

How can school-based nutritional assistance programs foster child nutrition and learning?

Evidence from Kyrgyzstan

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Motivation

- Millions of children around the world face substantial challenges to their health and education during early childhood (ages 0-8)
- School-based nutritional assistance programmes a key form of intervention and now widely applied around the world
- Yet, only limited rigorous evidence on these programmes
 - Quantitative estimates of impact on early childhood development (ECD)
 - Pathways creating impact



This paper

- Child development in the context of the McGovern-Dole Food for Education and Child Nutrition (FFE) program in Kyrgyzstan
- Nationwide school-based nutritional assistance program funded by the USDA, implemented by Mercy Corps
- Research questions (RQs):

RQ1—What is the status of nutrition in Kyrgyz households with grade 1 and 2 children?

RQ2—What is the impact of nutrition on child health and education?

RQ3—What is the impact of the nutritional assistance programs on child nutrition, health and learning?

Framework of program impact pathways

1 Nutritional channels

- Nutrition and short-term hunger
- Health

2 Economic incentives

- School attendance / changes in time use
- Budget reallocation

3 Social impacts

- Social environment inside the household
- Social relations outside the household



The FFE program in Kyrgyzstan

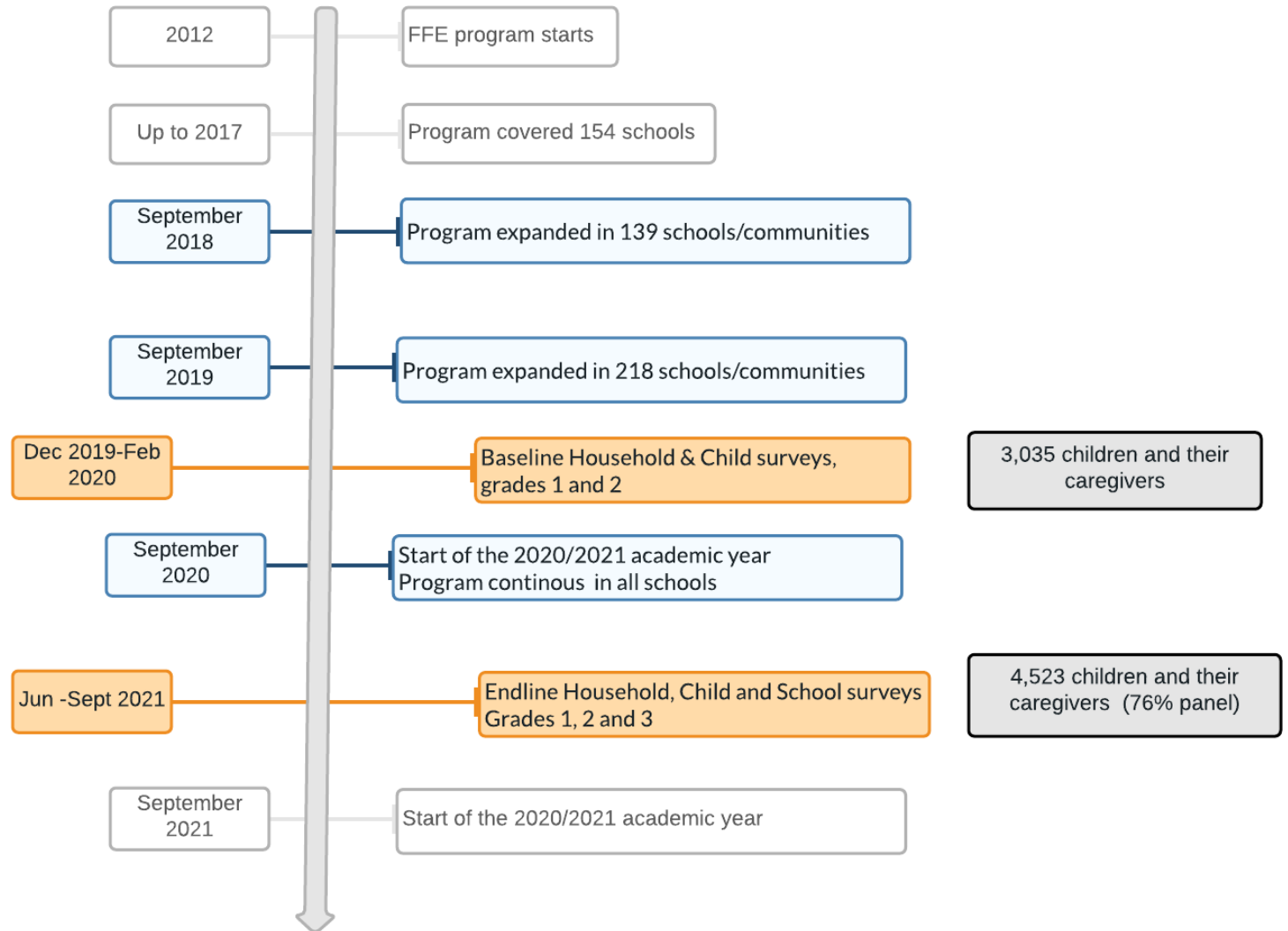
Multi-component nutritional assistance program implemented by Mercy Corps
Core component: provision of hot nutritious meals in primary schools with enriched commodities

Key additional component: Social and Behavioural Change (SBC) at the community level (caregivers as change agents).

