The Impacts of School Reopening in the Pandemic: Evidence from Brazil

Pre-analyis Plan

February 2021

Abstract: This study evaluates the educational and health impacts of school reopening in the context of the Covid-19 pandemic in São Paulo, Brazil. We randomly assign nudges via text messages (SMS) to encourage students to attend in-person classes, compliant with the State policy under safe school reopening protocols. We then leverage random variation in attendance across schools induced by nudges to estimate the causal effects of school reopening on students' educational and health outcomes, their families' health and economic outcomes, and school staff's health outcomes.

Keywords: Covid-19, School reopening, Education, Health, Economic Impacts.

1 Introduction

In order to minimize the impacts of the Covid-19 pandemic, an array of non-pharmaceutical measures – from mandatory face masks to social distancing to lockdowns – were adopted around the world. Recent evidence documents that these measures effectively reduced the spread of the disease and saved lives (Friedson et al., 2020, Dave et al., 2020 and Sears et al., 2020, Carneiro et al., 2020). However, these measures also generated significant costs to society. One of the most concerning effects of lockdown measures is the closure of schools.

The costs of school closure might have direct and indirect effects on students, their families and school staff. The direct effects include effects on learning and health outcomes. Students might not adapt to remote teaching, reduce learning, or even permanently drop out of the school system. Similar school interruptions have been associated with short and long-run negative effects on students in other circumstances (Meyers and Thomasson, 2017; Belot et al., 2010), which is consistent with the early evidence on the recent interruptions (Madonado and De Witte, 2020; Engzell et al., 2020). Furthermore, these adverse effects might be particularly strong for low-income students, amplifying existing inequalities (Haeck and Lefebvre, 2020).

On the other hand, school closure might prevent Covid-19 infections. Nonetheless, it is not clear that the schools' closure is a particularly effective measure to contain Covid-19 spread since young generations are less susceptible to Covid-19 infection than adults (Snape and Viner, 2020). The fact that schools' closure was implemented simultaneously to other lockdown measures also hinders specific impact evaluations.

The closure of schools may also generate indirect economic costs to families. Children in online classes require supervision and some technological equipment, which might restrict the labor supply and diminish the productivity of students' family members.

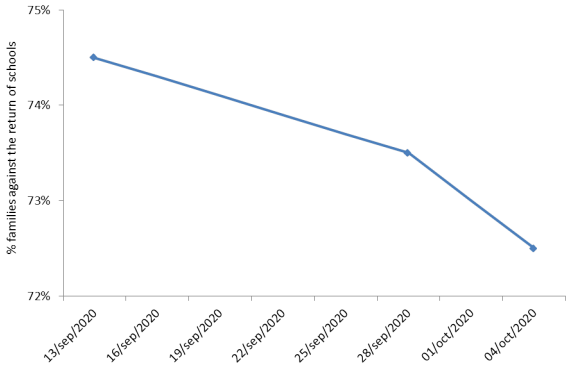
This study attempts to provide a broad picture of school reopening on health, education and economic outcomes of students, school staff and their families. Through a partnership with the São Paulo State's Education Secretariat (SEDUC-SP), in Brazil, we combine experimental and quasi-experimental methods to quantify the trade-offs brought about by the decision to reopen schools in terms of their potentially positive effects on students' educational outcomes and their potentially negative effects on students', school staff's and their families' health outcomes, due to their direct and indirect effects on the spread of Covid-19. We also study the joint distribution of educational benefits and health costs by students' and families' characteristics.

SEDUC-SP will provide researchers with administrative data on the school reopening process, as well as data on remote learning activities and educational outcomes available throughout the length of the evaluation. In partnership with the State Health Secretariat, SEDUC-SP will also provide researchers with detailed and geo-referenced information on Covid-19 cases, hospitalizations and fatalities. This information will be complemented with phone surveys, directly administered by the research team, that contact either students themselves

(grades 10 to 12) or students' caregivers (grades 6 to 9).

There are two important challenges in the evaluation of the causal effects of school reopening. First, the reopening sequence is not random and may be influenced by the current state of the disease in each municipality or the state of local schools. Thus, simple comparisons between schools that reopened and schools that did not are unlikely to identify causal effects on either health and education outcomes.

Second, the fact that schools officially reopen does not guarantee that students will effectively return. Families might be skeptical about schools' effective functioning under the pandemic or might be afraid that children get sick and thus avoid sending them back to school. Reports by our implementing partner document that, by the end of 2020, over 70% of students and their caregivers were against returning before a vaccine becomes available.



Note: SMS surveys conducted by Movva with over 10,000 caregivers (grades 6 to 9) and students (grades 10 to 12) asking them about their motivation to return to school once they reopen.

