households used a computer (4%). Instead, they relied on mobile devices (78%).

During qualitative research, respondents very widely agreed that school closures and online teaching were detrimental to their children's educational progress.

*'She missed school a lot. She was crying even. At home children cannot get any good education.' (Caregiver, Chuy oblast)*

*'Of course, studying at home differs from studying at school. We parents cannot teach like their teachers do. (Caregiver, Osh oblast)*

Some caregivers also recalled their children's highly emotional articulations of 'missing school'.

*'Parents cannot teach like teachers. She was missing her classmates. She missed classes. One time she wore her school dress and she just wanted to wear it and go out to the street. I cried when I saw her. I took a video and sent it to her teacher.' (Caregiver, Chuy oblast)*

In regards to reading during lockdowns, responses were divided between caregivers who used their time at home to increase their reading effort with children, while others expressed not having engaged in reading.

*'Yes, they [caregivers] started reading books. because everyone was at home. They had more time for their children to read.' (Vice-Principal, Osh oblast)*

*'I think it [reading] decreased. Because we couldn't go anywhere. We couldn't go to the library. We were in lockdown. We were reading the same books over and over. We have our own books at home, so we were limited to them.' (Caregiver, Chuy oblast)*

## COVID-19 disruptions by school cohorts

### *Schools*

For the evaluation of the school feeding program, the panel structure can solve the time-invariant structural differences between the school groups. However, any shocks related to the outcomes affecting the groups differently over time are a bias of concern. For that reason, it is useful to investigate whether the pandemic affected the study groups differently.

Table 4 shows that principals think that the losses in learning were significantly higher for grade 1 students in 2019 FFE schools: 38% of principals in 2019 FFE schools think that first graders learned less compared to 23% of the principals in 2018 FFE schools. Apart from that, the results suggest there were no other significant differences in the average way school groups experienced the pandemic.

### *Households*

Our survey results in Table 5 show that households with children enrolled in 2018 schools were more likely to know someone who died or was ill from the coronavirus than households with children enrolled in 2019 FFE schools. Moreover, the data shows that households in the 2018 FFE schools group were significantly more prone to suffering a negative income shock. Perhaps for that same reason, we observe that they were more likely to receive financial help from the Government or their private networks.

Groups were not significantly different in their reported level of preparedness, nor in the hours dedicated to homeschooling per day. However, households in the 2018 FFE schools group were significantly less likely to use books and the internet for homeschooling.

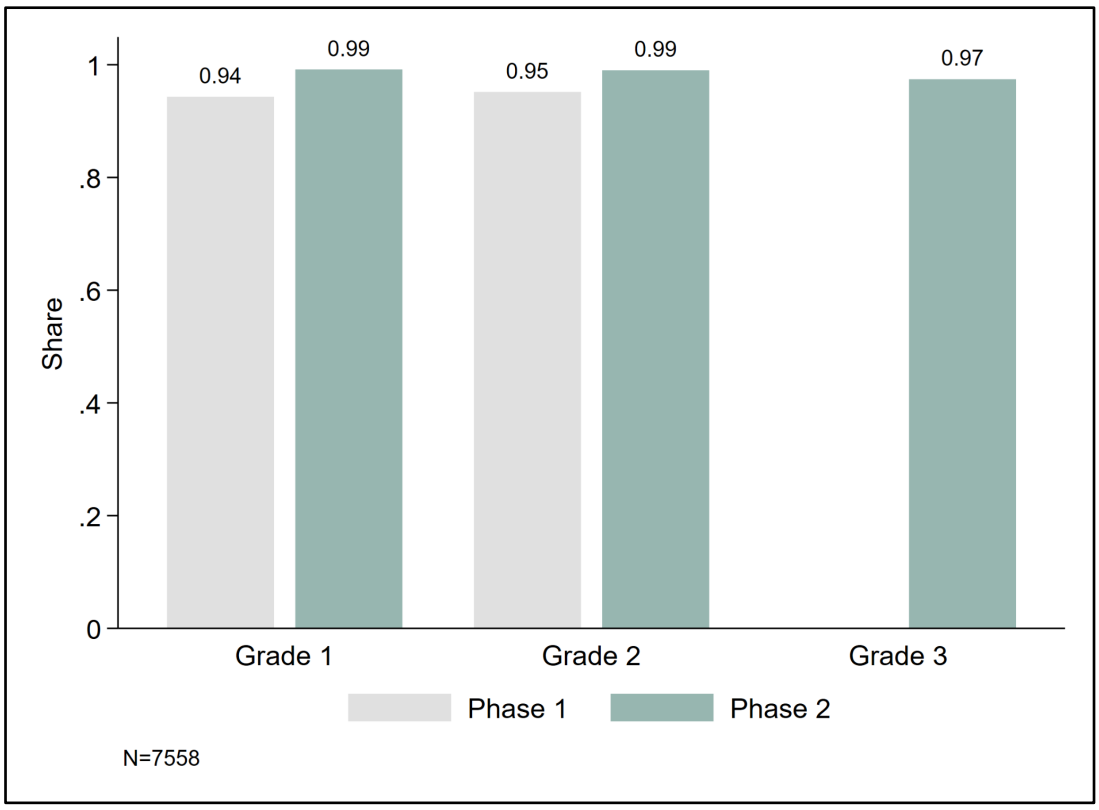
The comparison suggests that the negative health, economic, and education-related shocks of the pandemic afflicted more households in the 2018 FFE school group compared to households in the 2019 FFE schools group.

## V. Program participation

### School feeding status

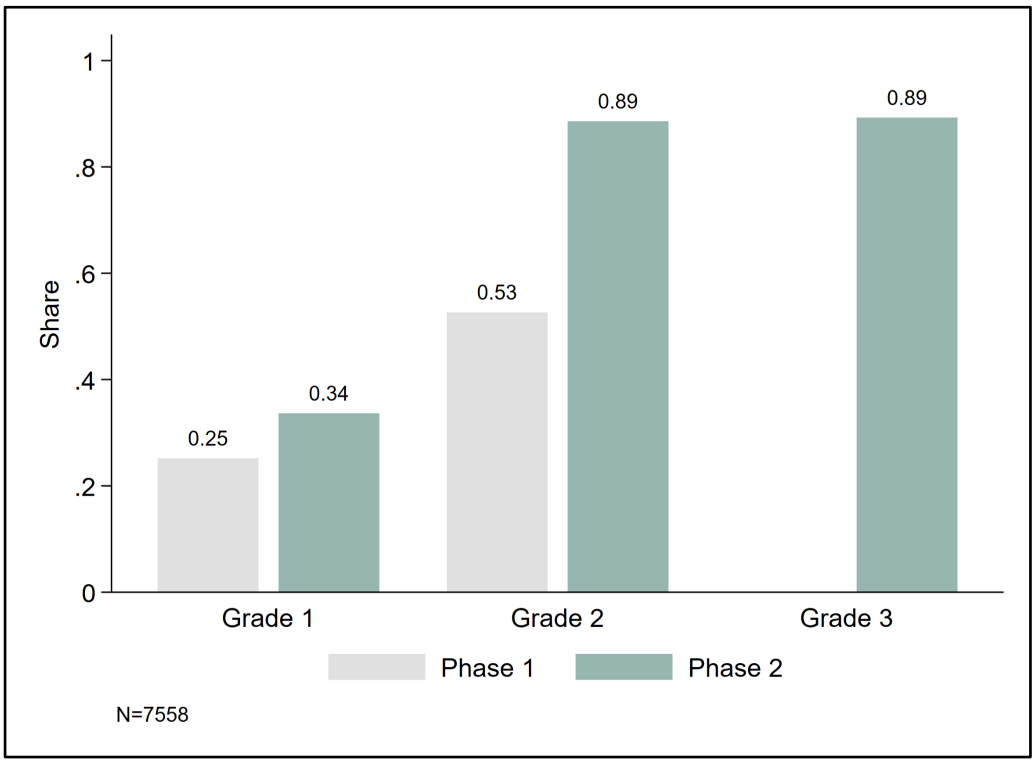
Our data reveals that virtually all children in our sample were receiving school meals during the academic year they were interviewed (Figure 9). At baseline, 95% of the children were receiving a hot meal in school, and in the endline, the same share increased by four percentage points, reaching full coverage.

***Figure 9: Share of students receiving hot meals during the survey's academic year***




However, the probabilities of receiving the hot meals the academic year before each survey varied by grade (Figure 10). 25% of first-graders in the baseline and 34% in the endline received school meals during the academic year previous to the interviews (i.e. pre-school). Moreover, 53% of second graders in the baseline and 89% in the endline said they received hot meals during the academic year before the interviews (i.e. in grade 1).

*Figure 10: Share of students receiving hot meals during the academic year previous to the survey.*




## Household and community engagement with the school feeding program

Caregivers' engagement with the school feeding program also increased over time. In the baseline, about 30% tried a meal served at school, whereas in the endline, the same share rose to 40%. Moreover, the percentage of people reporting monetary contributions to the school feeding program grew by ten percentage points (Table 6).

*Table 6: Children and caregivers' engagement with the school meals program by survey phase*

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Child usually finishes hot meal at school | 0.85 (0.36) | 0.83 (0.38) | -0.02* |
| Caregiver ever tried a hot meal at school | 0.28 (0.45) | 0.40 (0.49) | 0.12*** |
| Caregiver contributes money to hot meal program | 0.51 (0.50) | 0.62 (0.49) | 0.11*** |
| Average hot meal financial contribution (SOM) | 51.47 (59.95) | 65.20 (70.26) | 13.73*** |
| N | 2304 | 2319 | |

*Notes*: Panel sample The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

The FFE program expanded along with the support and engagement of the caregivers and the community. Indeed, from the qualitative research, we learned that school meals are perceived as an established and appreciated institution in all schools visited. No respondent challenged the relevance of school meals for children and there was no single voice that did not express support for the school feeding program to be continued or expanded (e.g. beyond 4th grade).

Moreover, all respondents articulated that the monetary contribution would be fair and feasible for local households to raise. We recorded no instances in which caregivers needed to be generally convinced that the school meal program would benefit their child and family. Some communities, however, opt for a cheaper, non-meat diet at school.

*'When my older grandchild was in 4th grade, I really liked how they started with school meals…How they baked bread - it was good. My grandchildren really liked it. We pay 200 Som, and it is nothing.'*
*(Caregiver, Chuy oblast)*

*No, the money [contribution] is no challenge at all. 100 Som is nothing.'*
*(Caregiver, Osh oblast)*

### Social Behavior Change activities take-up

Mercy Corps started the implementation of the Social Behavior Change activities in the academic year 2018/2019. The activities targeted caregivers as change agents at the community level, and imparted knowledge about nutrition, hygiene, and good reading practices.

Table 7 shows that in the baseline survey (Phase I), 26% of caregivers participated in an SBC activity on nutrition, 23% on hygiene and sanitation, and 24% on reading. By the endline (Phase II), the same shares grew by 4, 13, and 3 percentage points, respectively, confirming the expansion of the SBC program coverage.

In addition to the activities, the SBC program promoted good practices through messages on TV and virtual groups. We observe a decrease in the proportion of caregivers that saw such information (from 68% to 53%). In contrast, we notice an increase in the level of caregivers' engagement with the virtual world. Certainly, during the pandemic, people got more engaged with virtual ways to communicate with their communities and we can observe that in our data. Belonging to a virtual group like WhatsApp or Telegram grew by six percentage points; now, 76% of households make part of such groups. Moreover, the share of caregivers on a topical virtual group, where they discussed health, nutrition, food safety, hygiene, or sanitation, grew by 14 percentage points, from 17% to 30%.

Fewer people engage with TV, but we provide evidence of growing opportunities to reach them through virtual channels.