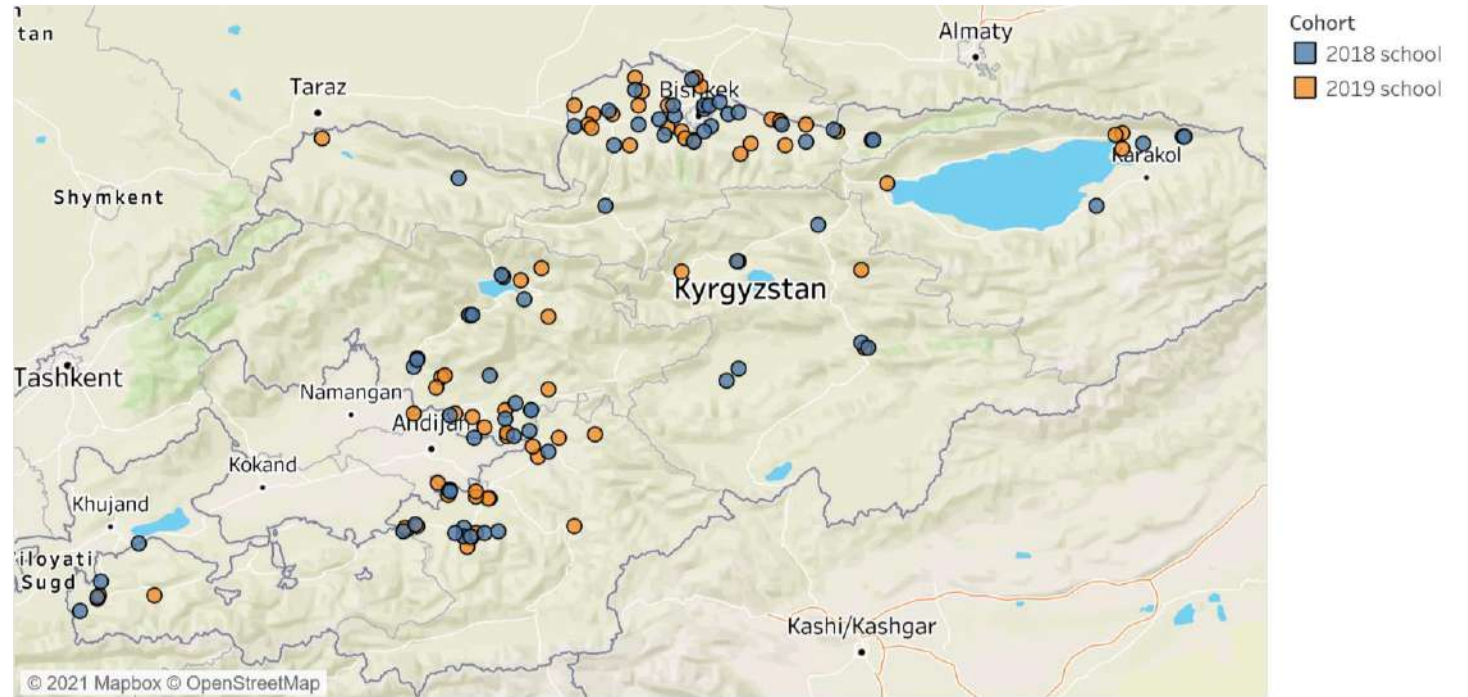
Topics: *First 1000 Days Nutrition (breastfeeding, complementary feeding), Dietary Diversity, Anemia Prevention, Handwashing and Hygiene*



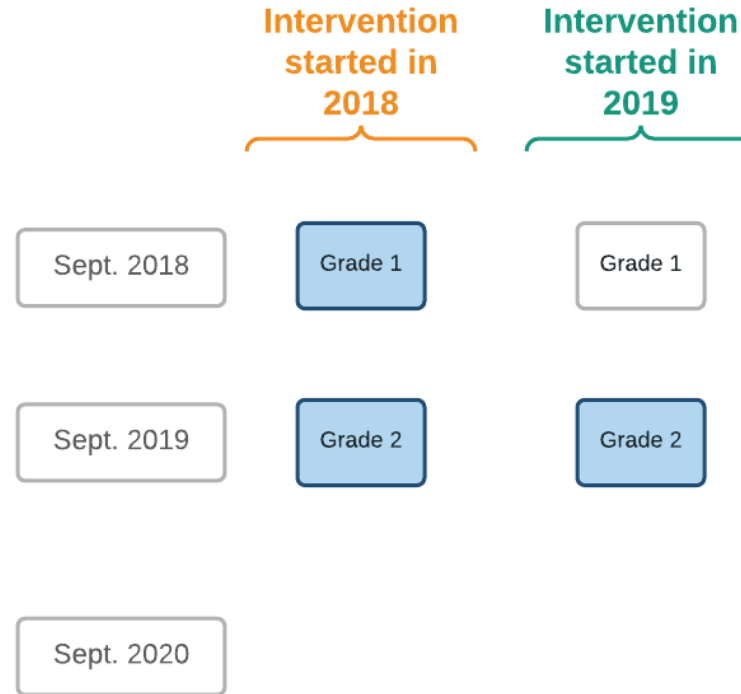
The timeline of the FFE program in Kyrgyzstan