For these reasons, we conduct an experiment to induce random variation in in-person attendance across schools. We will randomly assign nudges via text messages to students and their caregivers in some schools but not others, to motivate them to return to in-person classes under safe school reopening protocols. Similar low-cost interventions have been shown to be effective in incentivizing students in similar contexts (Yeager et al., 2019, Bettinger et al., 2020; Lichand and Wolf, 2020). If this intervention effectively increases students' in-person attendance relative to control schools, then we can directly evaluate the effect of school reopening on the outcomes of interest. This SMS experiment received ethical clearance from the UZH-OEC Ethical Committee and by the São Paulo State' Government Secretariat (through its Steering Committee for Data and Information Governance, CDESP).

We complement the experimental analysis with a quasi-experimental approach. The State is partitioned into 17 health regions. The São Paulo State' COVID-19 plan classifies each region into different risk zones, according to the current local disease activity. Such risk zones directly influence school reopening for all municipalities within each zone. Since February 8, 2021, schools in

municipalities with low disease activity (green zone) have a mandatory return to in-person classes with up to 100% daily capacity; those with low to moderate disease activity (yellow zone) have a mandatory return to in-person classes with up to 70% daily capacity; those with moderate to high disease activity (orange zone) or with high disease activity (red zone) have an optional return to in-person classes with up to 35% daily capacity. Classifications can be revised weekly.

Table 1: School in-person activities by COVID-19 risk zone

Reopening phase	Mandatory return	Maximum occupation
Red phase	no	35%
Orange phase	no	35%
Yellow phase	yes	70%
Green phase	yes	100%

Because transitions between zones depend on pre-specified cutoffs based on criteria such as per capita new COVID-19 cases, hospitalizations and deaths, and the share of free ICU beds earmarked for COVID-19 patients, these rules generate a set of discontinuities for municipalities just below and just above each cutoff. We will take advantage of these discontinuities as a natural experiment to identify the causal effect of school reopening on the outcomes of interest using a regression discontinuity design.

2 Research questions and hypotheses

The study will investigate the following research questions and will test the following hypothesis.

1. What effects will school reopening have on students' educational outcomes?

    - **Hypothesis 1**: School reopening will affect educational outcomes by reducing dropouts, and the likelihood of student dropout. We will use data on attendance and drop-out rate information. This is conditional on the quality and quantity of data available from SEDUC-SP.

2. What effects will school reopening have on students', school staff's, and their families' health?

    - **Hypothesis 2A**: School reopening will have negligible or small negative effects on students', school staff's, and their families' Covid-19 cases, hospital admissions and deaths. To test this hypothesis we will rely on individual data provided by SEDUC-SP on Covid-19 cases and hospitalizations among students and their network. We will likely obtain this information through the Health Secretariat. In case

this information would not be available as expected, we will use data from the platform that SEDUC-SP created to collect information on Covid-19 cases in schools and that is managed by schools directors. Last, we will use any available public information and platform.

- **Hypothesis 2B**: Negative impacts are larger for adults, and increasing in age.

3. Does the school reopening alters the labor supply choices of the students' family members?

    - **Hypothesis 3A**: The school reopening will not affect the probability that the students (children or teenagers) work.
    - **Hypothesis 3B**: The school reopening will increase the the labor supply of other family members.
    - **Hypothesis 3C**: The positive effect of school will be particularly strong for female members of the household and informal workers.

4. Do the educational and health effects vary according to schools' and municipalities' characteristics?

    - **Hypothesis 4**: School reopening will have worse effects on health outcomes in municipalities where the recent spread of the disease has been faster and schools have a worse physical infrastructure. We will use available data platforms, such as the Brazilian school census, to combine information on the outcome of interest with administrative information on school infrastructures and available analysis of the trends in the pandemic spread.

5. Do treatment effects vary with the time gap since the school reopened?

    - **Hypothesis 5**: School reopening will not produce short-run treatment effects since both educational and health outcomes need time to be affected. We expect these effects to be increasing over time.

6. Do nudges motivate students to go back to school?

    - **Hypothesis 6**: In-person attendance will be higher within schools where students and caregivers are nudged to return. We will use data on attendance and drop-out rate information. This is conditional on the quality and quantity of data available from SEDUC-SP.

7. Do schools with higher attendance experience larger impacts on health and/or educational outcomes?

    - **Hypothesis 7**: Impacts of school reopening on educational and health outcomes will be increasing along with increasing in-person attendance. We will use data on attendance and drop-out rate information. This is conditional on the quality and quantity of data available from SEDUC-SP.

8. What is the joint distribution of treatment effects on education and health variables?

    - **Hypothesis 8**: Educational benefits and health costs will be concentrated on families with disadvantaged backgrounds.