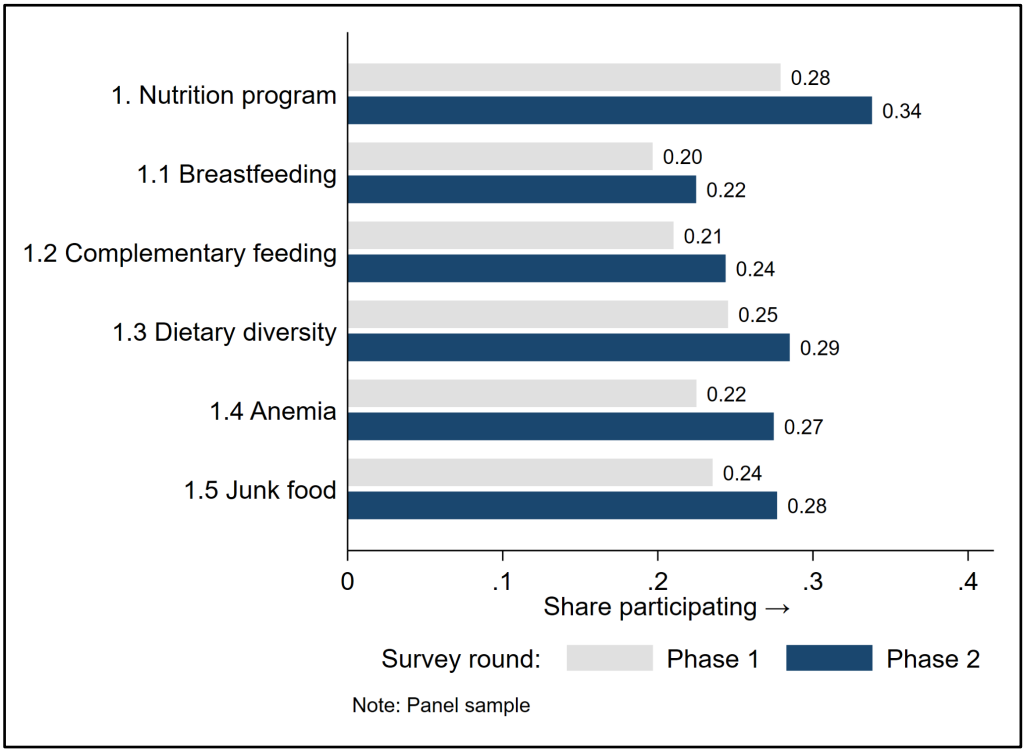
***Table 7: Social Behavior Change (SBC) activities by survey phase participation***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Caregiver participated on SBC nutrition training | 0.28 (0.45) | 0.34 (0.47) | 0.06*** |
| Caregiver total SBC nutrition topics trained on | 1.11 (1.95) | 1.30 (2.05) | 0.19*** |
| Caregiver participated in SBC hygiene training | 0.24 (0.43) | 0.39 (0.49) | 0.15*** |
| Caregiver participated in SBC reading training | 0.25 (0.44) | 0.29 (0.46) | 0.04*** |
| Caregiver saw SBC message on TV | 0.65 (0.48) | 0.53 (0.50) | -0.12*** |
| Caregiver belongs to any Whatsapp group | 0.69 (0.46) | 0.76 (0.43) | 0.06*** |
| Caregiver belongs to a topical Whatsapp group | 0.17 (0.37) | 0.30 (0.46) | 0.14*** |
| Caregiver is a Parents-teachers-Association member | 0.24 (0.43) | 0.26 (0.44) | 0.02 |
| N | 2304 | 2319 | |

*Notes*: Panel sample The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

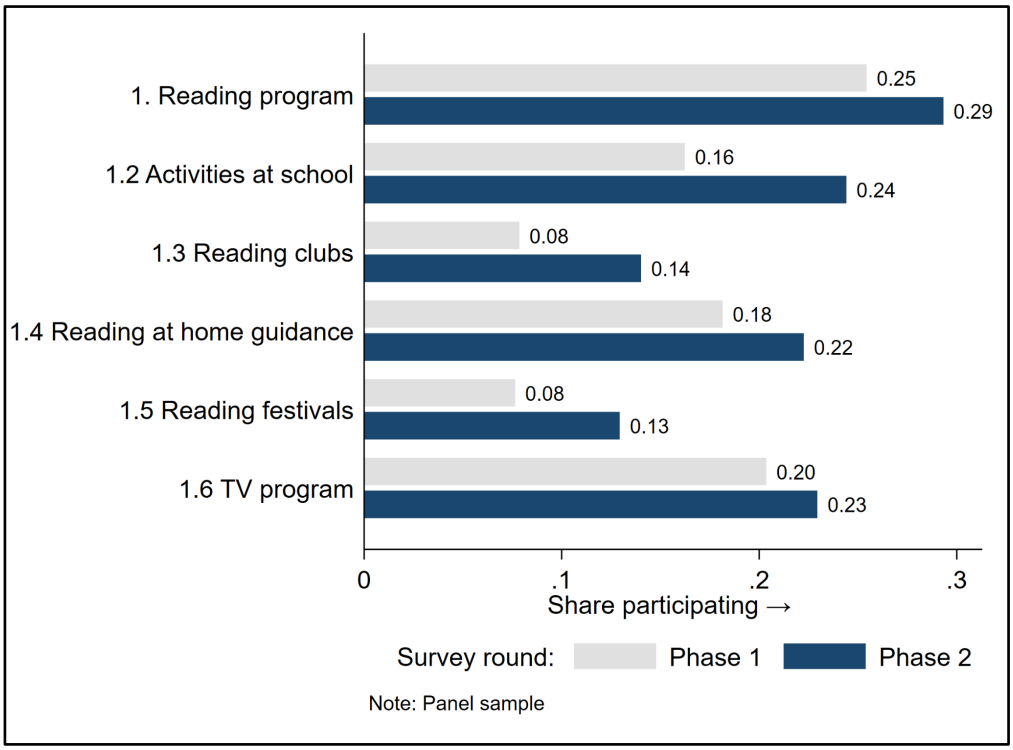
Figure 5 breaks down the SBC activities related to nutrition by its five main categories: breastfeeding, complementary feeding, dietary diversity, anemia, and junk food. For each type, 20-25% of caregivers participated in such activities in the baseline. The graph shows an increase by 2-5 percentage points in all components of activities in the endline.

***Figure 11: Participation in SBC nutritional activities***




Regarding the participation in the reading practices activities, we observe higher involvement in all activities (Figure 12). The activities with higher participation were those at school and those related to reading at home guidance.

*Figure 12: Participation in SBC reading activities*



Moreover, qualitative research revealed that the reading program because it is rather based on singular events, is not as thoroughly embedded in the daily school routine as is the school meals program. However, respondents were widely aware of the activities, the availability and quality of books associated with the program was positively noted, and also quite many respondents recalled their active participation in reading-related events.

*'There was a good contest by Mercy Corps. Parents and children had to make a video about reading. In that, parents should buy a book, read to a child and ask questions. Children should answer the questions, or parents should answer. Our school sent in around 30 videos, and we got 1st place.'*
*(Teacher, Chuy oblast)*

Our analysis confirms broader coverage over time of all of the SBC activities programs. The quantitative research highlights a particular increase in training on hygiene and sanitation, due to Mercy Corps WASH activities focused on preventing the spread of the coronavirus. In addition, we recorded many positive attitudes towards the nutritional and reading activities programs.

## VI. Nutritional preference, knowledge and practices

In this section we present findings related to nutritional preferences, knowledge, and practices of children and their caregivers.

### Children's nutritional preferences and knowledge

We elicited children's snack preferences based on their choices when presented with selected pictures of commonly available healthy and unhealthy snacks. The results suggest that the proportion of children that preferred healthy snacks over unhealthy snacks significantly decreased over time. In the baseline, about half of all children preferred healthy snacks over unhealthy snacks, compared to 43% in the endline.

We also presented children with a list of 10 relatively common foods and meals and asked them how much they liked each item. Our results suggest that half of all children prefer healthy foods over unhealthy foods, with no evidence of significant changes in food preferences between surveys.

Lastly, we also find that children have improved their nutrition knowledge as they become older. In the baseline about 7 out of 10 children knew that sweets and candy are not healthy, compared to about 8 out of 10 in the endline (the difference is significant). Moreover, they were significantly more likely to know the right reasons why sweets are bad (65% vs. 75%, respectively).

These results suggest that a lot of children have fairly good nutrition knowledge and fairly healthy general food preferences. Also that they have gained knowledge about the more healthy foods. Even though their preferences for unhealthy snacks increased between surveys, their preferences for healthy foods relative to unhealthy foods did not change. More importantly are the ways how

the preferences and knowledge translate in practice. We provide insights on snacking practices in one of the subsections below.

***Table 8: Children's nutritional preference and knowledge***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Child snack preference score | -0.09<br>(1.21) | -0.24<br>(1.38) | -0.15*** |
| Child prefers healthy snacks | 0.50<br>(0.50) | 0.43<br>(0.50) | -0.07*** |
| Child food preference score | -0.14<br>(4.09) | -0.20<br>(4.01) | -0.07 |
| Child prefers healthy foods | 0.50<br>(0.50) | 0.48<br>(0.50) | -0.02 |
| Child knows that sweets are not good for health | 0.72<br>(0.45) | 0.80<br>(0.40) | 0.07*** |
| Knows why sweets are bad | 0.65<br>(0.48) | 0.75<br>(0.43) | 0.10*** |
| N | 2304 | 2319 | |

*Notes*: Panel sample. The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

### Caregivers' nutritional preferences and knowledge

Contrary to children, where preferences were half-half divided, we find that main caregivers are more likely to have preferences for healthy foods compared to unhealthy foods, and that such likelihood increased over time: 75% of caregivers rated healthy foods and meals higher than unhealthy ones in the baseline, and 79% did it in the endline.

We evidence that caregivers increased their nutritional knowledge over time too. In the baseline about 60% correctly identified foods that are rich in Vitamin A, about 23% correctly identified foods rich in Vitamin C, and about 50% correctly identified foods that are iron-rich. In the endline the same shares increased by about 10 percentage points.

These results suggest that the majority of caregivers have healthy food preferences, but they have somewhat limited nutrition knowledge (especially in Vitamin C foods). Nevertheless, we evidence some improvements in nutritional knowledge over time.

***Table 9: Caregiver nutritional preference and knowledge***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Caregiver prefers healthy foods | 0.75<br>(0.43) | 0.79<br>(0.41) | 0.04*** |
| Good knowledge about vitamin A-rich foods | 0.61<br>(0.49) | 0.71<br>(0.46) | 0.10*** |
| Good knowledge about vitamin C-rich foods | 0.23<br>(0.42) | 0.35<br>(0.48) | 0.13*** |
| Good knowledge about iron-rich foods | 0.49<br>(0.50) | 0.59<br>(0.49) | 0.09*** |
| N | 2304 | 2319 | |

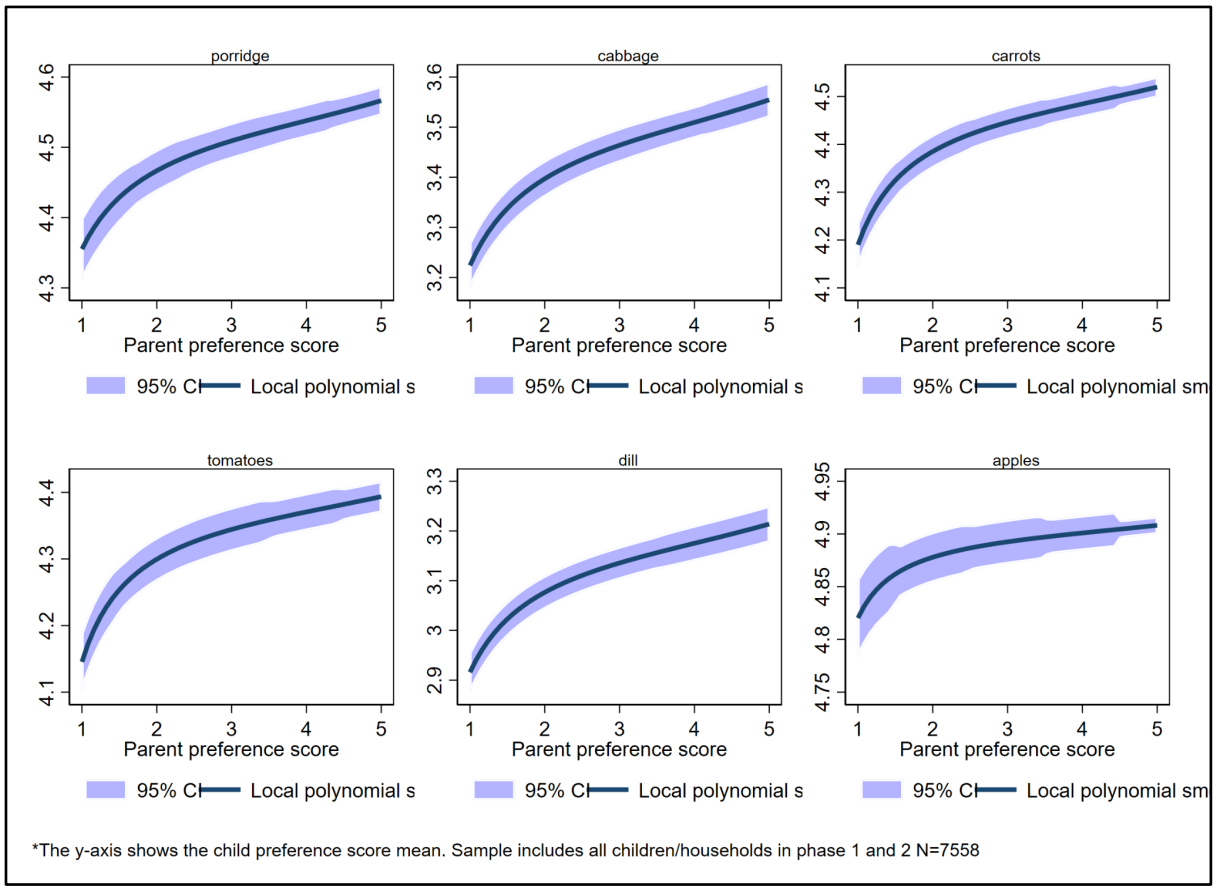
*Notes*: Panel sample. The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

### The relationship between parents and children nutritional preferences

We ask parents and children to rate how much they like the taste of common foods in Kyrgyzstan. The figures below show the relationship between children and parents rating scores.