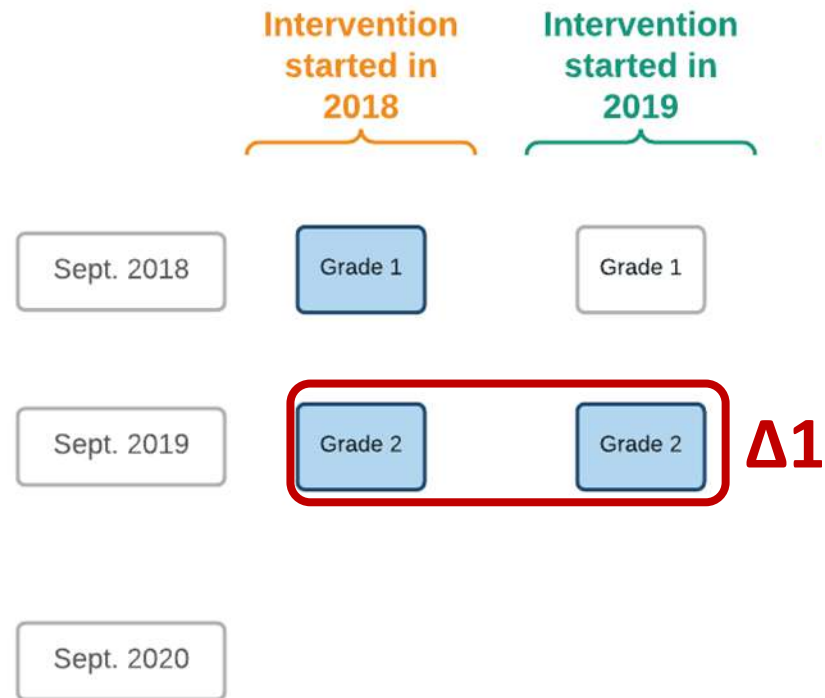
Schools' geographic location by cohort



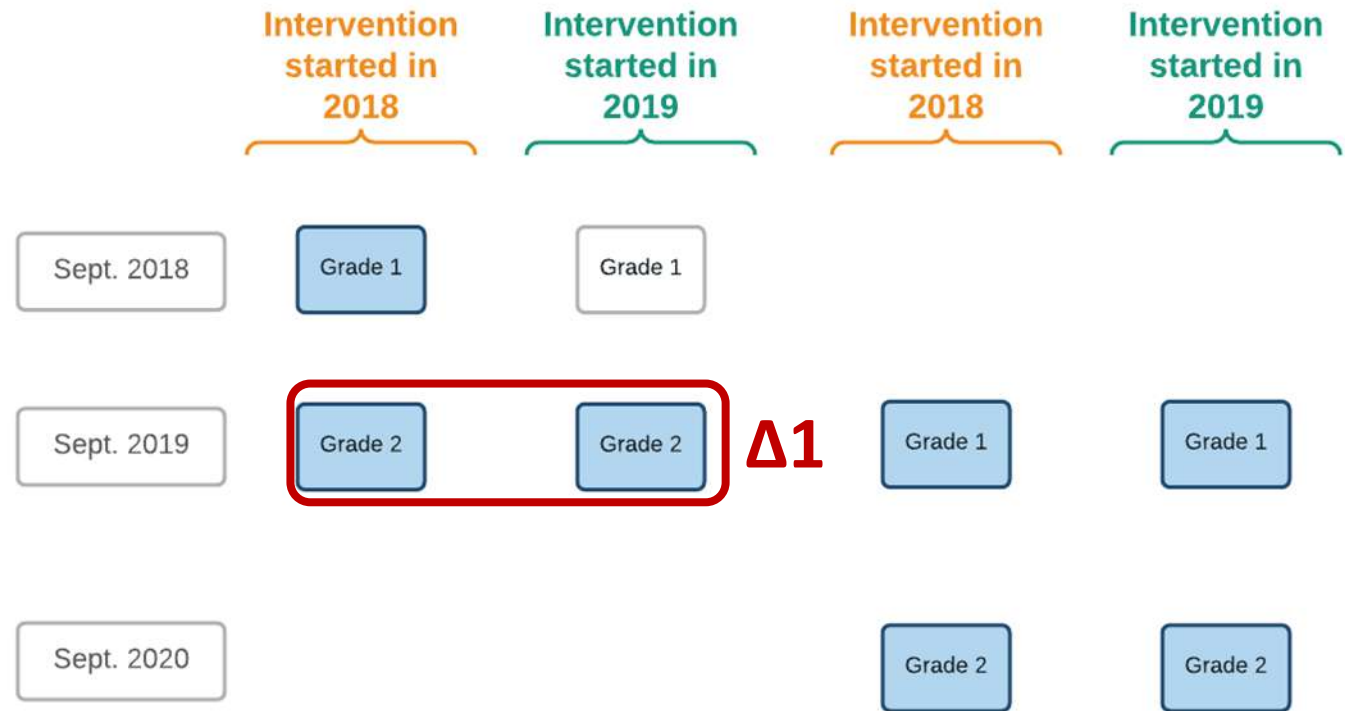
Impact evaluation design based on staggered rollout



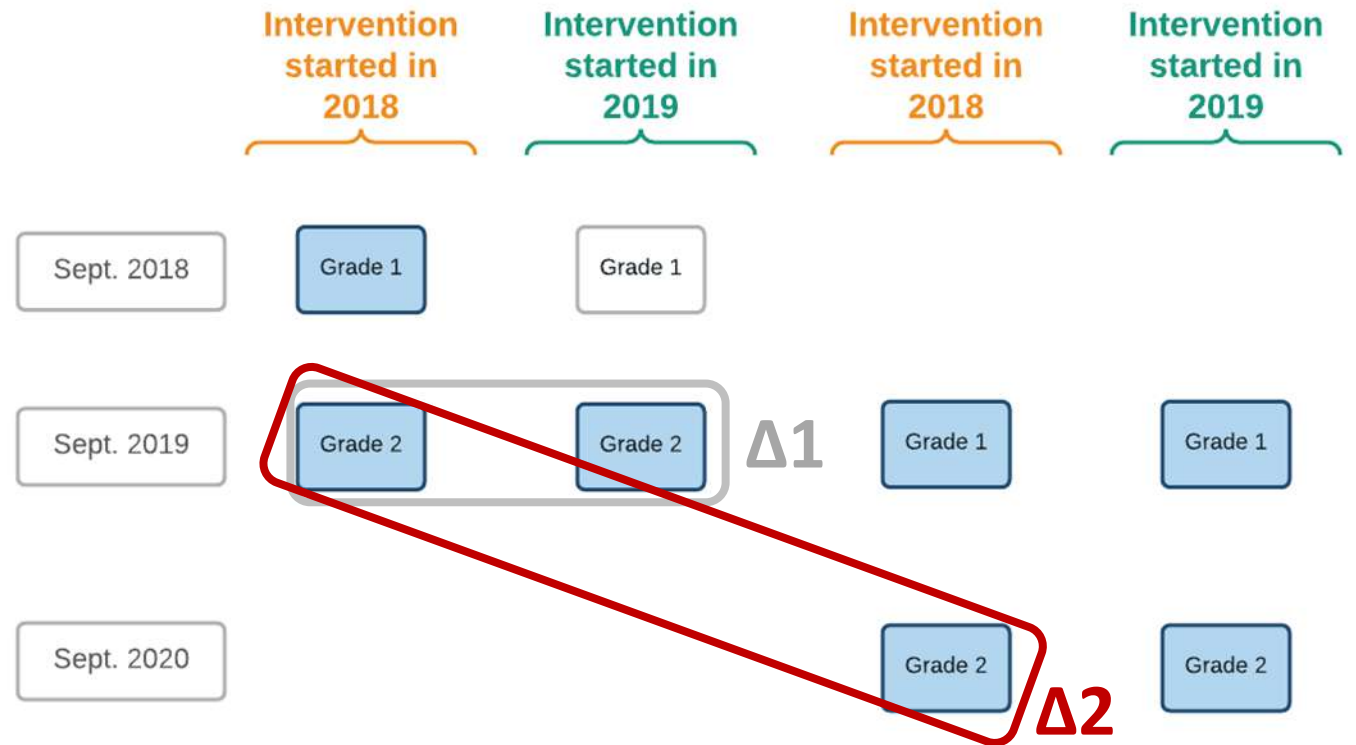
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Impact evaluation design based on staggered rollout