3 Experimental intervention

The experiment implements an encouragement design, whereby we will send nudges to motivate students to return to in-person classes. Our sample comprises nearly 200,000 students distributed across 98 municipalities and 342 schools, half of which are assigned to nudges. We randomize treatment at the school level within municipalities, with pair matching to ensure balance. We also stratify assignment by State health region, because we are interested in estimating heterogeneous treatment effects by local disease activity. We will send two SMS a week over the course of 1 month to students themselves (grades 10 to 12) or to their primary caregivers (grades 6 to 9) for a month.

Our implementing partner is Movva, a Brazilian edtech specialized in nudges via text messages, with expertise in implementing randomized trials and partnering with researchers to conduct evaluations to assess the effectiveness of programs and policies. Movva is in charge of designing and sending text messages in the context of our experimental intervention.

The nudge intervention used for the encouragement design includes messages such as the following (we present more examples in Appendix B):

[**Motivating Fact**] EDUQ+: It is normal to be afraid in times of uncertainty. Use this scenario to your advantage: take the opportunity to develop the ability to focus on your plans for the future.

[**Suggested Activity**] EDUQ+: How about summarizing your life project? Highlight which dreams you would regret NOT realizing. Plan step by step how to get there. **Discuss with your teacher in person if your school has reopened!**

[**Interactive Message**] EDUQ+: Tell us! From 0 to 10, what is your level of confidence that completing high school will help with your plans for the future? SMS free of charge.

[**Growth Message**] EDUQ+: One step at a time! That's how we build our story. Be the protagonist of yours and focus on your studies to finish the school year. **Return to regular classes when your school reopens!**

4 Data and outcomes

We will rely on two sources of data: detailed administrative data from

SEDUC-SP and phone survey conducted by the research team. Each of them depends on specific partnerships. We describe each of them below.

4.1 Administrative data

SEDUC-SP will provide detailed administrative data for students' outcomes. This data will contain information on students' dropout from the school system and the utilization of the platform for online classes. It will possibly contain information on students quarterly grades and in-person attendance. SEDUC-SP will also provide telephone numbers for students, their caregivers, and their household addresses.

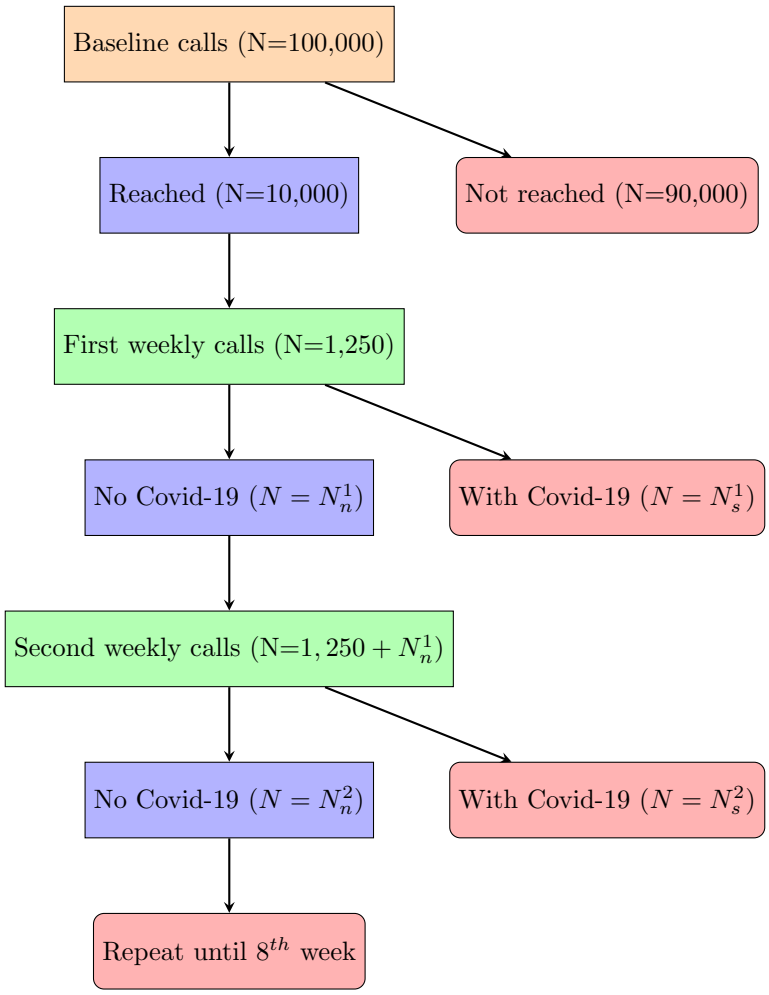
We also requested a list of health variables to SEDUC-SP. In partnership with São Paulo health secretariat, it will provide us detailed information on the Covid-19 related hospitalizations for students and school staff. SEDUC-SP will also provide direct information about positive test cases in the school environment from its internal monitoring system. For a complete list of requested variables, see Appendix C.

The research team will match these health variables to students, caregivers, and school staff using personal identifiers and home addresses. This will allow us to estimate the direct effect of school reopening on affected subjects and not only aggregate effects on municipalities. We further discuss the different levels of aggregation in the estimation in section 5.