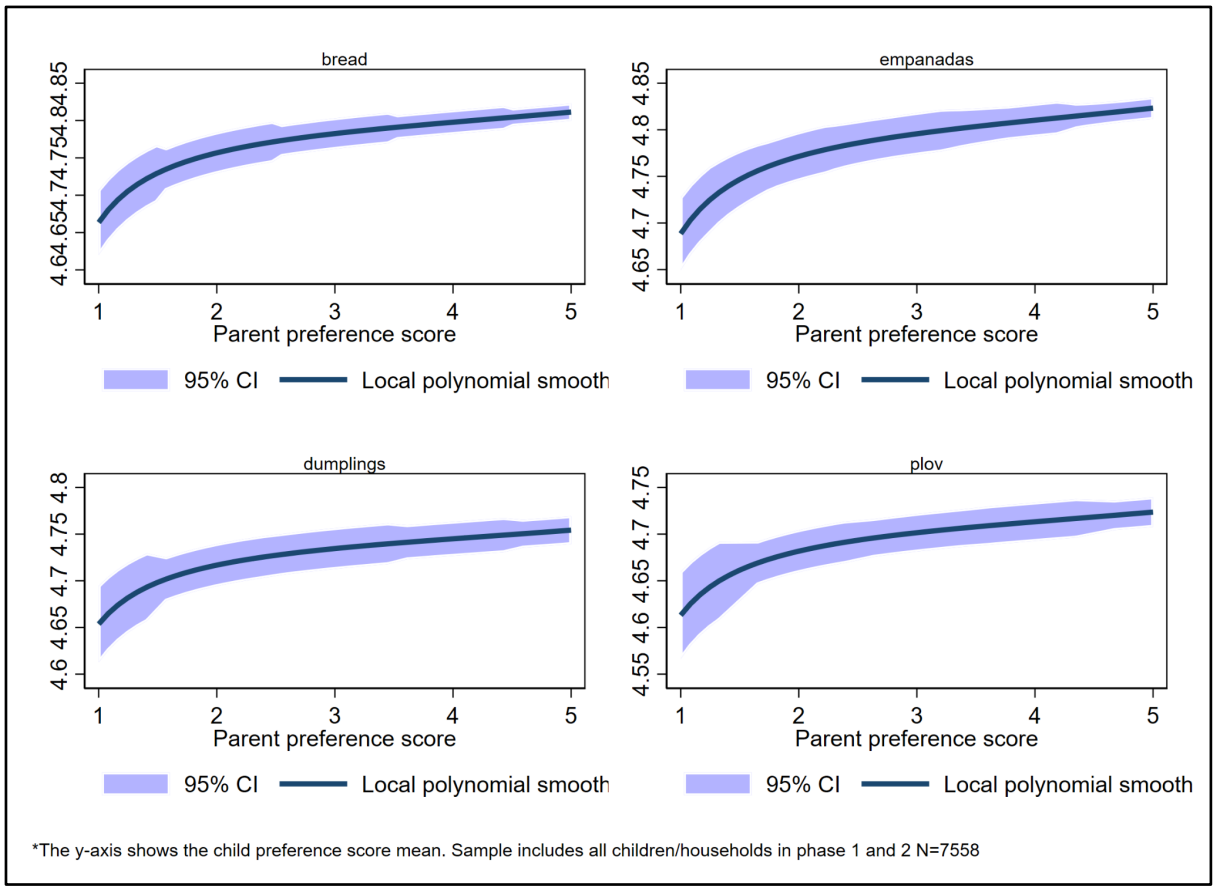
Are parents teaching by example? We find a strong and positive correlation between parents and children's food preferences. How parents rate the taste of nutrient-rich (Figure 13) and non-nutrient rich foods (Figure 14) is a strong predictor of how children rate the same food.

***Figure 13: correlation of children and caregivers' preferences for nutrient-rich foods***




*The y-axis shows the child preference score mean. Sample includes all children/households in phase 1 and 2 N=7558

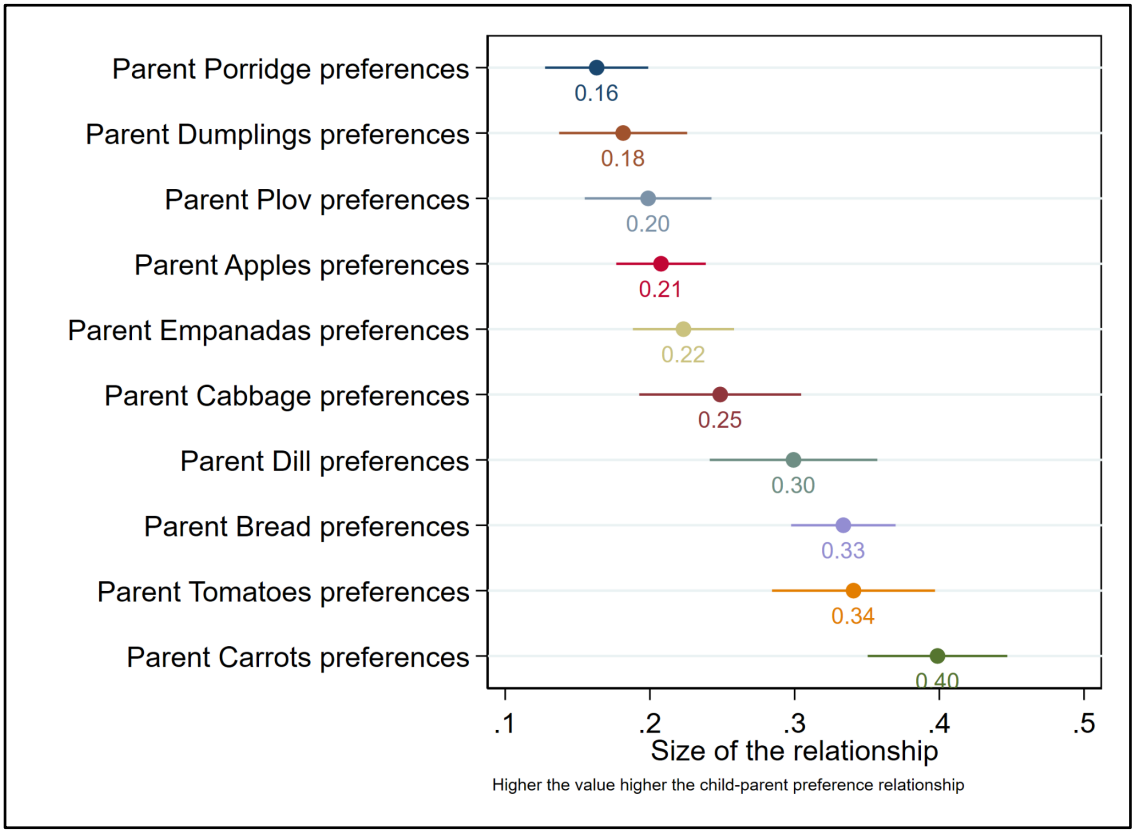
***Figure 14: correlation of children and caregivers' references for nutrient-poor foods***




In addition, we find that some of the parent-child food preferences relations are stronger than others. Figure 15 shows the size of the relationships by type of food, controlled by household fixed effects. We find that the correlations are stronger for nutrient-rich foods like carrots and tomatoes than for nutrient-poor foods like dumplings or empanadas.

Influencing parents' preferences, especially on healthy foods, could be an effective channel to influence children's preferences.

*Figure 15: Child-caregiver preference relationships: comparing the slopes by types of foods*




## Children's snacking practices

Table 10 shows that a large majority of children eat snacks during main meals (75%). Most children receive money for snacks from parents (75%), and buy snacks from shops (60%).

Children reported eating 1.5 snacks per day in the baseline, and 1.8 snacks in the endline. The increase in snacking was driven by unhealthy snacks. On average, children were eating 0.3 more unhealthy snacks per day, such as chips or candy, compared to no change in the number of healthy snacks, such as fruits or vegetables. In the baseline, the probability that a child ate a healthy snack was 1.7 times lower than the probability that they ate a healthy one. In the endline, eating a healthy snack became even less likely as the same ratio grew to 2.1 times.

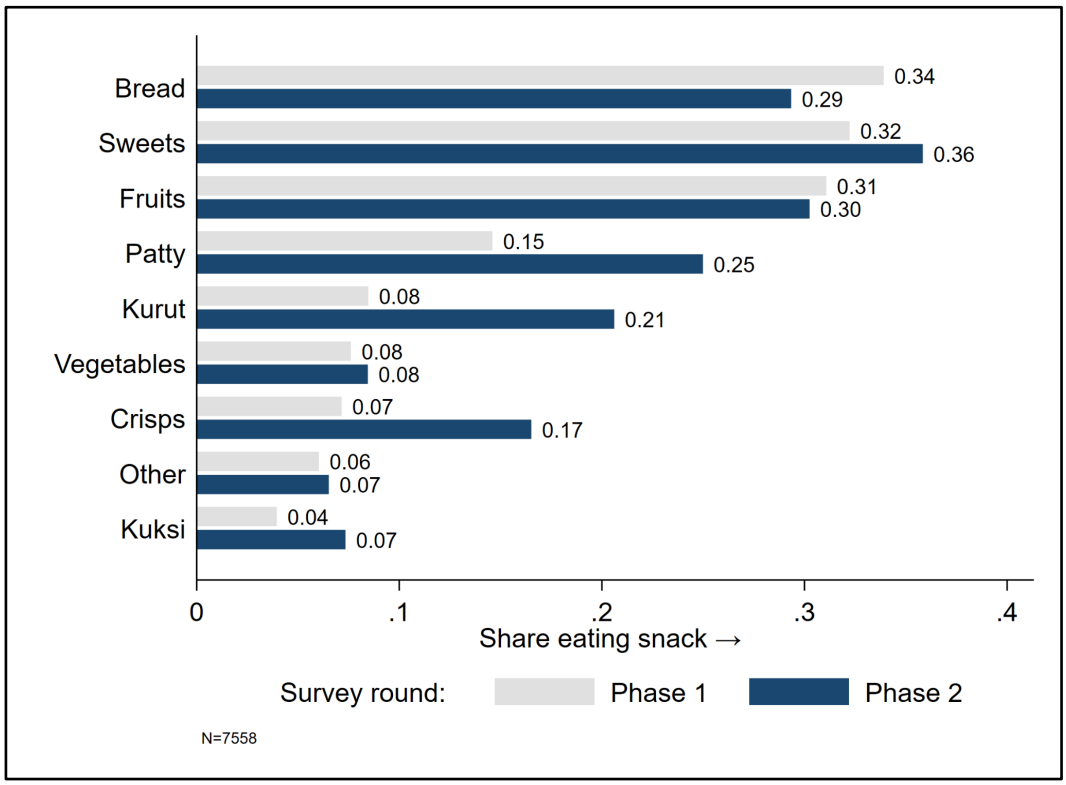
***Table 10: Children snacking practices***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Eats breakfast before school | 0.85<br>(0.36) | 0.87<br>(0.34) | 0.02* |
| Buys snacks from shop | 0.59<br>(0.49) | 0.57<br>(0.50) | -0.02 |
| Parents give money for snacks | 0.75<br>(0.44) | 0.81<br>(0.39) | 0.06*** |
| Ate snack between meals | 0.74<br>(0.44) | 0.77<br>(0.42) | 0.02* |
| Eats healthy snacks | 0.37<br>(0.48) | 0.36<br>(0.48) | -0.01 |
| Eats unhealthy snacks | 0.64<br>(0.48) | 0.73<br>(0.44) | 0.09*** |
| Number of snacks per day | 1.45<br>(1.36) | 1.79<br>(1.57) | 0.34*** |
| Number of healthy snacks per day | 0.44<br>(0.63) | 0.46<br>(0.67) | 0.02 |
| Number of unhealthy snacks per day | 1.01<br>(1.00) | 1.33<br>(1.16) | 0.32*** |
| N | 2304 | 2319 | |

*Notes*: Panel sample. The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Figure 16 displays how popular certain snacks are among the children. The most frequently consumed snacks between meals are bread, sweets, and fruits. The illustration shows that the increase in unhealthy snacking between surveys was driven by sweets, kurut, patty, and crispies.

*Figure 16: Snacks children eat*




We observe a deterioration in children snacking habits over time. Their snacking practices became more common, and the increment was driven by unhealthy snacks rather than healthy snacks.

### Nutritional practices at home

Table 11 complements all the previous findings by showing nutritional practices at home during the 2019/2020 winter season (column 1), and during the 2021 summer season (Column 2). The commonly used Household Dietary Diversity Score, based on consumption on the day before the survey, suggests an average value of 8.2 different food groups consumed in the baseline, and 8.7 in the endline. Additionally, we use the Minimum Dietary Diversity for Women (MDD-W) and Minimum Dietary Diversity for Infant and Young Child Feeding (MDD-IYCF) measures to complement these findings. Our results suggest that dietary diversity in the household is above the critical value of 4 food groups for 78% of all children, measured by the MDD-W indicator, and 66% of all children, measured by the MDD-IYCF indicator. Furthermore, we evidence an improvement over surveys of about 11 percentage points in both of these probabilities.

The differences in diet diversity between surveys is driven by a higher prevalence and quantity of nutrient rich foods. The probability of having consumed any Vitamin A, Vitamin C and iron-rich food in the 24 hours prior to the survey increased between 4 and 10 percentage points over time. In terms of quantity, households significantly increased the number of food groups, especially vitamin A-rich food groups.