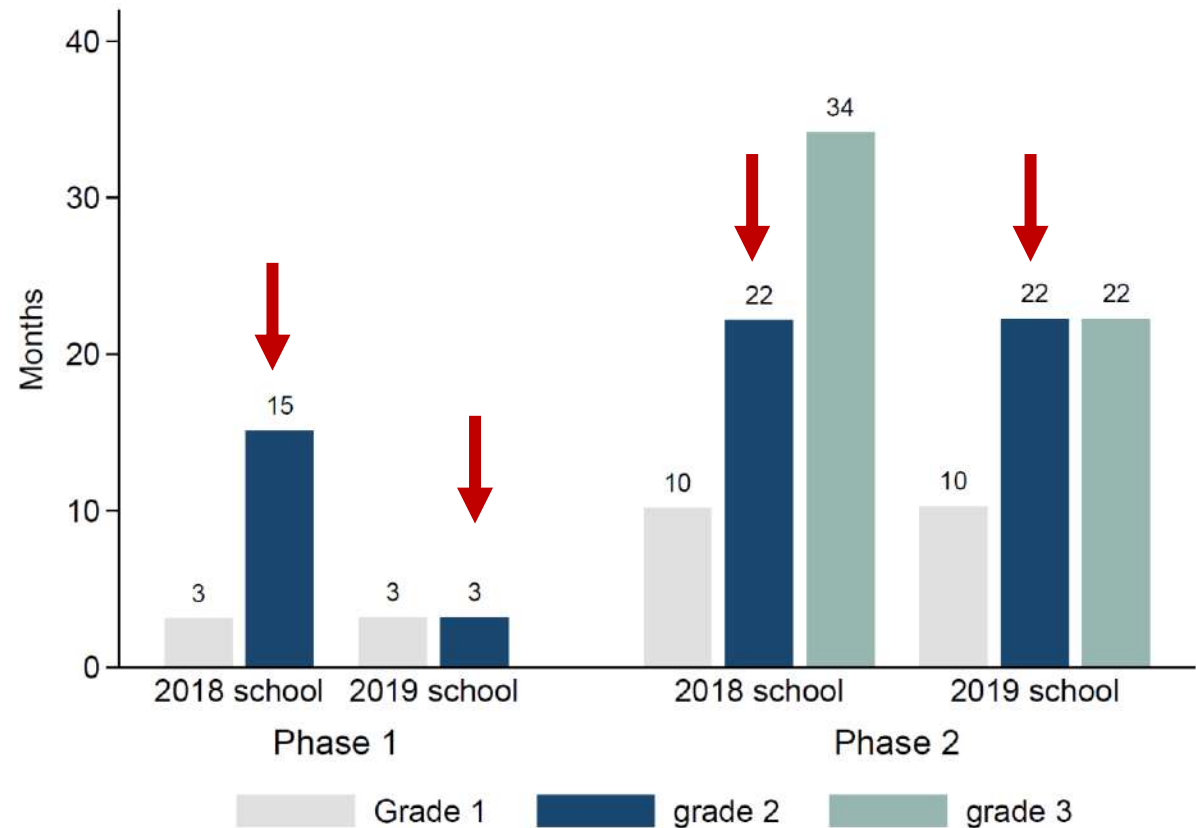


Impact evaluation design based on staggered rollout



Second graders exposure to the program at survey

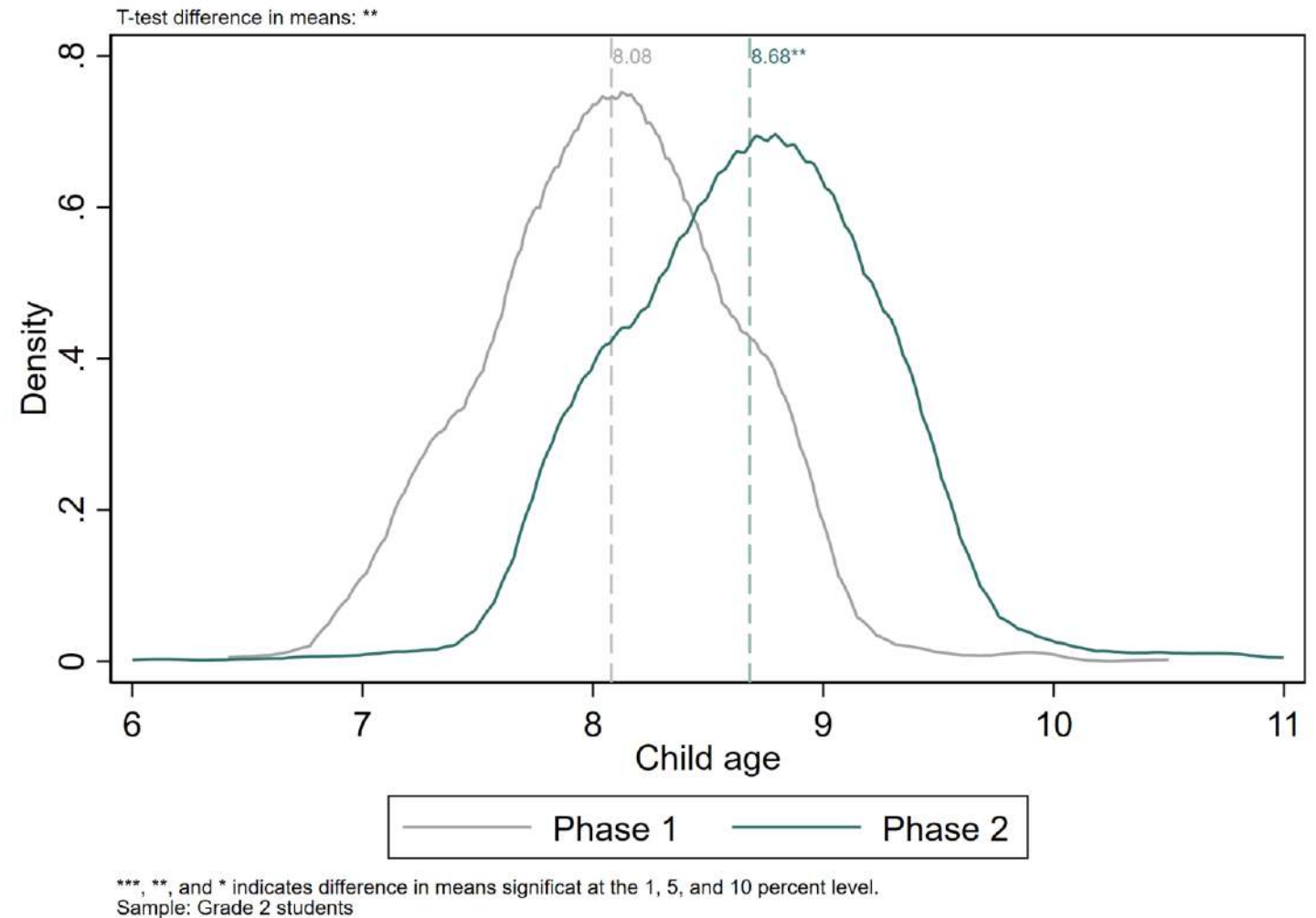
Figure 1: Months exposed to the program by school cohort and grade in phase 1 and 2