4.2 Phone survey data

We will complement the administrative data above by conducting weekly phone surveys with student/their caregivers, and school staff members. As stated above, phone numbers will be shared by SEDUC-SP in a secure environment. The script of the calls varies according to who answers the survey, and to their previous answers for respondents whom we have contacted before.

The structure of the survey is depicted in the flowchart below:


Baseline calls (N=100,000)
Reached (N=10,000)
Not reached (N=90,000)
First weekly calls (N=1,250)
No Covid-19 ($N = N_n^1$)
With Covid-19 ($N = N_s^1$)
Second weekly calls (N=$1,250 + N_n^1$)
No Covid-19 ($N = N_n^2$)
With Covid-19 ($N = N_s^2$)
Repeat until 8^{th} week

We will try teaching 100,000 subjects at baseline. Based on similar studies, we expect a response rate of approximately 10%, reaching approximately 10,000 individuals. The baseline survey will ask questions about demographic characteristics of the respondent, household appliances, opinions and behavior related to the pandemic, and a health questionnaire.

Then, in each following week, we will call 1,250 subjects, a random sample of those successfully reached in the baseline call. In those surveys, we will ask questions about health outcomes, perceptions of online and in-person learning, and household members' labor supply. If the interviewed individual has or had Covid-19 symptoms, we interview her only once.

In each of the follow-up surveys, we also call again all respondents who had not experienced Covid-19 symptoms to date, only applying the health survey module.

4.3 Outcomes

We will assess the effects of school reopening on the following variables - obtained both through administrative data and mobile based phone surveys (the list of health and educational variables requested to SEDUC is in Appendices C and D):

- Quarterly grades, by school subject, based on these activities (admin data);
- Student dropouts (admin data);
- Number of positive Covid-19 cases in the family of students, school staff and municipalities that reopen (admin and phone survey data);
- Number of Covid-19 related hospitalizations in the family of students, school staff and municipalities that reopen (admin and phone survey data);
- Number of Covid-19 deaths in the family of students, school staff and municipalities that reopen (admin and phone survey data).
- Labor supply of household members (phone survey only).

We also have information on various other baseline variables: the history of access to the distance learning platform since May; attendance and grades for the first quarter of the year, provided by administrative records; predicted risk of dropouts at the student-level, on a 0-100 scale. We will use them for the heterogeneity (described below).

Because we have access to multiple education and health outcomes, we will create health and education summary measures (following Kling, Liebman, and Katz, 2007) to deal with family-wise error rates from multiple comparisons.

5 Estimation

We will use the experiment to assess the reduced-form effects of school reopening on the outcomes of interest by simply comparing schools that received nudges to schools that did not receive within the same municipality. Using in-person attendance data for the schools that reopen, from administrative records, we can use the assignment to nudges as an instrumental variable to estimate the causal effect of marginal increases in in-person attendance on health and education outcomes. We show that this sample size is large enough to detect small effect sizes (see power calculations in Appendix A).

We will also rely on quasi-experimental methods to evaluate the effect of school reopening on the variables of interest. As discussed, we will take advantage of the rules that determine the cutoffs for transitions across risk zones in a regression discontinuity design. We will estimate the following regression:

$$Y_{ismh,t+1} = \beta \mathbb{1}[i_{h,t} - c_{h,t} > 0] + f^h(i_{h,t} - c_{h,t}) + \theta \boldsymbol{X}_{ismh,t} + \epsilon_{ismh,t+1},$$

where $Y_{ismh,t+1}$ is the outcome of interest for individual i, school s, municipality m, health region h and period $t+1$, the cutoffs for different reopening stages is represented by $c_{h,t}$, $i_{h,t}$ is a multi-variable index described in section 2, and $\boldsymbol{X}_{ismh,t}$ is a vector of baseline covariates at the baseline period. Finally, $\mathbb{1}$ is an indicator function and $f^h(.)$ is a potentially non-linear local function. We will cluster standard-errors at the health region level.

This specification compares municipalities just above and just below the cutoff for changing the reopening stage. From Table 1, there are two relevant cutoffs (from orange to yellow and from yellow to green). We will estimate the treatment effect associated with each cutoff separately. Since the variation in treatment is approximately the same for each cutoff, we interpret each treatment effect as the effect of reopening schools for a level of disease activity (high or low). We will also estimate the treatment effect associated with the discontinuity from the red to orange, to isolate the effect of disease activity from that of changes in in-person attendance.

We envision that some issues could render this approach infeasible. First, State authorities might change the rules for reopening as a response to public pressure. Second, the dynamics of the disease activity might not display significant heterogeneity across Health regions at any point in time to allow for enough mass around the cutoffs. If we run into any of these problems, we will implement a matched difference-in-difference strategy instead.