These results suggest that nutrition at home is sufficiently diverse for the majority of households in our sample. Also, that diet diversity and quality of meals was superior during the 2021 summer compared to the winter in 2019/2020 .

***Table 11: Diet diversity at home***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Minutes spent preparing meals | 90.79 (37.91) | 139.24 (63.07) | 48.45*** |
| Dietary diversity score 0-12 (24h) | 8.17 (1.42) | 8.71 (1.37) | 0.54*** |
| MDD-W>4 | 0.79 (0.41) | 0.90 (0.30) | 0.12*** |
| MDD-IYCF>4 | 0.66 (0.47) | 0.78 (0.41) | 0.11*** |
| Number of vitamin A-rich food groups (24h) | 2.43 (1.27) | 3.38 (1.27) | 0.95*** |
| Any vitamin A-rich food (24h) | 0.95 (0.22) | 0.99 (0.11) | 0.04*** |
| Number of plant-based vitamin A-rich food groups (24h) | 1.34 (0.87) | 1.98 (0.92) | 0.64*** |
| Any plant-based vitamin A-rich food (24h) | 0.84 (0.37) | 0.93 (0.25) | 0.10*** |
| Number of iron-rich food groups (24h) | 1.04 (0.46) | 1.08 (0.51) | 0.03** |
| Any iron-rich food (24h) | 0.92 (0.26) | 0.93 (0.26) | 0.00 |
| Number of vitamin C-rich food groups (24h) | 2.08 (1.04) | 2.40 (0.85) | 0.32*** |
| Any vitamin C-rich food (24h) | 0.95 (0.22) | 0.99 (0.11) | 0.04*** |
| N | 2304 | 2319 | |

*Notes*: Panel sample. The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

## VII. Learning environments at home, reading attitudes and children's health

### Learning environments at home

We evidence some improvements concerning learning environments at home. The number of books owned by the average household increased from 18.5 in Phase I to 24.5 in Phase II (Table 12). That increase was due to having more books borrowed, and buying more books for children. In fact, the proportion of children that said they had story books at home increased by 14 percentage points. Nevertheless, we evidence a slight decrease in the proportion of children saying they had toys at home. Around one in four children in our study do not have toys at home.

Regarding interactions between family members and children, the table shows that most children get help with studies at home (92%). However, our results show that there is still a high proportion of students who do not get stories told at home or get read from books (about 40%).

We don't evidence any change in the time caregivers' dedicate to reading books. Our results suggest instead a reduction in the proportion of their time watching TV. Caregivers have substituted their time reading news on paper to reading them on smartphones.

*Table 12: Learning environment at home*

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Books owned at home | 18.57 (46.62) | 24.52 (80.92) | 5.94*** |
| Child has toys at home | 0.76 (0.43) | 0.74 (0.44) | -0.02* |
| Child has school textbooks at home | 0.99 (0.12) | 0.80 (0.40) | -0.19*** |
| Child has storybooks at home | 0.68 (0.47) | 0.82 (0.39) | 0.14*** |
| Child gets read stories from books at home | 0.59 (0.49) | 0.58 (0.49) | -0.01 |
| Child gets told stories at home | 0.54 (0.50) | 0.57 (0.49) | 0.04** |
| Child gets help with studies at home | 0.89 (0.31) | 0.92 (0.26) | 0.03*** |
| Caregiver: times reading books last week | 1.02 (2.04) | 1.00 (2.03) | -0.01 |
| Caregiver: times reading newspaper last week | 0.86 (1.45) | 0.68 (1.46) | -0.18*** |
| Caregiver: hours per day watching TV | 1.53 (1.29) | 1.28 (1.11) | -0.25*** |
| Caregiver: hours reading news on smartphone | 1.01 (1.07) | 1.28 (1.27) | 0.27*** |
| Caregiver: hours per day listening to radio | 0.26 (0.97) | 0.27 (1.07) | 0.01 |
| N | 2304 | 2319 | |

*Notes*: Panel sample.. The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

### Reading attitudes

In general, children have good attitudes towards reading. Table 13 shows that almost all children say they like reading in school, and learning from books. Most of them also enjoy reading outside school, and like different types of books. There is no evidence that these attitudes meaningfully changed over time. We see, however, a big negative change in the proportion of children that feel comfortable reading aloud in class, from 83% in the baseline to 74% in the endline, which can be an indicator of decreasing self confidence over time.

***Table 13: Children reading attitudes***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| like reading in school | 0.95 | 0.94 | -0.01* |
| | (0.22) | (0.24) | |
| like learning from a book? | 0.97 | 0.96 | -0.01** |
| | (0.17) | (0.20) | |
| like the stories you read in class? | 0.97 | 0.97 | -0.00 |
| | (0.16) | (0.17) | |
| like reading out loud in class? | 0.83 | 0.74 | -0.09*** |
| | (0.38) | (0.44) | |
| like reading for fun outside school? | 0.86 | 0.84 | -0.02** |
| | (0.34) | (0.37) | |
| like reading different kinds of books? | 0.90 | 0.90 | 0.00 |
| | (0.31) | (0.30) | |
| Child reads book not for school | 0.51 | 0.66 | 0.15*** |
| | (0.50) | (0.47) | |
| N | 2304 | 2319 | |

*Notes*: Panel sample.. The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

### School attendance and health

We asked caregivers whether their child was regularly attending school in the last month of school. Our results show that, from our panel sample, 3% of the children were not attending school regularly in the last month of the 2020/2021 academic year. In Phase I all students interviewed were attending school, compared to 97% of them in Phase II (Table 14). .

Moreover, caregivers reported a significant increase in the number of school days missed during the last weeks and months. Students passed from missing 0.26 days the week before the survey in Phase I to 0.6 days in Phase II: an increase of almost double the days, on average. The increment in school absences over time is due to non-health related reasons, and it is likely to be explained by school closures due to COVID-19. Instead, health-related absence decreased over time: the average child passed from missing about one day of school due to health issues, to only half a day in the month before the survey.

The large majority of all children in FFE schools are not likely to be hungry in class. Even so, we observe improvements in short-term hunger indicators overtime. We calculated an index measuring "short-term hunger in class", based on children's reports on eating breakfast at home and school meals during class days. The index ranges from 0 to 6, where higher values indicate higher short-term hunger in class. The average value of 0.88 suggests that the large majority of all children in FFE schools were not hungry in class in Phase I. Although the change is small (but

significant), we see an improvement in the index, meaning that short-term hunger was reduced in Phase II.

***Table 14: Child health and school attendance***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| School attendance: yes/no | 1.00<br>(0.04) | 0.97<br>(0.16) | -0.02*** |
| School days missed last 7 days | 0.26<br>(0.82) | 0.60<br>(1.57) | 0.34*** |
| School days missed last 30 days | 1.40<br>(2.52) | 1.78<br>(5.39) | 0.38*** |
| School days missed last 30 days (non-health related) | 0.38<br>(1.52) | 1.13<br>(4.95) | 0.75*** |
| School absences due to health (last 30 days) | 1.02<br>(1.97) | 0.65<br>(2.05) | -0.37*** |
| Any school absence due to health (last 30 days) | 0.36<br>(0.48) | 0.18<br>(0.38) | -0.18*** |
| Estimated short-term hunger in class | 0.85<br>(1.11) | 0.85<br>(1.03) | -0.01 |
| N | 2304 | 2319 | |

*Notes*: Panel sample.. The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

## VIII. Learning outcomes

### Children's learning

To better understand the evolution of learning outcomes in our sample, we compare the same students' results in cognitive and non-cognitive skills one year and a half apart.

Our results show that as children grew older and experienced more time in school, their performance in most skills improved (Table 15). Inhibitory control augmented about half of a standard deviation for students who were in grade 1 in the baseline (and were in grade 2 in the endline). Moreover, their working memory, grit, and focus indicators increased by about 0.3 of a standard deviation.

***Table 15: Learning outcomes evolution of students who were in grade 1 at baseline and grade 2 in endline***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Working memory (standardized) | -0.29 | 0.01 | 0.30*** |
| | (1.12) | (0.99) | |
| Inhibitory control (standardized) | -0.33 | 0.14 | 0.47*** |
| | (1.27) | (0.78) | |
| Grit (standardized) | -0.19 | 0.06 | 0.25*** |
| | (1.18) | (0.90) | |
| Focus (standardized) | -0.21 | 0.06 | 0.27*** |
| | (1.18) | (0.90) | |
| N | 1150 | 1154 | |

*Notes*: Panel sample of students that were in grade 1 during the baseline survey. The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

For students in grade 2 at baseline (i.e. grade 3 in endline), these skills also improved, although in a smaller magnitude (Table 16). Their inhibitory control score augmented about 0.3 of a standard deviation, and working memory, grit, and focus indicators increased about 0.12 of a standard deviation.

Regarding numeracy and literacy skills the out-turn follows a mixed storyline. The fact that students in grade 2 in baseline undertook the same exams in the endline allows us to track their evolution in language and maths performance over time[6]. The grade two numeracy exam consisted of two tasks that captured children's analytical capacities. We calculated a numeracy

[6] We can't compare literacy and numeracy scores of students in grade 1 in the baseline (i.e. grade 2 in the endline) because they took different exams in each survey due to the tasks being tailored to students' age groups.

score based on children's performance in numerical tasks. Our results suggest an improvement of about half of a standard deviation in numeracy scores between surveys.

The literacy exam consisted of reading text passages in Russian and Kyrgyz and answering questions on both. In the baseline, 93% of the students could read in at least one language, and 43% could do it with comprehension. In the endline, the share of students who could read did not change, but the proportion that could read with understanding grew by 15 percentage points.

Children are expected to perform better in the endline as in principle they have more months of education and they are, on average, one year older. What is not expected is for them to perform worse. We calculated a literacy score based on children's reading fluency (correct words per minute) and accuracy (percentage of correct words). Over time, we observe a considerable deterioration in children's performance: children's average literacy score decreased by about 20% of a standard deviation[7].

[7] The difference is bigger and holds significance when we exclude students who could not read with comprehension in the baseline (we compare literacy scores among students who could read with comprehension in the baseline).

***Table 16: Learning outcomes evolution of students who were in grade 2 at the baseline and grade 3 at the endline***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Working memory (standardized) | 0.08<br>(0.94) | 0.20<br>(0.87) | 0.12*** |
| Inhibitory control (standardized) | -0.05<br>(1.06) | 0.24<br>(0.69) | 0.29*** |
| Grit (standardized) | 0.01<br>(1.01) | 0.12<br>(0.85) | 0.11*** |
| Focus (standardized) | 0.00<br>(1.00) | 0.14<br>(0.85) | 0.14*** |
| Child can read | 0.93<br>(0.25) | 0.92<br>(0.26) | -0.01 |
| Child can read with comprehension | 0.43<br>(0.50) | 0.58<br>(0.49) | 0.15*** |
| Full literacy score (standardized) | 0.14<br>(1.28) | -0.04<br>(0.74) | -0.18*** |
| Full numeracy score (standardized) | -0.20<br>(1.05) | 0.28<br>(0.86) | 0.47*** |
| N | 1154 | 1158 | |

*Notes*: Panel sample of students that were in grade 2 during the baseline survey. The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

### Learning across grades

Instead of tracking the learning evolution of the same students across time, we can compare the learning levels in each grade between academic years. Specifically, we can compare the learning outcomes of first (second) graders in the 2019/2020 academic year against those of first (second) graders in the 2020/2021 academic year. Such analysis could provide insights on differences in learning across grades by school cohort.

We should bear in mind the surveys' differences in interview timings for interpretation: in the baseline survey, we examined students during the middle of the academic year, whereas in the endline the exam took place after the end of the academic year. In principle, first (second) graders in the endline were older and should have experienced half a year more of school than first (second) graders in the baseline. If so, with all other things constant, and assuming that being older

and having more time in school and outside school means more learning, we should expect improved exam performance among the most recent cohort.

Specifically, if the most recent cohort performs better, it does not necessarily mean that they are a better cohort. The reason may be that they are older and are further in the academic year. Nonetheless, if they perform the same or worse, it means that being older and further in the academic year did not give them any advantage. That would be explained by students from the most recent cohort experiencing more time outside school and lower quality of instruction due to remote teaching and the COVID-19 school disruptions.

Results in table 17 show differences in first-graders' cognitive and non-cognitive scores. First-graders in the 2020/2021 academic year scored 0.1 and 0.2 of a standard deviation higher on working memory and inhibitory control, respectively, compared to first-graders one year before. Moreover, their literacy and numeracy scores were 0.43 and 0.35 of a standard deviation higher. We do not observe differences in performance in grit or focus.