Mixed methods – Qualitative research

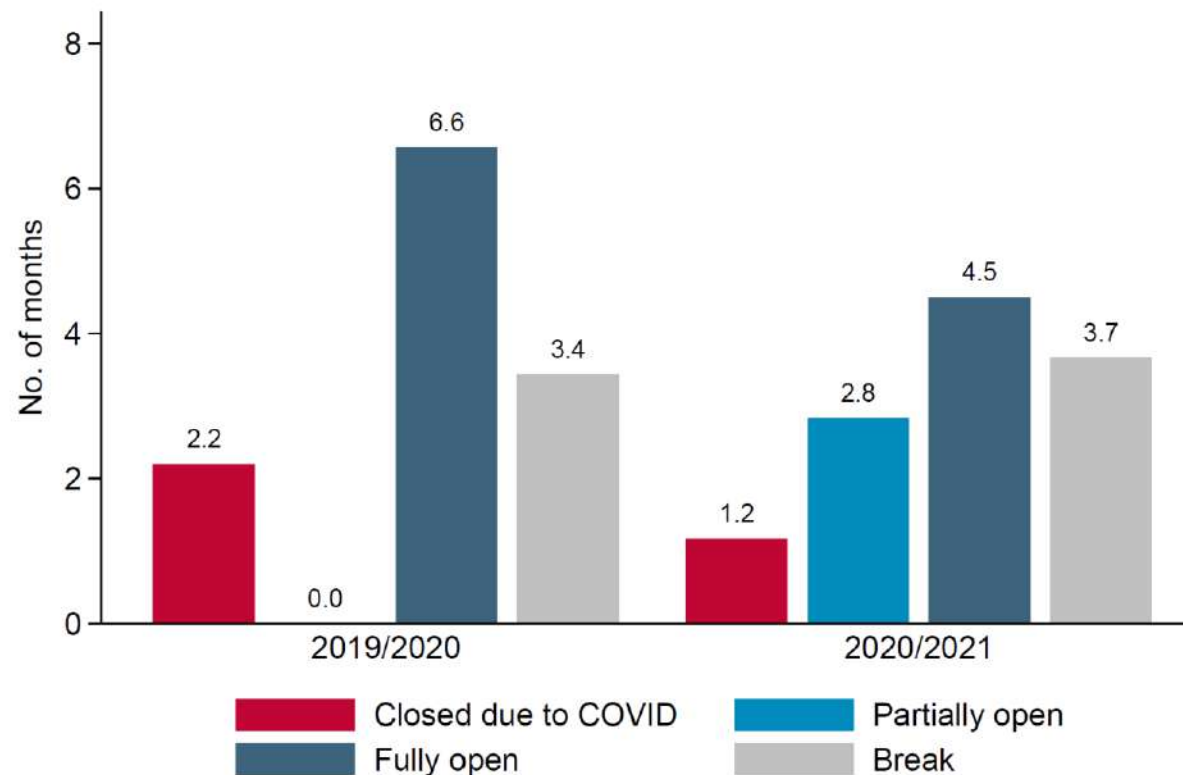
- In-depth ethnographic insights
- Two waves of qualitative research:
 - Wave 1: before the phase 1 survey to inform the quantitative design and testable hypotheses
 - Wave 2: after the phase 1 survey to validate and extend findings on outcomes and mechanisms.
 - Based on 40 in-depth conversations in 21 communities, with school representatives, teachers, caregivers, children and experts on nutrition and education familiar with the program.
 - Wave 3: after the second phase survey to validate and extend findings

Second graders age differences between surveys



School closures in Kyrgyzstan

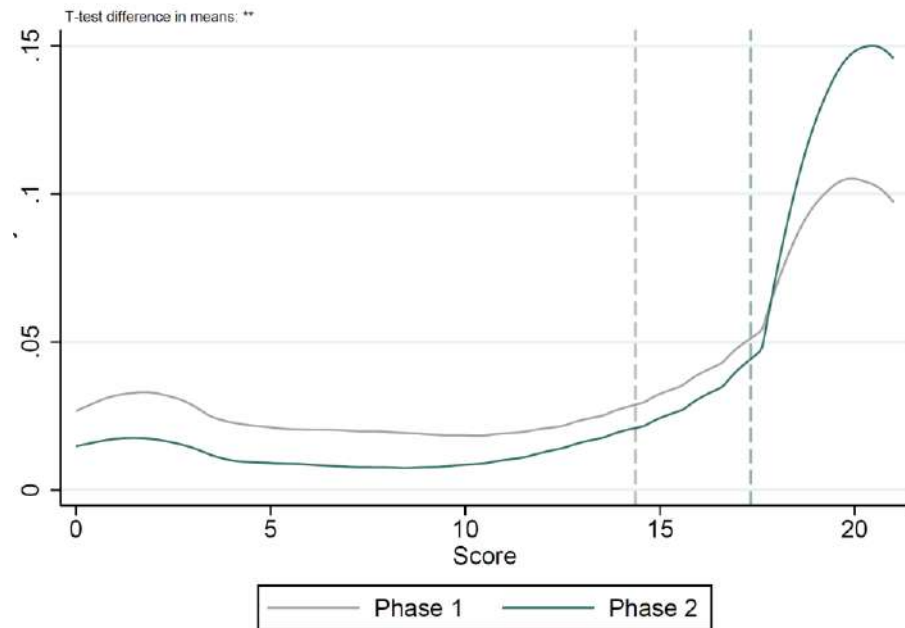
Figure 20: Schools status in Kyrgyzstan during the 2019/2020 and 2020/2021 academic years



Note: The academic year last around 9 months, from September to May.
Source: UNESCO

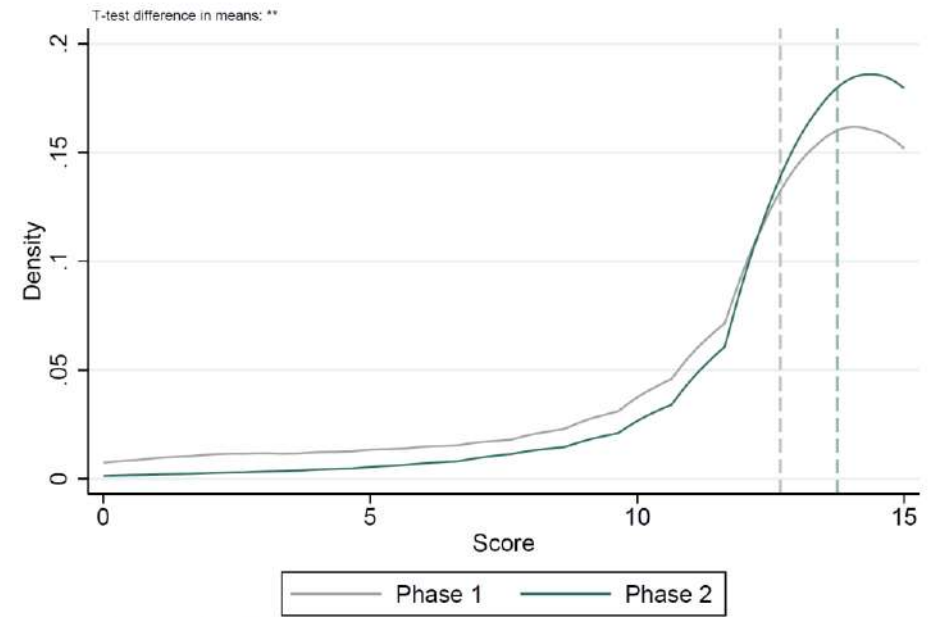
First graders evolution on literacy and numeracy

Figure 8: Grade 1 literacy scores by phase



N=3023. ***, **, and * indicates difference in means significant at the 1, 5, and 10 percent level.