For both the experimental and quasi-experimental strategies, we are also interested in estimating heterogeneous treatment effects and spillovers. We will estimate heterogeneous effects according to students' race and gender, whether the school is based on a rural or urban region, and the quality of school infrastructure (the first component of a principal component analysis comprising the presence of kitchen, bathrooms, trash collections, and basic sanitation, the availability of potable water, and the average number of students per class in 2019). We can estimate spillovers by comparing health outcomes across different

neighborhoods, by their distance to the nearest school with ongoing in-person classes.

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Appendix A - Power calculation

We can write the following equation that relates the important quantities to the power calculation:

$$\frac{ES}{\sigma} = (t_{(1-k)} + t_{\alpha}) * \sqrt{\left(\frac{1 + (V(N_m)/\overline{N} + \overline{N} - 1)\rho}{N * P(1-P)}\right)} \tag{1}$$

where ES is the effect size of treatment, σ is the standard-error of the estimate, $t_{(1-k)}$ is the power of the exercise, t_{α} is the significance level and P is the proportion treated.

Note that if the size of the clusters is balanced, we can simplify the equation above to:

$$\frac{ES}{\sigma} = (t_{(1-k)} + t_{\alpha}) * \sqrt{\left(\frac{1 + (\overline{N} - 1)\rho}{N * P(1-P)}\right)} \tag{2}$$

and if we do not have any clustering the equation above simplifies to:

$$\frac{ES}{\sigma} = (t_{(1-k)} + t_{\alpha}) * \sqrt{\left(\frac{1}{N * P(1-P)}\right)} \tag{3}$$

Table A1 summarizes the estimates of interest as well as the treatment-level, the total number of treated units and clusters:

Table A1: Relations of interest, number of observations and clusters

Outcome	Treatment	Level	N observations	N clusters
Students' dropout	Nudges	student	200,000	842
Grades	Nudges	student	200,000	842
Covid-19 cases	Nudges	students/staff	200,000	842
Covid-19 hosp.	Nudges	students/staff	200,000	842
Covid-19 deaths	Nudges	students/staff	200,000	842
Economic outcomes	School reop.	students' families	10.000	842

The number of treated students shown in Table 1 is the number of students reached by the experiment - half in the treatment and half in the control group. The only exception is the case of economic outcomes. For several relations above, we will have both administrative and phone survey data. Whenever this is the case, we calculate the estimates' power based on the admin data, which amplifies the number of available observations. For economic outcomes, the number of observations is restricted by the number of calls we make (approximately 10,000 families reached). The number of schools (clusters) considered in the sample is based on the design of the experiment.

Now, we discuss the important paramaters for the power calculation. We show them in Table A2:

Table A2: Parameters

Panel A: Intracluster correlation (ρ)

Variables	Parameters	Source
Students' dropout	0.007	School census (2019)
Students' grades	0.032	Prova Brasil (2017)
Covid-19 cases	0.015	State health secretary (2020)
Covid-19 hospitalizations	0.008	DataSUS (2020)
Covid-19 deaths	0.006	DataSUS (2020)
Employment	0.110	RAIS (2017)
Student attendance	0.005	SEDUC (2019)

Panel B: Other variables

Variables	Parameters	Source
Power ($t_{(1-k)}$)	0.8	Standard parameter
One-side level of significance (t_α)	1.282	Standard parameter
Proportion of treatment (P)	0.5	Standard parameter
Average cluster size ($\overline{N}$)	236	School census (2019)
Cluster size variance ($V(N_m)/\overline{N}$)	522	School census (2019)

We assume that both the call and the nudges will be uniformly distributed among the municipalities in the sample and among treated and control clusters. As can be seen in equations (1) and (2), this choice minimizes the minimum effect size of the estimates.

Using the parameters in Tables A1 and A2, we are able to calculate the minimum effect size (measured in standard-deviations) that would be detectable for each relation of interest. To ease interpretation we also measure MDE in % of each variable mean. Results are summarized in Table A3:

Table A3: Results of the power calculation

Outcome	Treatment	Level	MDE (s.d.)	% mean
Students' dropout	School reopening	student	0.015	5.7%
Grades	School reopening	student	0.027	0.54%
Covid-19 cases	School reopening	students and staff	0.020	4.8%
Covid-19 hospitalizations	School reopening	students and staff	0.016	3.2%
Covid-19 deaths	School reopening	students and staff	0.014	2.7%
Economic outcomes	School reopening	Family members	0.048	5.5%

Appendix B - Additional text messages examples

Additional example 1:

[**Motivating fact**] EDUQ+: Studying at home and miss school is challenging during the quarantine period. Soon, this will pass, and you will be learning with your class again.

[**Suggested activity**] EDUQ+: It's time to go back! List the school subjects that you would like to revise with your teaches when in person classes return!