***Table 17: First graders learning by survey phase***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Working memory (standardized) | -0.24 | -0.15 | 0.10** |
| | (1.09) | (1.05) | |
| Inhibitory control (standardized) | -0.28 | -0.08 | 0.20*** |
| | (1.24) | (1.00) | |
| Grit (standardized) | -0.13 | -0.14 | -0.01 |
| | (1.13) | (1.06) | |
| Focus (standardized) | -0.15 | -0.15 | 0.01 |
| | (1.14) | (1.05) | |
| Grade 1 exam: full literacy score (standardized) | -0.22 | 0.21 | 0.43*** |
| | (1.06) | (0.88) | |
| Grade 1 exam: full numeracy score (standardized) | -0.18 | 0.18 | 0.35*** |
| | (1.17) | (0.75) | |
| N | 1509 | 1516 | |

*Notes*: Panel sample of students that were in grade 1 during the baseline survey. The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 18 shows the same analysis but for second-graders. In the 2020/2021 academic year students in grade two scored 0.2 of a standard deviation more on inhibitory control than those in the 2019/2020 academic year. Their scores in the numeracy exam were also better by 0.19 of a standard deviation. However, there was no difference in their working memory, grit, or focus.

The table shows a different story regarding language skills. In the middle of the 2019/2020 academic year, 93% of students in second grade could read. In contrast, after the end of the 2020/2021 academic year, only 87% of students in second grade could do it; a statistically significant reduction in the probability of having students that can read in the second grade of 6 percentage points. Additionally, there was no difference in the share of second graders with capacity to understand what they were reading. More striking, second graders' fluency and accuracy while reading were significantly lower for those enrolled in the most recent academic year (-0.3 of a standard deviation).

***Table 18: Second graders learning by survey phase***

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Working memory (standardized) | 0.08 (0.95) | 0.06 (0.96) | -0.02 |
| Inhibitory control (standardized) | -0.04 (1.07) | 0.15 (0.81) | 0.19*** |
| Grit (standardized) | 0.05 (1.00) | 0.07 (0.91) | 0.02 |
| Focus (standardized) | 0.05 (0.99) | 0.09 (0.90) | 0.05 |
| Child can read | 0.93 (0.26) | 0.87 (0.34) | -0.06*** |
| Child can read with comprehension | 0.42 (0.49) | 0.44 (0.50) | 0.02 |
| Grade 2 exam: full literacy score (standardized) | 0.17 (1.37) | -0.13 (0.71) | -0.30*** |
| Grade 2 exam: full numeracy score (standardized) | -0.22 (1.06) | -0.03 (0.99) | 0.19*** |
| N | 1526 | 1498 | |

*Notes*: Panel sample of students that were in grade 2 during the baseline survey. The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

## IX. Impacts of the FFE program

### Impacts of the school meal program

*Impact of receiving school meals during Grade 1 on learning*

Initially, second graders in the baseline who were in the 2019 FFE group were not exposed to the FFE program in first grade, while those in the 2018 FFE group were. Subsequently, all second graders in the endline were exposed to the FFE program during first grade. Since both groups are

from the same schools and communities, we can compare the evolution of learning outcomes in second grade by FFE group between surveys.

Our primary assumption is that second graders' learning outcomes in both groups would have evolved similarly if all students had received the program in first grade. If that had been true, we could conclude that the variation in program status during first grade caused any change in learning outcome trajectories.

In the baseline, we documented that second graders from the schools where the FFE program was implemented first (2018) had improved indicators compared to those from schools where the program started later (2019). Indeed, the baseline mean scores shown in table 19 demonstrate that in Phase I, students from 2018 FFE schools were better off than students from 2019 FFE schools: their mean performance was superior in working memory, inhibitory control, and focus; their probability of being capable of reading and of doing it with comprehension was higher; as well as their literacy and numeracy scores. Those differences were statistically significant for inhibitory control, the probability of reading, and the numeracy score.

***Table 19: Second graders learning differences by FFE program exposure in phase 1***

| Variable | (1) 2018 school Mean/SD | (2) 2019 school Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Inhibitory control | 8.68 | 8.28 | -0.41** |
| | (3.66) | (4.34) | |
| Working memory | 3.38 | 3.30 | -0.07 |
| | (1.15) | (1.07) | |
| Focus | 8.64 | 8.47 | -0.17 |
| | (3.72) | (4.10) | |
| Grit | 8.71 | 8.71 | 0.00 |
| | (3.84) | (4.29) | |
| Child can read | 0.95 | 0.91 | -0.04** |
| | (0.34) | (0.34) | |
| Child can read with comprehension | 0.45 | 0.39 | -0.06 |
| | (0.88) | (0.76) | |
| Full literacy score (standardized) | 0.25 | 0.10 | -0.15 |
| | (2.19) | (2.39) | |
| Full numeracy score (standardized) | -0.08 | -0.36 | -0.28*** |
| | (1.74) | (1.82) | |
| N | 760 | 766 | |
| Clusters | 77 | 77 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. Standard deviations are clustered at variable school_id. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

The same type of analysis but in Phase II shows the learning gap between FFE school groups changed over time (Table 20). Even though the gap between groups' means increased for working memory, grit, and focus, it decreased for inhibitory control, reading skills, and literacy and numeracy scores. For instance, second-graders in 2018 FFE schools were no longer more likely to know how to read than second-graders in 2019 FFE. Another example is that the average numeracy score gap lessened from 0.28 to 0.13 of standard deviation. In the endline, the gap in skills was statistically significant for inhibitory control, working memory, and the numeracy score.

***Table 20: Second graders learning differences by FFE program exposure in phase 2***

| Variable | (1) 2018 school Mean/SD | (2) 2019 school Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Inhibitory control | 9.04 | 8.76 | -0.28** |
| | (2.34) | (2.72) | |
| Working memory | 3.39 | 3.26 | -0.13** |
| | (0.90) | (1.03) | |
| Focus | 8.79 | 8.54 | -0.25 |
| | (3.16) | (3.58) | |
| Grit | 8.87 | 8.66 | -0.21 |
| | (3.59) | (3.73) | |
| Child can read | 0.87 | 0.86 | -0.00 |
| | (0.48) | (0.44) | |
| Child can read with comprehension | 0.46 | 0.41 | -0.04 |
| | (0.70) | (0.64) | |
| Full literacy score (standardized) | -0.10 | -0.16 | -0.06 |
| | (1.13) | (1.07) | |
| Full numeracy score (standardized) | 0.03 | -0.10 | -0.13* |
| | (1.33) | (1.62) | |
| N | 750 | 748 | |
| Clusters | 77 | 77 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. Standard deviations are clustered at variable school_id. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

The analysis shows that learning gaps between groups mostly shrank over time. The learning outcomes of second graders from schools where Mercy Corps implemented the FFE program later caught up with those from schools where they implemented the program first. Such results are suggestive evidence of a positive impact of the FFE program.

Nevertheless, this conclusion would be erroneous if our main assumption does not hold. For the evaluation, the panel structure can solve the time-invariant structural differences between the school groups. But any shocks related to the outcomes affecting the groups differently over time are a bias of concern. Apart from the variation in program exposure during first grade, there was

one major shock that affected school groups differently over time and that can explain our results: the COVID-19 pandemic.

Our analysis of household exposure and resilience to the COVID-19 pandemic suggests that the negative effects of the pandemic afflicted more households in the 2018 FFE school group compared to households in the 2019 FFE school group. Households with children enrolled in 2018 FFE schools were more exposed to the virus, were significantly more prone to suffering a negative income shock, and were more likely to have children missing days of school.

To mitigate potential biases, we compare the groups' outcomes evolution controlling for relevant variables that may have changed distinctively over time, reflecting the households and schools differences in the capacity to counter-measure the adverse effects of the pandemic. We perform a difference-in-differences estimation controlling for school fixed characteristics, year effects, and children's individual characteristics such as age, gender, preschool status, and the number of days the child was absent from school during the survey's academic year. The evaluation also takes into account households composition, household income and assets, and the education and age of households heads.

Table 21 shows the difference-in-differences estimation results. We observe that 2019 FFE schools did better over time than 2018 FFE schools: their outcomes improved more or deteriorated less. However, the improved evolution was only significant for numeracy skills.

***Table 21: Second graders learning outcomes evolution, Difference-in-Differences including individual controls and school fixed effects***

| Variable | 2018 school | | 2019 school | | Difference-in-differences |
|---|---|---|---|---|---|
| | Baseline Mean/(SE) (1) | Evolution Coef/(SE) (2) | Baseline Mean/(SE) (3) | Evolution Coef/(SE) (4) | Coef/(SE) (5) |
| Working memory | 3.37 | -0.00 | 3.30 | 0.00 | -0.06 |
| | (0.03) | (0.05) | (0.03) | (0.04) | (0.05) |
| Inhibitory control | 8.68 | 0.37*** | 8.28 | 0.45*** | 0.09 |
| | (0.08) | (0.11) | (0.09) | (0.13) | (0.14) |
| Grit | 8.71 | 0.15 | 8.71 | -0.12 | -0.23 |
| | (0.08) | (0.11) | (0.08) | (0.13) | (0.14) |
| Focus | 8.64 | 0.13 | 8.47 | -0.03 | -0.13 |
| | (0.08) | (0.11) | (0.09) | (0.13) | (0.14) |
| Child can read | 0.95 | -0.11*** | 0.91 | -0.04** | 0.03 |
| | (0.01) | (0.02) | (0.01) | (0.02) | (0.02) |
| Child can read with comprehension | 0.45 | -0.05* | 0.39 | 0.01 | 0.01 |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.03) |
| Full literacy score (standardized) | 0.25 | -0.40*** | 0.10 | -0.33*** | 0.08 |
| | (0.04) | (0.06) | (0.05) | (0.07) | (0.08) |
| Full numeracy score (standardized) | -0.08 | -0.02 | -0.36 | 0.25*** | 0.13* |
| | (0.04) | (0.06) | (0.04) | (0.06) | (0.07) |
| N | 759 | 1509 | 766 | 1514 | 3023 |

*Notes*: The baseline means only include observations not omitted in the 1st and 2nd differences. The number of observations in the 1st and 2nd differences includes both baseline and follow-up observations. ***, **, and * indicate significance at the .01, .05, and .1 percent critical level. The following variable(s) was included as covariates [child_age_months child_age_months2 child_girl parent father_tertiary mother_tertiary father_age mother_age parents_missing income asset_index i.school_id school_miss_m_other preschool sibling hh_size otheradult home_Kyr].

It is important to highlight that we are estimating the lagged effects of having received the program during first grade on students' exam performance in grade two. Since all children were already receiving school meals when surveyed, we cannot capture the short-term or immediate impacts, and we could be underestimating the total effects of the program.

When taking a comparative perspective between times before and during school closures, this allows for the conclusion that the school feeding program is appreciated and undeniably an effective institution; but also caregivers present school meals not as an indispensable institution necessary to secure the existential well-being of their children (although, less than school representatives and teacher).

During qualitative research, respondents reflected that the school meal program would decisively contribute to increasing students' ability to 'focus' on studying, as compared to them being distracted by being hungry. In that sense, school meals are understood to meaningfully improve the conditions for learning. But only few respondents went as far as to attribute a child's better school performance to participating in a school feeding program.

*'Before children were hungry and they were not interested in studies. Now, they are full and they are focused on school. They are in a good mood now.' (Teacher, Osh oblast)'*

### *Impact of receiving school meals during preschool on learning*

Around one-third of first graders in our sample received school meals during preschool education. The panel structure of our data allows us to provide rigorous insights on the impacts of receiving the FFE program during preschool on learning.

This section compares the learning outcomes of first-graders who attended preschool and received meals against those who attended preschool but did not receive meals[8]. Our estimations control for school fixed characteristics, year effects, and children's individual characteristics such as age, gender, parents' age and education, and household assets.

Our more robust estimations show that children who went to preschool and received school meals performed much better in the grade 1 literacy exam than children who went to preschool but did not receive school meals (Table 22). Specifically, their literacy score was 0.21 of a standard deviation higher, on average. We do not observe statistically significant differences in performance in the grade one numeracy exam results.

***Table 22: Impact of receiving school meals in preschool on performance in the grade one exam***

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | Literacy score | Literacy score | Literacy score | Numeracy score | Numeracy score | Numeracy score |
| Preschool | 0.19*** | 0.09** | 0.06 | 0.16*** | 0.07* | 0.05 |
| | (0.04) | (0.04) | (0.05) | (0.04) | (0.04) | (0.05) |
| Hot meal | -0.32*** | -0.27*** | -0.21** | -0.15 | -0.11 | -0.01 |
| | (0.10) | (0.09) | (0.09) | (0.10) | (0.10) | (0.10) |
| Preschool*Hot meal | 0.25** | 0.22** | 0.21** | 0.10 | 0.07 | 0.01 |
| | (0.11) | (0.10) | (0.10) | (0.11) | (0.11) | (0.11) |
| Observations | 3,025 | 3,024 | 3,024 | 3,023 | 3,022 | 3,022 |
| R-squared | 0.06 | 0.14 | 0.11 | 0.04 | 0.10 | 0.08 |
| Covariates | No | Yes | Yes | No | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | No | Yes | No | No | Yes |
| Number of school_id | | | 154 | | | 154 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### *Impact of receiving school meals on nutritional customs, household economy, and local perceptions*

Since all children in our sample were already receiving school meals when surveyed, we cannot quantify the immediate effects of the program on outcomes such as household budget allocations or cooking customs. However, qualitative research provides meaningful insights into the program's effects on these outcomes. Here, we highlight potential program impacts in cooking practices, households' economic well-being, and community perceptions.