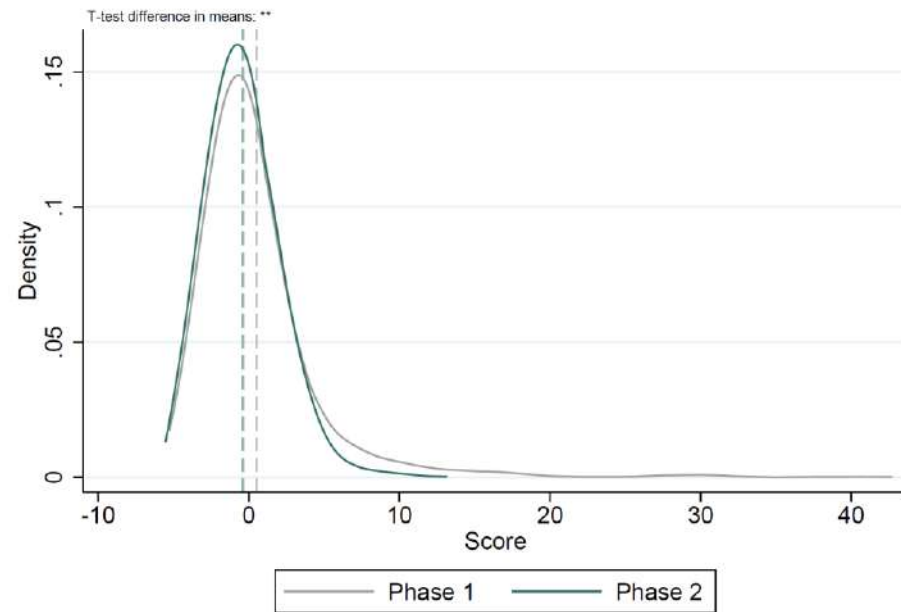
Figure 9: Grade 1 numeracy scores by phase



N=3020. ***, **, and * indicates difference in means significant at the 1, 5, and 10 percent level.

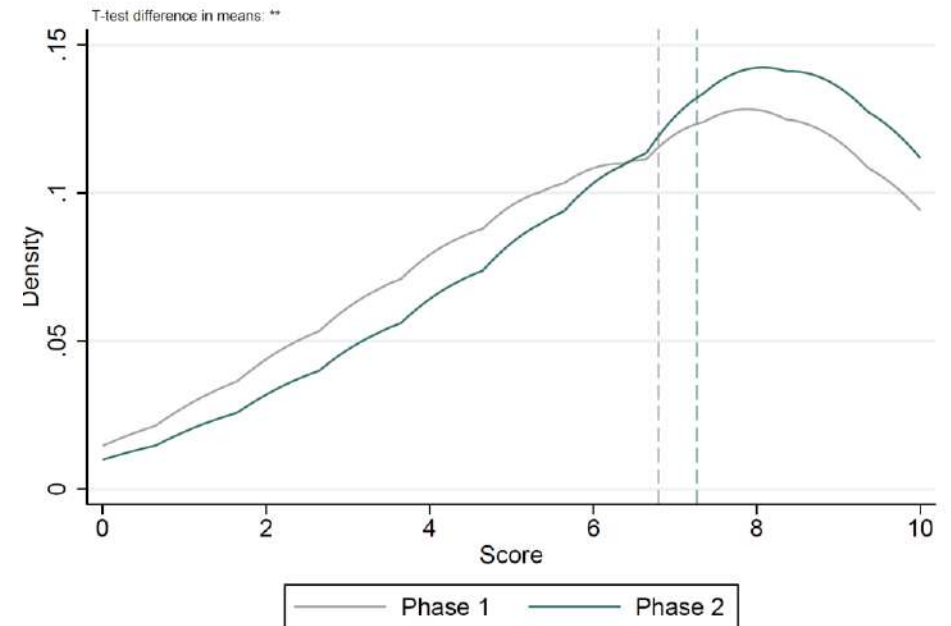
First graders evolution on literacy and numeracy

Figure 10: Grade 2 literacy scores by phase



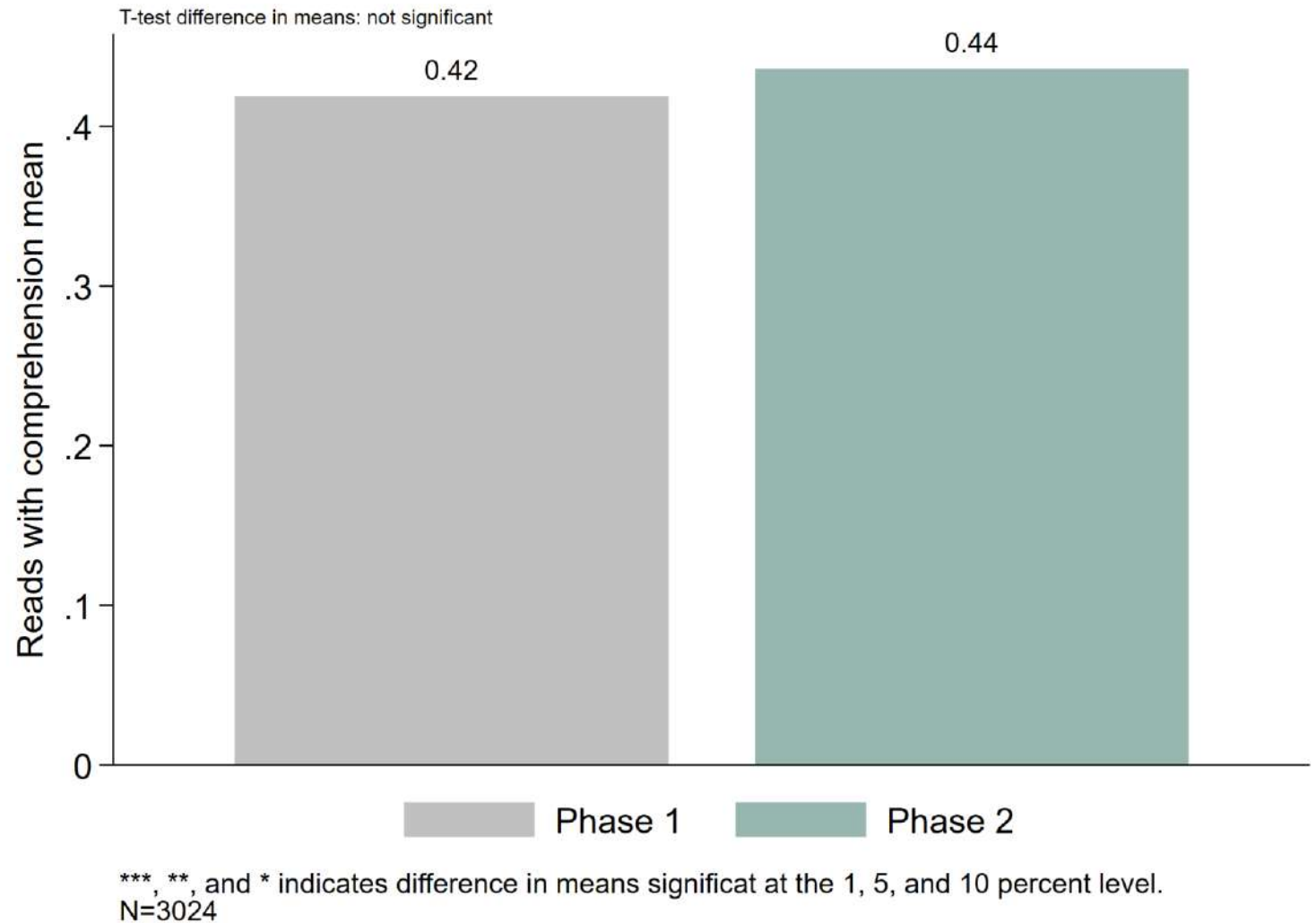
N=3026. ***, **, and * indicates difference in means significant at the 1, 5, and 10 percent level.