[**Interactive message**] EDUQ+: Tell us: do you believe that in-person classes will help your learning? Text for free YES or NO.

[**Growth message**] EDUQ+: United and strong! In return to in-person school, talk to your class and evaluate how you can help one another with your studies.

Additional example 2

[**Motivating fact**] EDUQ+: The day has come! School uniform, bag, books, and facial masks! The way to study in the school will be different. Take care of yourself and protect your schoolmates and teachers.

[**Suggested activity**] EDUQ+: Health above yearning! In school, avoid handshakes and hugs. Keep distance and always wash your hands! Soon it will pass!

[**Interactive message**] EDUQ+: Friend is the one who cares! In school, are you being careful with your classmates and teachers? Text for free YES or NO.

[**Growth message**] EDUQ+: Studying is a serious business, as well as fighting Covid-19. For your in-person classes to continue, it is necessary that everyone do your part and be careful.

Appendix C - List of Health Outcomes Requested to SEDUC-SP

Table C1: List of requested health variables

Variable	Source
STATE OF NOTIFICATION	Ficha de notificação SIM-P COVID-19
CITY OF NOTIFICATION	Ficha de notificação SIM-P COVID-19
INSTITUTION CODE	Ficha de notificação SIM-P COVID-19
NOTIFICATION DATE	Ficha de notificação SIM-P COVID-19
PATIENT NAME	Ficha de notificação SIM-P COVID-19
PATIENT'S MOTHER NAME	Ficha de notificação SIM-P COVID-19
DATE OF BIRTH	Ficha de notificação SIM-P COVID-19
SOCIAL SECURITY NUMBER	Ficha de notificação SIM-P COVID-19
SEX	Ficha de notificação SIM-P COVID-19
STREET	Ficha de notificação SIM-P COVID-19
NUMBER	Ficha de notificação SIM-P COVID-19
NEIGHBORHOOD	Ficha de notificação SIM-P COVID-19
CITY OF RESIDENCE	Ficha de notificação SIM-P COVID-19
STATE OF RESIDENCE	Ficha de notificação SIM-P COVID-19
HOSPITALIZATION DATE	Ficha de notificação SIM-P COVID-19
ICU	Ficha de notificação SIM-P COVID-19
DATE OF HOSPITALIZATION	Ficha de notificação SIM-P COVID-19
DATE OF DISCHARGED	Ficha de notificação SIM-P COVID-19
SYMPTOMS	Ficha de notificação SIM-P COVID-19
STATE	Ficha de investigação de SG suspeito de doença pelo coronavírus
CITY OF NOTIFICATION	Ficha de investigação de SG suspeito de doença pelo coronavírus
SOCIAL SECURITY NUMBER	Ficha de investigação de SG suspeito de doença pelo coronavírus
DATE OF BIRTH	Ficha de investigação de SG suspeito de doença pelo coronavírus
SEX	Ficha de investigação de SG suspeito de doença pelo coronavírus
ZIP CODE	Ficha de investigação de SG suspeito de doença pelo coronavírus
CITY OF RESIDENCE	Ficha de investigação de SG suspeito de doença pelo coronavírus
STREET	Ficha de investigação de SG suspeito de doença pelo coronavírus
NUMBER	Ficha de investigação de SG suspeito de doença pelo coronavírus
NEIGHBORHOOD	Ficha de investigação de SG suspeito de doença pelo coronavírus
NOTIFICATION DATE	Ficha de investigação de SG suspeito de doença pelo coronavírus
DATA ONSET SYMPTOMS	Ficha de investigação de SG suspeito de doença pelo coronavírus
SYMPTOMS	Ficha de investigação de SG suspeito de doença pelo coronavírus
TEST TYPE	Ficha de investigação de SG suspeito de doença pelo coronavírus
TEST RESULT	Ficha de investigação de SG suspeito de doença pelo coronavírus
FINAL CLASSIFICATION	Ficha de investigação de SG suspeito de doença pelo coronavírus
CASE OUTCOME	Ficha de investigação de SG suspeito de doença pelo coronavírus
NOTIFICATION DATE	ficha de registro individual - casos hospitalizados
ONSET SYMPTOMS	ficha de registro individual - casos hospitalizados
STATE	ficha de registro individual - casos hospitalizados