During qualitative research, quite many caregivers stated that they would 'anyways' cook the same meals at home as the ones provided at school. In previous research waves, caregivers rather

[8]Our data shows that the odds of attending preschool and receiving school meals were not different by FFE school cohort. In this case, we say a child was exposed to an FFE environment if they were in grade one and their caregiver said they received hot meals the previous year.

mentioned singular incidences when a child would request them to prepare the same meal at home as they ate in school. But now we recorded the tendency that a more substantial change in diet might have been implemented and is regarded as 'normal'.

*'We anyways cook these meals at home [like at school]. We cook beans, rice soup, and buckwheat. Only I couldn't bake the bread. I participated in healthy food training, so I cook only healthy food at home.' (Caregiver, Chuy oblast)*

During qualitative research, school representatives and teachers hinted at the fact that the school meal is relevant for reducing stress on the budgets of poorer households. Caregivers themselves did not admit to such a situation, but reflected that during pandemic-related closures of schools they needed to allocate more money for food. When caregivers articulated that their children do not eat at home, they stated that this would be 'because they do not want to eat' or because 'there would be no time' in the morning. Regardless of reason, it was widely reported by caregivers and school representatives that 'children come hungry' to school, which attests to the relevance (and reliance on) the meals provided there.

*'Sometimes we have enough time for breakfast and sometimes we don't have time for it. I trust that he [the son] can eat some meals at school. It is good that they eat hot meals because they can focus on the subjects.' (Caregiver, Osh oblast)*

As during previous fieldwork, respondents during the latest wave of qualitative research also reflected that the school feeding program would have a saving-effect on their household budget, and sometimes even a levelling-effect in stratified communities.

*'Before, children would bring money [to school] to eat snacks. At that time, those who brought money were from rich families. It was not equal for those who could not bring money.' (Vice-Principal, Osh oblast)*

When respondents were asked during qualitative research about what their children 'missed' during school closures, they initially spoke about 'studying' and 'being together' at school with teachers and friends. The school feeding program was usually not directly associated with this 'studying' and school-complex, but it was widely mentioned as an answer to a follow-up question on whether studying or school meals were 'missed more' by children during school closures.

*'What did you/your child miss more: school meals or learning at school? Why?'*
*'He [caregiver's son] missed everything: meals, studying and his classmates.' (Caregiver, Chuy oblast)*

*'Some students called me [during school closures] and said that they missed buckwheat. I think it was because they were used to eating this [at school].' (Teacher, Osh oblast)*

## Impact of the Social Behavior Change activities

*Impacts of the nutritional activities on nutrition knowledge and practices at home*

Here, we study the effects of SBC activities aimed at providing key nutrition knowledge and introducing healthier nutrition practices at home. Table 23 shows that caregivers who participated in the SBC activities had higher odds of having good nutrition knowledge. For instance, their odds of having good knowledge about foods rich in vitamin-A were 35% higher, even after controlling for characteristics such as age or education (Table 23, columns 1 and 2).

Although this is suggestive causal evidence of the program's impacts, our conclusions would be erroneous if, for example, the caregivers with more nutrition knowledge were more likely to participate in SBC activities. To make our analysis more robust, we use the panel structure of the data to control for household fixed effects. Instead of contrasting those caregivers who participated in the SBC nutrition activities against those who did not, we distinguish how caregivers participation status relates to changes in their probabilities of having good nutritional knowledge (column 3). Such analyses control for households time-invariant characteristics, eliminating issues complicating causal inference based only on cross-sections.

Our more robust estimations show that participating in SBC activities focused on nutrition has strong positive impacts: it increases the odds of having good vitamin-A related knowledge by 50% and good vitamin-C related knowledge by 40%. Although the point estimate is positive, we do not observe statistically significant changes in the odds of having good iron-related knowledge.

***Table 23: Impacts of participating in SBC nutritional activities on caregivers' nutritional knowledge***

| VARIABLES | (1) Vitamin-A | (2) Vitamin-A | (3) Vitamin-A | (4) Vitamin-C | (5) Vitamin-C | (6) Vitamin-C | (7) Iron | (8) Iron | (9) Iron |
|---|---|---|---|---|---|---|---|---|---|
| SBC nutrition | 1.34*** | 1.35*** | 1.50*** | 1.12** | 1.05 | 1.40** | 1.34*** | 1.26*** | 1.10 |
| | (0.07) | (0.08) | (0.17) | (0.06) | (0.06) | (0.18) | (0.07) | (0.07) | (0.12) |
| Observations | 7,558 | 7,558 | 2,007 | 7,558 | 7,558 | 1,565 | 7,558 | 7,558 | 1,946 |
| Covariates | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| HH FE | No | No | Yes | No | No | Yes | No | No | Yes |
| Number of id | | | 996 | | | 777 | | | 967 |

seEform in parentheses

*** p<0.01, ** p<0.05, * p<0.1

We implement the same approach to evaluate the effects of SBC on nutritional practices at home. We show the main results in Table 24. In terms of practices at home, we find that diets are significantly better for caregivers who participated in SBC activities than those who did not (Columns 1, 3, and 5). Moreover, our more robust estimations show some positive impacts on the quality of diets at home (Columns 2, 4, and 6). Specifically, the odds of having dietary diversity in the household above the critical value of 4 food groups increased by 49%, based on the Minimum Dietary Diversity for infant and Young Child Feeding indicator (MDD-IYCF). Although the point estimates are positive, we do not observe statistically significant changes on the Household Dietary Diversity Score, nor the odds of having dietary diversity in the household above the critical value of 4 food groups measured by the Minimum Dietary Diversity for Women (MDD-W).

The results suggest that SBC activities focused on nutrition underpin the program's impact on nutrition practices at home. Interestingly, the positive effects are particularly noticeable in children's diets.

***Table 24: Impacts of the SBC nutrition-focused activities on nutritional practices at home***

| VARIABLES | (1)<br>Diet diversity | (2)<br>Diet diversity | (3)<br>MDD-W>4 | (4)<br>MDD-W>4 | (5)<br>MDD-IYCF>4 | (6)<br>MDD-IYCF>4 |
|---|---|---|---|---|---|---|
| SBC nutrition | 0.14*** | 0.10 | 1.28*** | 1.15 | 1.29*** | 1.49*** |
| | (0.04) | (0.07) | (0.10) | (0.19) | (0.08) | (0.19) |
| Observations | 7,558 | 7,558 | 7,558 | 1,202 | 7,558 | 1,684 |
| R-squared | 0.04 | 0.08 | | | | |
| Covariates | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| HH FE | No | Yes | No | Yes | No | Yes |
| Model | OLS | OLS | logit | logit | logit | logit |
| Number of id | | 5,240 | | 598 | | 836 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

### *Impacts of promoting reading activities on learning practices at home*

This section studies the causal effects of participating in SBC activities focused on reading with children on learning practices at home.

We compare the learning environments of households where the caregiver participated in SBC reading activities against those where they have not. Moreover, following the same methods in the previous section, we contrast how caregivers' change in participation status relates to changes in learning environments at home.

Our results show that having participated in the reading promotion activities significantly improves the learning environment at home. SBC activities increased the odds of children having storybooks at home, getting help with homework, being told stories, and being read from books by 40-50% (Table 25).

***Table 25: Impacts of SBC reading promotion activities on learning practices at home***

| VARIABLES | (1)<br>has storybooks | (2)<br>gets help with homework | (3)<br>gets told stories | (4)<br>gets read from books |
|---|---|---|---|---|
| SBC reading | 1.41** | 1.47*** | 1.41*** | 1.50* |
| | (0.22) | (0.17) | (0.16) | (0.32) |
| Observations | 1,565 | 2,050 | 2,085 | 725 |
| Number of id | 778 | 1,019 | 1,037 | 360 |
| Covariates | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| HH FE | Yes | Yes | Yes | Yes |

seEform in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These insights were substantiated during qualitative research. Most respondents reported being aware of the literacy promotion activities, actively borrowing books from the school libraries, and also purchasing books themselves. Such awareness, for example, is reflected by being able to describe the design and contents of certain books.

*''Children got interested in reading books. Lately, parents started buying books. Our libraries don't have good books…Mercy Corps books are very illustrative and they are good quality books. We also made books ourselves. We tried to make similar books to Mercy Corps books.' (Principal, Chuy oblast).*

Other adjustments to the material learning environment at home were rarely mentioned by respondents. The following quote therefore represents an exceptional case of parental effort:

*'After this [reading event], I started reading books to my children. I explained to my husband that he also should read. Before, my children would do homework lying on the floor. But, after these training sessions, we bought bookshelves and put their books in them. And they started studying at the table. Before I would buy unnecessary things for my daughter, but now I buy books. They read books on the weekends. (Caregiver, Osh oblast)*

### *Social impacts of the FFE program*

Qualitative research revealed that reading is a social activity in multiple ways. Because reading at home has not been a much established practice, caregivers reported needing outside stimulus for getting involved in reading with their children. This stimulus may be a teacher 'telling' parents to read and/or buy books, or it may be a reading-related event. Respondents clearly reflected that following such outside stimulus, caregivers oftentimes engaged more in learning to read with their children and that their general interest increased.

*'…some parents said that until now they didn't know how to read with their children. One parent said that she was reading a story with characters and role-playing, and children started to be interested in reading books.' (Teacher, Osh oblast)*

*'We read all together, with my husband and grandparents. We played roles. My daughter liked it very much. After dinner, my daughter started bringing her books to read. We read together one fairy tale and discussed it. When she brings any new book, she brings it to us and asks that we read [together].' (Caregiver, Osh oblast)*

Furthermore, there were indications that such joint reading would improve the relatedness between caregivers and their children more generally and beyond reading itself.

*'It is good to read books together with children. It is valuable because you can develop connections between parents and children. You pay more attention to your child.' (Caregiver, Chuy oblast)*

*'We had activities where parents read stories with their kids. It was important because kids started getting interested in reading books. Because many parents say that they would not have enough time.*

*But this program taught that they should reserve time for reading books with their children. Parents started getting interested in books [too].' (Vice-Principal, Chuy oblast)*

As noted in previous research waves, the effect of either the school feeding program or the literacy promotion activities on local community dynamics is rather weak. Social exchanges among caregivers and with school representatives might evolve through new channels and change in regards to particular topics discussed, such as via the WhatsApp groups established in some settings; but eventually, they follow previously established patterns of communication and support, and do rarely lead to deeper or new integration.

The gendered disbalance among caregivers has been noted during previous research already. Also in this wave of qualitative fieldwork, caregiver respondents were almost exclusively female. Without exception, the few males represented in the sample provided non-substantial answers, primarily because they served as proxy interviewees for females and were not involved directly with the daily matters of nutrition or education.

## X. Discussion

The research presented in this report provides valuable information on the nutritional and educational status of Kyrgyz students in their first years of primary education. It also furnishes us with crucial insights on how children and household well being evolved during the COVID-19 pandemic and how the McGovern-Dole Food for Education and Child Nutrition Program (FFE) impacted children's education and nutrition.

Many children in Kyrgyzstan exhibit good nutrition knowledge and healthy food preferences. However, they continue engaging in harmful habits like junk food snacking. We document that unhealthy snacking practices among children have become more common and require attention. We provide evidence on how parents teach eating habits by example and why influencing caregivers' preferences could effectively change children's practices. Moreover, our impact analysis and the qualitative insights show that the SBC nutritional component positively shaped the nutritional knowledge and practices of caregivers who have participated in the activities. Even though many Kyrgyz households already had healthy food preferences and prepared well diverse diets, participating in the SBC activities helped families improve children's diets even more. It is essential to make sure that such positive impacts reach other members of the community.

The reading components of the SBC activities have been an effective way to improve learning environments and practice at home. They had a substantial positive impact on caregivers' attitudes towards the importance of reading and on the home reading environments. Even though the learning environments in Kyrgyz homes have ameliorated, there are many opportunities for improvement: many students live in households that do not read or tell stories to their children, and they lack elements crucial for child development, such as books and toys. For instance, reading at home continues to be a rare practice - and around one in four children in our study do not have any toys.

Currently, only one-third of caregivers participate in SBC activities organized by the program, and virtually all are female. Encouraging other family members to engage with children's nutrition and learning - and teaching them the best ways to do it - is crucial for children's development. The program promoted good practices through SBC messages on TV and virtual groups. We observe fewer people engaging with TV in Kyrgyzstan, but we provide evidence of growing opportunities to reach them through virtual channels like WhatsApp and Telegram.

Our research occurred in the middle of a global health crisis that has heavily affected children's education around the world. We interviewed children and caregivers in Kyrgyzstan before and during the COVID-19 pandemic. The timing of our study places us in a privileged position to study how the current crisis has negatively impacted children's education and whether the FFE program mitigated the pandemic adverse outcomes.

Indeed, it is of great concern the unlearning or less learning that occurred during the pandemic among students in Kyrgyzstan. Some students in our sample undertook the same exam before and after the beginning of the pandemic. We show that after one year and a half, the average student has unlearned some language skills: in the second survey, when they were about 9.5 years old, students performed worse in reading fluency and accuracy than in the first survey, when they were about eight years old.