Figure 11: Grade 2 numeracy scores by phase



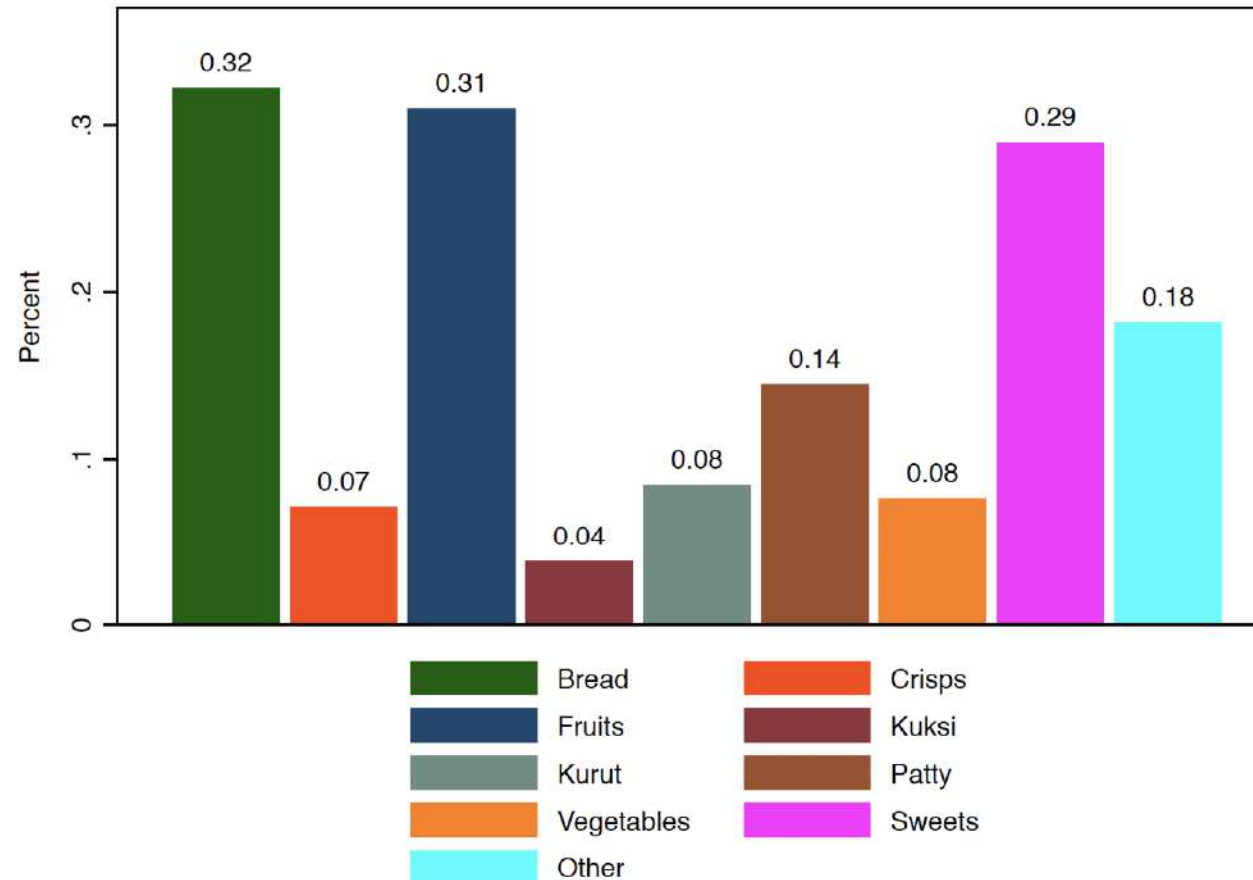
N=3018. ***, **, and * indicates difference in means significant at the 1, 5, and 10 percent level.

Second graders reading with comprehension



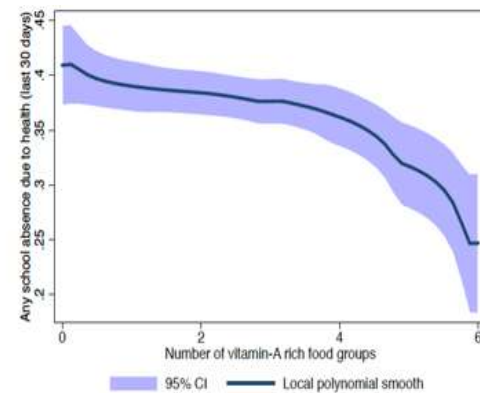
Many children eat snacks, including unhealthy ones

- Many children exhibit good nutrition knowledge and healthy food preferences
- But 75% eat snacks between meals, some of which are rather unhealthy:

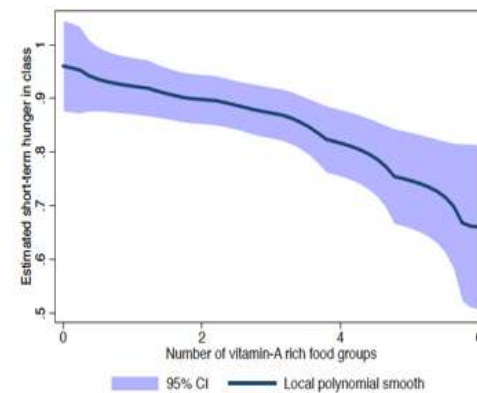


Healthy and diverse nutrition has strong benefits for learning

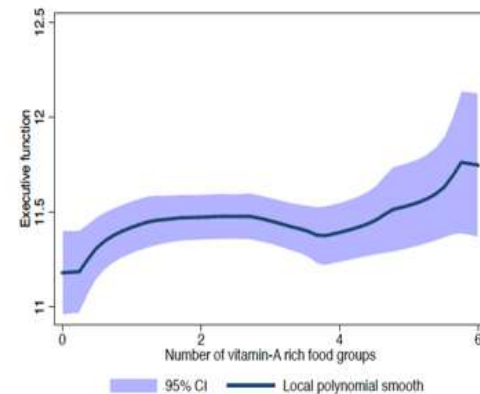
Ex.: Household diets that are rich in vitamin A are strongly associated with better child health, less short-term hunger, better executive function, and higher literacy and numeracy.



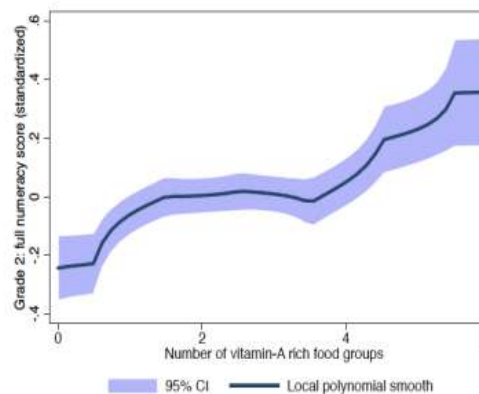
(a) School absence due to health issue.