Table C1 (continued): List of requested health variables

Variable	Source
CITY	ficha de registro individual - casos hospitalizados
SOCIAL SECURITY NUMBER	ficha de registro individual - casos hospitalizados
DATE OF BIRTH	ficha de registro individual - casos hospitalizados
SEX	ficha de registro individual - casos hospitalizados
EDUCATION LEVEL	ficha de registro individual - casos hospitalizados
STREET	ficha de registro individual - casos hospitalizados
NUMBER	ficha de registro individual - casos hospitalizados
NEIGHBORHOOD	ficha de registro individual - casos hospitalizados
SRAG OUTBREAK RELATED	ficha de registro individual - casos hospitalizados
HOSPITAL CASE RELATED	ficha de registro individual - casos hospitalizados
SYMPTOMS	ficha de registro individual - casos hospitalizados
HOSPITALIZATION	ficha de registro individual - casos hospitalizados
ICU	ficha de registro individual - casos hospitalizados
ICU ADMISSION	ficha de registro individual - casos hospitalizados
ICU DISCHARGE	ficha de registro individual - casos hospitalizados
TEST RESULT	ficha de registro individual - casos hospitalizados
FINAL CLASSIFICATION	ficha de registro individual - casos hospitalizados
CASE OUTCOME	ficha de registro individual - casos hospitalizados
DATE OF DEATH	ficha de registro individual - casos hospitalizados
TYPE	sistema seduc monitoramento covid-19 nas escolas
PUBLIC OR PRIVATE	sistema seduc monitoramento covid-19 nas escolas
PRINCIPAL	sistema seduc monitoramento covid-19 nas escolas
CITY	sistema seduc monitoramento covid-19 nas escolas
SCHOOL SITUATION	sistema seduc monitoramento covid-19 nas escolas
SCHOOL	sistema seduc monitoramento covid-19 nas escolas
RESEARCH TYPE	sistema seduc monitoramento covid-19 nas escolas
ABSENCE	sistema seduc monitoramento covid-19 nas escolas
TYPE OF MONITORING	sistema seduc monitoramento covid-19 nas escolas
AGE	sistema seduc monitoramento covid-19 nas escolas
SEX	sistema seduc monitoramento covid-19 nas escolas
NAME	sistema seduc monitoramento covid-19 nas escolas
SOCIAL ISOLATION	sistema seduc monitoramento covid-19 nas escolas
DATE OF SOCIAL ISOLATION	sistema seduc monitoramento covid-19 nas escolas
COVID TEST	sistema seduc monitoramento covid-19 nas escolas
TEST DATE	sistema seduc monitoramento covid-19 nas escolas
TEST RESULT	sistema seduc monitoramento covid-19 nas escolas
QUARENTINE	sistema seduc monitoramento covid-19 nas escolas

Appendix D - List of education variables

Table D1: List of educational variables

Variable	Description
cd_escola	School ID
endereco_escola	School address
Lat	School latitude
Long	School longitude
funcionarios	Number of school staff
Alunos	Number of students enrolled
cd_func	School staff member ID
endereco_func	Staff member home address
CEP_func	Staff member home address's ZIP code
data_nascimento	Staff member date of birth
Telephone	Staff member phone number
Prof	Indicator variable if staff member is a teachers
series_prof	For teachers, list of all grades s/he teachers in each school
cd_aluno	Student ID
endereco_aluno	Student home address
CEP_aluno	Student home address's ZIP code
telefone1	Student phone number
numero_func	Average number of school staff who attended daily that week
Aula	Indicator of whether school held regular classes that week
numero_alunos	Average number of students who attended daily that week
frequencia_func	School staff member's daily attendance (within schools that reopen)
frequencia_aluno	Student's daily attendance (within schools that reopen)
Nota	Student's grades (for all schools)

Appendix E - Phone survey instruments

1. Consent:

• Informed consent, Parents/Adolescents:

Olá, esta chamada é parte de uma pesquisa para estudar os efeitos da reabertura de escolas sobre varia´veis de educação e saúde no estado de São Paulo, conduzida pela Secretaria de educacação em parceria com a Universidade de Zurique, na Suíça. Estamos entrevistando alunos e seus pais. Suas respostas para o questionário a seguir permanecerão confidenciais e não ser compartilhadas com ninguém além da equipe de pesquisa. A chamada deve durar aproximamente cinco minutos. Se você deseja participar, digite 1. Se não, digite 0.

• Informed consent, Teachers and school staff:

Olá, esta chamada é parte de uma pesquisa para estudar os efeitos da reabertura de escolas sobre variáveis de educação e saúde de no estado de São Paulo, conduzida pela Secretaria de educação em parceria com a Universidade de Zurique, na Suíça. Estamos entrevistando professors e funcionários da escola. Suas respostas para o questiona´rio a seguir permanecerão confidenciais e não ser compartilhadas com ninguém além da equipe de pesquisa. A chamada deve durar aproximamente cinco minutos. Se você deseja participar, digite 1. Se não, digite 0.

2. Características individuais

• Gender:

Qual o seu gênero? Para masculino pressione 1, para feminino pressione 2, se você se identifica como outro gênero, pressione 0

• Age:

Qual é a sua idade? Se você possui menos de 18 anos, pressione 1. Se você tem entre 18 e 25, pressione 2. Se você tem entre 26 e 35 pressione 3. Se você tem entre 36 e 45, pressione 4. Se você tem entre 46 e 55 pressione 5. Se você tem mais de 55 anos, pressione 6.