Furthermore, we also compare the learning levels of students in second grade before and after the beginning of the school closures. Despite being older and, in principle, having received more months of school, we document that children enrolled in second grade after the start of the pandemic learned much less than those enrolled in second grade before the beginning of the pandemic.

In summary, our research shows significant learning losses due to COVID-19 school closures in Kyrgyzstan. But they did not affect every child equally (e.g., it was worse for the oldest students in our sample than the youngest). There is a need to identify students where significant losses in learning occurred more to target them with remedial education.

Nevertheless, it is encouraging to learn that the positive effects of receiving school meals in first grade may have counterbalanced the adverse consequences of the pandemic. We provide evidence of positive effects of the program on learning. Specifically, the learning gap between FFE school cohort groups was smaller when both groups received school meals in first grade than when only one group did. Our results demonstrate that the FFE program can still play a central and critical role in fostering learning, even as health conditions and other intrapersonal factors related to educational outcomes are generally quite good among Kyrgyz children.

In addition, one of the main findings in our study that supports the positive effects on learning of the school meals program is the improved outcomes of students who received school meals during preschool. Students that attended preschool and benefited from the feeding program were better-off than students who attended preschool but did not receive school meals. Providing school meals in preschool can improve learning outcomes through various paths such as improved nutrition and higher attendance. Despite the great impacts, early childhood education attendance is still low in Kyrgyzstan. Only one of two children in our sample attends preschool education, even

though all of the schools in our study are currently offering it, and from them only one third received school meals. Efforts to increase preschool education coverage supported by school feeding programs stand as a more effective way to improve learning in future grades.

## XI. Conclusions

In this study, we provide quantitative and qualitative evidence of the positive impacts of the McGovern-Dole Food for Education and Child Nutrition Program (FFE) on children development. Our report identifies the program impact pathways as well as areas for improvement. Future iterations of the program should build on these learnings to generate even larger impacts.

Specifically, this follow-up report provides compelling answers to the three research questions asked. We review the answers to these questions in turn.

RQ1: How was the status of nutrition in Kyrgyz households with primary grade children and how did it evolve over time?

Our analysis suggests that many children exhibit good nutrition knowledge and healthy food preferences, but also tend to eat unhealthy snacks. We observe increased unhealthy snacking among children in the 2021 summer compared to the winter in 2020, which can be explained by seasonality or being out of school.

While some caregivers have limited nutrition knowledge, many have healthy food preferences and prepare well diverse diets at home. We show that diets were better during the summer time, and that caregivers increased their nutritional knowledge over time. Both of these outcomes were positively influenced by the SBC nutritional activities.

RQ2: What is the impact of nutrition preferences, knowledge and practices on child health and education among Kyrgyz children?

Many Kyrgyz children display very good “intrapersonal characteristics” that determine learning outcomes, such as good health, low short-term hunger in class, high cognitive function and strong noncognitive skills. At the same time, we find that healthy and diverse nutrition plays a key role and has strong benefits for learning. In the baseline analysis, we show that it is associated with better executive function, literacy and numeracy, especially among grade 2 students.

Learning environments at Kyrgyz homes exhibit opportunities for improvement. Many households lack key inputs for children’s development such as toys and books, and do not have adequate reading practices. These environments have improved over time thanks to the SBC reading activities.

RQ3: What was the impact of the FFE program on nutrition, health, and education?

The COVID-19 health crisis resulted in school closures that negatively affected children's education. We document unlearning and learning losses among second and third graders in

Kyrgyzstan during the pandemic. Such adverse effects were mitigated by the positive impacts of the FFE program.

Our impact analysis comparing children in grade two who received school meals since grade one suggests that the program had a positive role fostering learning. Specifically, we document that the learning gap between FFE school cohort groups was smaller when both groups received school meals in first grade than when only one group did. Results were robust to different specifications, and they also appeared when we investigated students exposed to the program during preschool.

## Annex

### Program roll-out: schools and households differences by school cohort

In this section, we study if the schools where the program was implemented first (2018 FFE schools) --and the households attending these schools-- were systematically different from those where the program took place later (2019 FFE schools). This analysis is important because it help us identify whether the results could be influenced by group characteristics unrelated to the difference in exposures to the school meal program.

#### *Differences in school characteristics by school cohort*

In terms of structural differences between groups, Table 26 shows that FFE 2018 schools are significantly bigger than FFE 2019 schools, and they are less likely to have afternoon shifts. In grades offered, quality, and efficiency indicators, schools have similar characteristics.

In general, school characteristics are similar between cohorts.

***Table 26: Structural differences between FFE school cohorts***

| Variable | (1) 2018 school Mean/SD | (2) 2019 school Mean/SD | (3) Total Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|---|
| Years of preschool offered | 1.91 (1.50) | 1.92 (1.53) | 1.92 (1.51) | 0.01 |
| No. of years since preschool is offered | 5.21 (1.71) | 5.30 (1.45) | 5.26 (1.58) | 0.09 |
| School offers up to 11 grade | 0.92 (0.27) | 0.86 (0.35) | 0.89 (0.31) | -0.06 |
| Morning shift | 0.32 (0.47) | 0.30 (0.46) | 0.31 (0.46) | -0.03 |
| Afternoon shift | 0.08 (0.27) | 0.18 (0.39) | 0.13 (0.34) | 0.10* |
| Both shifts | 0.60 (0.49) | 0.52 (0.50) | 0.56 (0.50) | -0.08 |
| Total students 20/21 | 572.70 (385.07) | 425.47 (389.33) | 499.08 (392.94) | -147.23** |
| Share female students 20/21 | 0.49 (0.04) | 0.48 (0.06) | 0.48 (0.05) | -0.01 |
| Grade 2 (20/21)-Grade 1 (19/20) ratio | 1.00 (0.10) | 1.01 (0.12) | 1.00 (0.11) | 0.01 |
| Grade 5 (20/21)-Grade 1 (19/20) ratio | 0.91 (0.30) | 0.92 (0.41) | 0.92 (0.36) | 0.01 |
| Students-teacher ratio | 14.41 (5.28) | 13.09 (4.51) | 13.75 (4.94) | -1.32* |
| Teachers with a diploma (%) | 0.86 (0.18) | 0.83 (0.16) | 0.84 (0.17) | -0.02 |
| Avg. student-classroom ratio grade 1-3 | 29.48 (12.00) | 26.81 (13.27) | 28.15 (12.68) | -2.67 |
| Top score national exam | 146.95 (52.32) | 144.14 (55.36) | 145.55 (53.70) | -2.80 |
| Average score national exam | 104.14 (37.06) | 102.76 (38.78) | 103.45 (37.81) | -1.38 |
| Estimated university admition rate | 0.49 (0.24) | 0.48 (0.26) | 0.48 (0.25) | -0.01 |
| N | 77 | 77 | 154 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

*Differences in household and children characteristics by school cohort*

There may be little observable differences in school characteristics between cohorts. However, we find evidence of systematic differences on the type of households and children each school group hosts.

Table 27 shows that children are not different in age or gender between cohorts, but that those studying in 2018 schools were more likely to have attended early childhood education.

In respect to household characteristics, compared to FFE 2019 schools, FFE 2018 schools host richer households: the reported average monthly income per capita. Although there is no difference in the number of parents present at home, we see that 2019 households are bigger and host more siblings on average. We don't find differences on mother's and father's ages between cohorts, but we find that children attending FFE 2018 schools have better educated parents.

We find evidence of structural differences between school cohorts that need to be taken into account for the evaluation analysis. The program was rolled-out first in schools hosting richer and more educated households, with larger probabilities of having sent their kids to preschool. These differences could play a role in children's education and nutrition that go beyond the difference in exposure to the school meal program.

***Table 27: Structural differences between households by FFE school cohort***

| Variable | (1)<br>2018 school<br>Mean/SD | (2)<br>2019 school<br>Mean/SD | T-test<br>Difference<br>(2)-(1) |
|---|---|---|---|
| Child age | 7.14<br>(0.75) | 7.12<br>(0.77) | -0.02 |
| Child is a girl | 0.50<br>(0.50) | 0.50<br>(0.50) | 0.00 |
| Child attended preschool | 0.52<br>(0.50) | 0.45<br>(0.50) | -0.07*** |
| Avg. nominal monthly income per capita (SOM) | 3409.36<br>(3789.40) | 2952.90<br>(2354.76) | -456.46*** |
| Wealth index | -0.16<br>(1.85) | -0.54<br>(1.79) | -0.39*** |
| Household size | 5.84<br>(1.68) | 6.04<br>(1.74) | 0.20*** |
| No. of siblings | 2.20<br>(1.29) | 2.29<br>(1.33) | 0.09* |
| No. of parents | 1.66<br>(0.67) | 1.64<br>(0.70) | -0.02 |
| Mother's age | 29.60<br>(13.08) | 29.26<br>(13.39) | -0.34 |
| Father's age | 30.24<br>(16.69) | 30.19<br>(16.95) | -0.05 |
| Mother has tertiary education | 0.42<br>(0.49) | 0.36<br>(0.48) | -0.07*** |
| Father has tertiary education | 0.33<br>(0.47) | 0.27<br>(0.45) | -0.06*** |
| N | 1518 | 1517 | |

## Follow-up survey dropouts

Around one-quarter of the children in Phase I were not surveyed in Phase II. This section provides insights on significant differences between the children who stayed and those who left the survey. The results in this section only use the information from the baseline (Phase I).

### *Panel vs survey dropouts*

Table28 shows that slightly older children were more likely to drop out from the survey, but that there were no differences in likelihoods by gender.

The same table also shows that families with larger monthly incomes were more likely to drop out, although the difference in income means is rather small (around SOM$280 or .1 standard deviation). We don't evidence significant differences in assets or wealth holdings.

Moreover, households dropping from the survey were on average younger, and had parents less educated.

***Table 28: Sociodemographic characteristics of survey dropouts***

| Variable | (1) Panel Mean/SD | (2) Survey dropout Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Child age | 7.11 (0.76) | 7.20 (0.76) | 0.08*** |
| Child is a girl | 0.49 (0.50) | 0.51 (0.50) | 0.01 |
| Avg. nominal monthly income per capita (SOM) | 3113.63 (2683.56) | 3394.19 (4335.09) | 280.56** |
| Asset index | 7.22 (2.00) | 7.29 (2.12) | 0.07 |
| Wealth index | -0.37 (1.81) | -0.28 (1.89) | 0.09 |
| Household size | 5.98 (1.71) | 5.81 (1.72) | -0.17** |
| No. of siblings | 2.29 (1.29) | 2.11 (1.35) | -0.18*** |
| Mother's age | 30.02 (12.84) | 27.59 (14.27) | -2.43*** |
| Father's age | 31.17 (16.27) | 27.21 (18.11) | -3.96*** |
| Mother has tertiary education | 0.41 (0.49) | 0.34 (0.47) | -0.06*** |
| Father has tertiary education | 0.32 (0.47) | 0.26 (0.44) | -0.06*** |
| N | 2304 | 731 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 29 shows that the probability of dropping out from the survey was not statistically different by school cohort. However, those dropping out were less likely to benefit from the school feeding or SBC activities. They were 3 percentage points less likely to finish meals at school, parents or caregivers were 6 percentage points less likely to have ever tried a school meal, and around 5 percentage points less likely to have ever participated in nutrition, hygiene, or reading SBC activities.

***Table 29: program participation of survey dropouts***

| Variable | (1) Panel Mean/SD | (2) Survey dropout Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| FFE cohort 2019 | 0.50<br>(0.50) | 0.51<br>(0.50) | 0.01 |
| FFE cohort 2018 | 0.50<br>(0.50) | 0.49<br>(0.50) | -0.01 |
| Usually finishes hot meal at school | 0.85<br>(0.36) | 0.81<br>(0.39) | -0.03** |
| School meals: ever tried | 0.28<br>(0.45) | 0.24<br>(0.42) | -0.05** |
| Caregiver participated on SBC nutrition training | 0.28<br>(0.45) | 0.22<br>(0.41) | -0.06*** |
| Caregiver participated in SBC hygiene training | 0.24<br>(0.43) | 0.20<br>(0.40) | -0.04** |
| Caregiver participated in SBC reading training | 0.25<br>(0.44) | 0.20<br>(0.40) | -0.05*** |
| N | 2304 | 731 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups.
***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

In respect to health and school attendance, Table 30 shows that survey dropouts were missing more days of school on average, and their absenteeism was more likely due to health issues. Furthermore, they had a higher estimated short-term hunger index.

The table also shows that in terms of learning, children dropping out from the survey were less skilled (although the difference is only significant for working memory, grade 1 numeracy, grade 2 numeracy).

In conclusion, those households and children dropping out of the survey were worse off socioeconomically, were less likely to benefit from the program, and were more disadvantaged in terms of health and learning outcomes.