(b) Short-term hunger in class.



(c) Executive function.



(d) Grade 2: numeracy.

Strong program benefits among grade 2 students

- Increased numeracy and executive function
- Improved nutritional knowledge among child
- Improved nutritional practices at home
- No evidence for social or economic impacts

	Full	FFE	No FFE	Diff	p
Nutrition: child level					
→ Did not eat unhealthy snack	0.36	0.40	0.32	0.07***	0.00
Food preference score	0.03	-0.00	0.07	-0.07	0.72
Has healthy food preferences	0.52	0.51	0.53	-0.02	0.40
→ Knows that sweets are not good for health	0.75	0.78	0.72	0.06**	0.01
Nutrition at home					
→ Household dietary diversity	8.20	8.39	8.02	0.37***	0.00
→ Number of vitamin A-rich food groups	2.42	2.58	2.26	0.33***	0.00
Good knowledge about vitamin A-rich foods	0.60	0.60	0.60	-0.01	0.84
Caregiver's food preference score	2.32	2.38	2.27	0.10	0.54
Health and foundations of learning					
School absence due to health issue	0.35	0.37	0.34	0.03	0.25
Estimated short-term hunger in class	0.85	0.85	0.84	0.01	0.83
→ Executive function	11.84	12.07	11.61	0.47***	0.00
Focus	8.57	8.65	8.49	0.16	0.17
School days missed last 30 days (non-health related)	0.34	0.36	0.32	0.04	0.41
Learning					
Grade 2: full literacy score (standardized)	0.00	-0.00	0.01	-0.01	0.81
→ Grade 2: full numeracy score (standardized)	0.00	0.14	-0.13	0.26***	0.00

Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01.

Similar benefits among *grade 1* students in program communities

- Increased numeracy scores and executive function
- Improved nutritional knowledge among child
- Improved nutritional practices at home
- Were *not* treated at school! Spillover effects?

		Full	FFE	No FFE	Diff	p
	Nutrition: child level					
→	Did not eat unhealthy snack	0.33	0.35	0.31	0.04*	0.07
	Food preference score	-0.23	-0.28	-0.18	-0.10	0.64
	Has healthy food preferences	0.48	0.47	0.48	-0.01	0.61
→	Knows that sweets are not good for health	0.70	0.73	0.66	0.07***	0.00
	Nutrition at home					
→	Household dietary diversity	8.16	8.32	8.00	0.32***	0.00
→	Number of vitamin A-rich food groups	2.41	2.54	2.28	0.26***	0.00
	Good knowledge about vitamin A-rich foods	0.61	0.60	0.63	-0.03	0.27
	Caregiver's food preference score	2.38	2.46	2.30	0.16	0.37
	Health and foundations of learning					
	School absence due to health issue	0.39	0.38	0.41	-0.03	0.22
	Estimated short-term hunger in class	0.91	0.89	0.92	-0.03	0.60
→	Executive function	11.06	11.27	10.84	0.43***	0.01
	Focus	8.12	8.17	8.07	0.10	0.45
	School days missed last 30 days (non-health related)	0.34	0.33	0.35	-0.02	0.69
	Learning					
	Grade 1: full literacy score (standardized)	0.01	0.06	-0.05	0.11**	0.03
→	Grade 1: full numeracy score (standardized)	-0.00	0.05	-0.05	0.09*	0.07

Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01.

Stronger program benefits among grade 2 students with SBC component

- Stronger impacts on learning outcomes with SBC than without SBC
- SBC component appears to underpin and support nutritional impact channels

	Full	SBC	No SBC	Diff	p
Nutrition: child level					
Did not eat unhealthy snack	0.40	0.38	0.40	-0.02	0.70
Food preference score	-0.00	0.58	-0.25	0.83***	0.01
Has healthy food preferences	0.51	0.54	0.49	0.04	0.28
Knows that sweets are not good for health	0.78	0.82	0.77	0.05	0.11
Nutrition at home					
→ Household dietary diversity	8.39	8.56	8.31	0.25**	0.02
Number of vitamin A-rich food groups	2.58	2.67	2.55	0.12	0.25
Caregiver knows vitamin A-rich foods	0.60	0.59	0.60	-0.00	0.93
Caregiver's food preference score	2.38	2.69	2.24	0.45*	0.08
Health and foundations of learning					
→ School absence due to health issue	0.37	0.42	0.35	0.07*	0.06
Estimated short-term hunger in class	0.85	0.77	0.89	-0.12	0.16
Executive function	12.07	12.07	12.08	-0.00	0.98
Focus	8.65	8.79	8.59	0.21	0.22
School days missed last 30 days (non-health related)	0.36	0.30	0.39	-0.09	0.27
Learning					
Grade 2: full literacy score (standardized)	-0.00	0.04	-0.02	0.06	0.40
→ Grade 2: full numeracy score (standardized)	0.14	0.23	0.10	0.14*	0.08

Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01.

Conclusions

- School-based nutritional assistance programs can play a critical role for fostering learning
- Driven by nutritional channels, rather than by economic or social impact channels
- SBC components strengthen impact of hot meal provision
- We observe similar gains in nutrition and learning among children in programme communities who were *not* direct beneficiaries in the past school year
 - Positive spillover effects or structural differences between schools/communities?
 - More research required to shed further light on this question

Thank you

We appreciate any feedback, either now or later by email

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Data collection summary



Table 1: Data collection 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

Summary statistics

	Mean	S.D.	Min.	Max.
Child age	7.14	0.76	3	10
Child is a girl	0.50	0.50	0	1
Household size	5.94	1.71	2	15
Main language at home is Kyrgyz	0.83	0.38	0	1
Main language at home is Russian	0.08	0.27	0	1
Main language at home is Uzbek	0.08	0.27	0	1
Grade 1	0.50	0.50	0	1
Grade 2	0.50	0.50	0	1
Oblast				
Batken	0.07	0.26	0	1
Chuy	0.34	0.47	0	1
Issyk-Kul	0.05	0.22	0	1
Jalal-Abad	0.26	0.44	0	1
Naryn	0.06	0.24	0	1
Osh	0.19	0.39	0	1
Talas	0.03	0.16	0	1

Summary statistics (continued)

	Mean	S.D.	Min.	Max.
FFE program indicators: child				
FFE cohort 2019	0.50	0.50	0	1
FFE cohort 2018	0.50	0.50	0	1
Usually finishes hot meal at school	0.84	0.37	0	1
FFE 2018 program indicators: caregiver				
Ever tried a school meal	0.33	0.47	0	1
Ever participated in SBC training on nutrition	0.27	0.45	0	1
Total number of nutrition topics trained on	1.13	1.97	0	5
Ever participated in SBC training on hygiene and sanitation	0.24	0.43	0	1
Ever saw SBC message on TV	0.68	0.47	0	1
<hr/>				
N	3035			