• Income: Qual é sua renda mensal? Se abaixo de 1 salário mínimo, pressione 1. Se é entre mil e 2 mil reais, pressione 2. Se é entre 2 mil e 3 mil reais, pressione 3. Se é entre 3 mil e 4 mil reais, pressione 4. Se é entre 4 mil e 5 mil reais, pressione 5. Se for maior que 5 mil reais, pressione 6.

• Civil: Você é casado? Se sim, pressione 1. Se não, pressione 2.

• Education: Qual é o seu maior nível de formação? Se ensino fundamental, presisone 1. Se ensino médio, pressione 2. Se ensino superior, pressione 3.

3. Características domiciliares

• Residents: Quantas pessoas moram no seu domicílio? Se uma ou duas pessoas, pressione 1. Se três ou quatro pessoas, pressione 2. Se cinco e seis pessoas, pressione 3. Se mais de seis pessoas, pressione 4.

• Rooms: Quantos cômodos seu domicílio possui? Se um cômodo, pressione 1. Se dois cômodos, pressione 2. Se três cômodos, pressione 3. Se quatro cômodos ou mais, pressione 4.

• Internet: O seu domicílio tem acesso a internet? Se não tem acesso, pressione 1. Se tem apenas a partir de dispositivos móveis, pressione 2. Se tem acesso a rede de wi-fi, pressione 3.

• Computer: O seu domicílio possui computadores? Se não tem acesso, pressione 1. Se tem um computador, pressione 2. Se tem mais de um computador, pressione 3.

• Yes or No: Para as próximas questões, após o toque, pressione 1 se concorda da afirmação ou 2 se discorda.

• Fridge: O seu domicílio possui geladeira?

• Stove: O seu domicílio possui fogão?

• Microwave: O seu domicílio possui microondas?

• Washing Machine: O seu domicílio possui máquina de lavar?

4. Opiniões e comportamentos pessoais

• Protection: Nos últimos 3 meses, eu evitei eventos sociais que eu queria participar.

• Mask: Nos últimos 3 meses, eu utilizei máscara em público.

• Transport: Nos últimos 3 meses eu tenho utilizado transporte público pelo menos uma vez por semana.

5. Questionário de saúde:

• Resp. Inf: Você teve tosse, coriza, dificuldade de respirar ou dor de garganta nos últimos 10 dias?

• Anosmya: Você teve perda de paladar ou olfato nos últimos 10 dias?

• Fever: Você teve febre ou se sentiu febril nos últimos 10 dias?

• Headache Você teve dor de cabeça nos últimos 10 dias?

• Fatigue: Você tem se sentido cansado ou fadigado nos últimos dias?

• Diarrhea: Você teve diarreia nos últimos 10 dias?

• Contact: Você entrou em contato com alguém com estes sintomas nos últimos 10 dias?

• Vaccine: Você já foi imunizado contra a COVID-19?

• Seek Health: Você procurou um serviço de saúde nos últimos 10 dias?

• Lab Test: Você já realizou exame laboratorial para COVID-19?

• Lab Test result Qual foi o resultado?

• Risk group: Você mora com algum idoso, gestante ou familiar acamado?

6. Questionário de educacação e trabalho infantil:

• Back to School: O estudante do domicílio voltou a frequentar a escola presencialmente?

• Motivation: Quanto motivado está o estudante deste domicílio para a volta às aulas? Se está muito desmotivado, pressione 1. Se está um pouco desmotivado, pressione 2. Se está um pouco motivado, pressione 3. Se está muito motivado, pressione 4.

• Online Classes: Como você avalia a qualidade das aulas remotas durante a pandemia para a aprendizagem dos alunos?

Se avalia como péssimas, pressione 1. Se avalia como ruins, pressione 2. Se avalia como boas, pressione 3. Se avalia como ótimas, pressione 4.

• Presential Classes: Você acredita que as aulas presenciais são melhores para o aprendizado dos alunos do que as aulas remotas?

• Previous Labour: O(s) jovem(ns) deste domicílio exerciam algum tipo de trabalho remunerado antes da pandemia?

• Pandemic Labour: O(s) jovem(ns) deste domicílio exerceram algum tipo de trabalho remunerado du- rante a pandemia?

• Present Labour: O(s) jovem(ns) deste domicílio exercem algum tipo de trabalho remunerado nesta semana?

• Employment: Você está empregado neste momento?

• More time: O retorno dos jovem(ns) deste domicílio às aulas presenciais aumentou o tempo que você dedica ao trabalho?

• Housework: O retorno dos jovem(ns) deste domicílio às aulas presenciais alterou o tempo que você dedica a tarefas domésticas?

• Leisure: O retorno dos jovem(ns) deste domicílio às aulas presenciais alterou o tempo que você dedica ao lazer pessoal?