***Table 30: School attendance and learning outcomes of survey dropouts***

| Variable | (1) Panel Mean/SD | (2) Survey dropout Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| School absences due to health (last 30 days) | 1.02 (1.97) | 1.27 (2.09) | 0.25*** |
| Estimated short-term hunger in class | 0.85 (1.11) | 0.95 (1.18) | 0.10** |
| School days missed last 30 days | 1.40 (2.52) | 1.73 (2.82) | 0.32*** |
| School days missed last 30 days (health issues) | 1.02 (1.97) | 1.27 (2.09) | 0.25*** |
| Executive function | 11.45 (2.88) | 11.37 (2.88) | -0.09 |
| Working memory | 3.23 (0.80) | 3.16 (0.81) | -0.07** |
| Inhibitory control | 8.22 (2.56) | 8.20 (2.54) | -0.02 |
| Grit | 8.50 (2.39) | 8.54 (2.39) | 0.03 |
| Focus | 8.34 (2.41) | 8.33 (2.44) | -0.01 |
| Full literacy score (standardized) | -0.02 (1.18) | -0.01 (1.40) | 0.02 |
| Full numeracy score (standardized) | -0.17 (1.10) | -0.30 (1.17) | -0.13*** |
| N | 2304 | 731 | |

*Notes*: The value displayed for t-tests are the differences in the means across the groups. The covariate variables grade_1, and child_age are included in all estimation regressions. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

### *Survey dropouts comparison by school cohort*

Most relevant are the differences in survey dropouts by school cohort because these differences can lead us to wrongful conclusions. For example, if less skilled students in 2019 FFE schools were more likely to drop out than less skilled students in 2018 FFE schools, the average scores will be disproportional in favor of the 2019 FFE school group: the differences in averages between groups would be biased downwards.

The last column in tables 31 and 32 show whether the conditional probabilities of studying in a 2018 school and being a survey dropout are different from the conditioned probabilities of studying in a 2019 school and being a survey dropout. The lack of significance of all coefficients shown in the last column of the tables demonstrates that there are no additional differences between groups due to survey dropouts, apart from the already existent structural differences documented in the previous section.

## *Table 31: Socio-demographics survey dropouts comparison by school cohort*

| Variable | 2018 FFE School | | 2019 FFE School | | Difference-in-differences |
|---|---|---|---|---|---|
| | Panel | Survey dropouts | Panel | Survey dropouts | |
| | Mean/(SE) | Coef/(SE) | Mean/(SE) | Coef/(SE) | Coef/(SE) |
| | (1) | (2) | (3) | (4) | (5) |
| Child attended preschool | 0.52 | -0.00 | 0.45 | 0.00 | 0.01 |
| | (0.03) | (0.03) | (0.03) | (0.03) | (0.05) |
| Average monthly income per capita (SOM) | 74.79 | 25.62 | 52.31 | 44.62 | 19.00 |
| | (24.22) | (36.10) | (18.49) | (49.50) | (61.07) |
| Household size | 5.86 | -0.05 | 6.11 | -0.30*** | -0.25* |
| | (0.08) | (0.10) | (0.07) | (0.10) | (0.15) |
| Mother's age | 34.18 | -0.30 | 34.31 | -0.73* | -0.43 |
| | (0.19) | (0.37) | (0.20) | (0.39) | (0.53) |
| Mother has tertiary education | 0.44 | -0.08*** | 0.37 | -0.05 | 0.03 |
| | (0.03) | (0.03) | (0.02) | (0.03) | (0.04) |
| Father has tertiary education | 0.35 | -0.06** | 0.29 | -0.06** | 0.00 |
| | (0.03) | (0.03) | (0.02) | (0.02) | (0.04) |
| Chuy | 0.33 | 0.02 | 0.33 | 0.02 | -0.00 |
| | (0.05) | (0.03) | (0.05) | (0.04) | (0.05) |
| Talas | 0.02 | 0.00 | 0.03 | -0.00 | -0.00 |
| | (0.02) | (0.01) | (0.02) | (0.01) | (0.01) |
| Batken | 0.08 | 0.01 | 0.06 | 0.02 | 0.02 |
| | (0.03) | (0.02) | (0.03) | (0.02) | (0.03) |
| Jalal-Abad | 0.29 | -0.02 | 0.25 | -0.04 | -0.02 |
| | (0.05) | (0.03) | (0.05) | (0.03) | (0.05) |
| Issyk-Kul | 0.05 | 0.01 | 0.05 | 0.00 | -0.01 |
| | (0.02) | (0.01) | (0.03) | (0.01) | (0.02) |
| Naryn | 0.08 | -0.01 | 0.05 | 0.02 | 0.02 |
| | (0.03) | (0.01) | (0.02) | (0.02) | (0.03) |
| Osh | 0.15 | -0.02 | 0.24 | -0.02 | 0.00 |
| | (0.04) | (0.02) | (0.05) | (0.03) | (0.04) |
| N | 1147 | 1518 | 1157 | 1517 | 3035 |
| Clusters | 77 | 77 | 77 | 77 | 154 |

*Notes*: The baseline means only include observations not omitted in the 1st and 2nd differences. The number of observations in the 1st and 2nd differences includes both baseline and follow-up observations. ***, **, and * indicate significance at the .01, .05, and .1 percent critical level. All columns display standard errors clustered at variable school_id.

## *Table 32: Nutrition and education outcomes survey dropouts comparison by school cohort*

| Variable | 2018 FFE School | | 2019 FFE School | | Difference-in-differences |
|---|---|---|---|---|---|
| | Panel Mean/(SE) (1) | Survey dropouts Coef/(SE) (2) | Panel Mean/(SE) (3) | Survey dropouts Coef/(SE) (4) | Coef/(SE) (5) |
| Doesn't eats unhealthy snack | 0.39 | -0.03 | 0.33 | -0.03 | 0.00 |
| | (0.03) | (0.03) | (0.03) | (0.03) | (0.04) |
| Child food preference score | -0.21 | 0.27 | -0.06 | -0.02 | -0.28 |
| | (0.20) | (0.23) | (0.20) | (0.26) | (0.35) |
| Child prefers healthy foods | 0.48 | 0.01 | 0.51 | -0.04 | -0.05 |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.04) |
| Child knows that sweets are not good for health | 0.75 | 0.01 | 0.70 | -0.02 | -0.02 |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.04) |
| Dietary diversity score (24h) | 8.35 | 0.03 | 8.00 | 0.03 | 0.01 |
| | (0.07) | (0.08) | (0.09) | (0.10) | (0.12) |
| Number of vitamin A-rich food groups (24h) | 2.60 | -0.17* | 2.27 | -0.01 | 0.16 |
| | (0.08) | (0.08) | (0.08) | (0.09) | (0.12) |
| Good knowledge about vitamin A-rich foods | 0.61 | -0.03 | 0.61 | 0.01 | 0.04 |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.05) |
| Caregiver food preference score | 2.45 | -0.10 | 2.29 | -0.03 | 0.08 |
| | (0.18) | (0.19) | (0.19) | (0.23) | (0.30) |
| Any school absence due to health (last 30 days) | 0.36 | 0.05 | 0.36 | 0.07** | 0.02 |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.04) |
| Estimated short-term hunger in class | 0.87 | 0.01 | 0.84 | 0.20** | 0.19* |
| | (0.06) | (0.06) | (0.05) | (0.08) | (0.10) |
| Executive function | 11.69 | -0.12 | 11.21 | -0.06 | 0.05 |
| | (0.15) | (0.18) | (0.18) | (0.18) | (0.25) |
| Focus | 8.41 | -0.02 | 8.27 | -0.01 | 0.01 |
| | (0.13) | (0.17) | (0.15) | (0.16) | (0.23) |
| School days missed last 30 days (non-health related) | 0.36 | 0.04 | 0.41 | 0.11 | 0.07 |
| | (0.05) | (0.07) | (0.08) | (0.10) | (0.12) |
| Full literacy score (standardized) | 0.06 | -0.04 | -0.11 | 0.07 | 0.11 |
| | (0.05) | (0.07) | (0.05) | (0.08) | (0.11) |
| Full numeracy score (standardized) | -0.07 | -0.11 | -0.26 | -0.16* | -0.05 |
| | (0.06) | (0.07) | (0.06) | (0.08) | (0.11) |
| N | 1147 | 1518 | 1157 | 1517 | 3035 |
| Clusters | 77 | 77 | 77 | 77 | 154 |

*Notes*: The baseline means only include observations not omitted in the 1st and 2nd differences. The number of observations in the 1st and 2nd differences includes both baseline and follow-up observations. ***, **, and * indicate significance at the .01, .05, and .1 percent critical level. All columns display standard errors clustered at variable school_id.

## Assets evolution between surveys

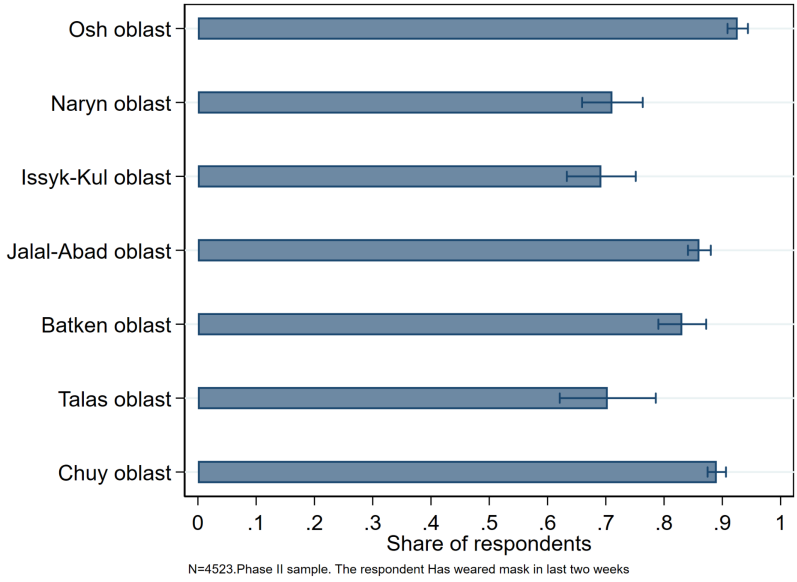
*Table 33: Households assets holdings by survey phase*

| Variable | (1) Phase 1 Mean/SD | (2) Phase 2 Mean/SD | T-test Difference (2)-(1) |
|---|---|---|---|
| Fridge: yes/no | 0.94 | 0.97 | 0.03*** |
| | (0.24) | (0.17) | |
| Stove: yes/no | 0.93 | 0.94 | 0.01 |
| | (0.25) | (0.24) | |
| Car: yes/no | 0.58 | 0.59 | 0.02 |
| | (0.49) | (0.49) | |
| Washing machine: yes/no | 0.92 | 0.94 | 0.02** |
| | (0.27) | (0.24) | |
| Hot shower: yes/no | 0.28 | 0.37 | 0.10*** |
| | (0.45) | (0.48) | |
| Computer: yes/no | 0.19 | 0.20 | 0.01 |
| | (0.39) | (0.40) | |
| Internet connection: yes/no | 0.86 | 0.91 | 0.05*** |
| | (0.35) | (0.28) | |
| Smartphone: yes/no | 0.88 | 0.95 | 0.07*** |
| | (0.32) | (0.21) | |
| Tablet: yes/no | 0.10 | 0.10 | 0.00 |
| | (0.30) | (0.30) | |
| TV: yes/no | 0.98 | 0.97 | -0.01 |
| | (0.14) | (0.17) | |
| Inside toilet with flush: yes/no | 0.17 | 0.22 | 0.05*** |
| | (0.38) | (0.41) | |
| Running water: yes/no | 0.40 | 0.49 | 0.09*** |
| | (0.49) | (0.50) | |
| N | 2304 | 2319 | |

*Notes*: Panel sample The value displayed for t-tests are the differences in the means across the groups. All missing values in balance variables are treated as zero.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

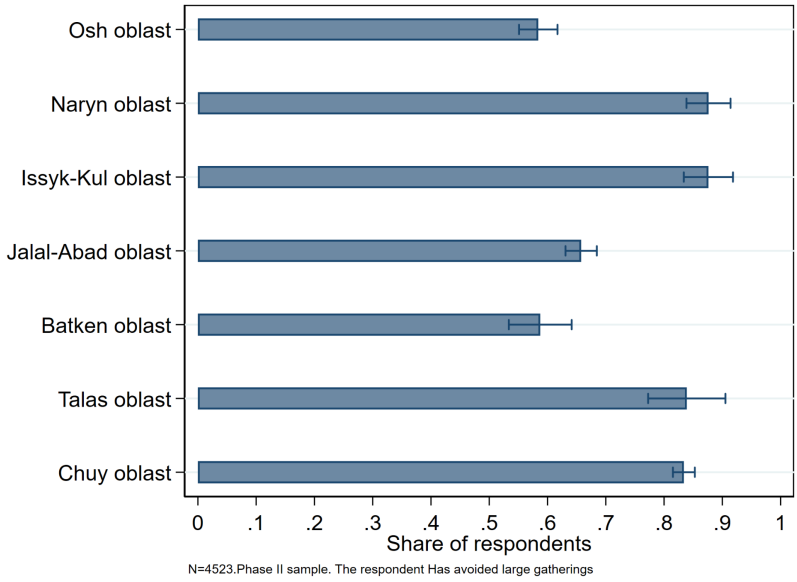
## Corona preventive behaviors by Oblast

***Fig: Share of respondents wearing a mask in the last 14 days by oblast***




N=4523.Phase II sample. The respondent Has weared mask in last two weeks

***Fig: Share of respondents avoiding large gatherings in the last 14 days by oblast***




N=4523.Phase II sample. The respondent Has avoided large gatherings