

Supplementary Information

“Post-pandemic social contacts in Italy: implications for distancing measures on in-person school and work attendance”

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1. Materials and Methods

1.1 Data

The analysis presented in this manuscript is based on a novel social contact survey data collection. The data collection consisted of two waves of more than 3500 responses each. The first ran from March 17, 2022, until March 29, 2022, and the second ran from March 17, 2023, until April 5, 2023. The survey was designed to include both a panel and a longitudinal set of responses: about half of the responses collected in the second wave were obtained from respondents who had already participated in the first wave. In this section, we provide details about the survey design and data cleaning procedure that was adopted in the study.

Survey methodology

We engaged the market research firm *YouGov* to carry out a survey on a representative sample of the Italian population in terms of age, sex, and NUTS level-1 area of residence. Members of *YouGov*'s existing online panel (adults aged 18 and older) were invited to participate through email invitations. Adults with underage children were randomly asked to administer the survey to one of their children or involve them in the completion process. Children's involvement differed based on their age: those aged 14 to 17 were asked to directly respond to the survey, with their parent's support; legal guardians of children aged less than 14 years were asked to compile the survey themselves and request their children's feedback, e.g., on if and with whom their children had social contacts.

Participants were asked to provide socio-demographic information (such as age, gender, household income, educational attainment, and occupation) as well as health-related information (such as their COVID-19 vaccination status, whether they had ever had a positive SARS-CoV-2 test and when, or if they suffered from chronic or acute diseases at the time of data collection). Additionally, the survey collected information about the respondents' cohabitants (such as age, chronic diseases, or acute diseases of any cohabitants). The full questionnaire is reported in its English translation in Section 3 of this Appendix.

To facilitate the recall of contacts and to reduce the impact of respondents' fatigue on the number of reported contacts, participants were first asked to report a list of direct contacts (identified by nicknames chosen by the participants) for each setting: home (cohabitants or other contacts at home), work, school, restaurants, leisure places, transportation means, and other places). After the collection of all lists, respondents were asked to report information about each individual contact and how the interaction occurred (e.g. the age and sex of the contact, whether it occurred in an open or closed setting, whether there was any physical interaction, the type of relation with the contact, the contact's COVID-19 vaccination status, their perceived income, who was wearing a mask during the interaction, etc.). In the last part of the questionnaire, participants were also asked to report the overall number of persons with whom they shared an indoor space for a period of more than 30 minutes (indirect contacts, e.g., schoolmates, co-workers, people in public transport means), including in the number people already reported as direct contacts. The 30-minute threshold used to define indirect contacts was chosen to capture sustained indoor co-presence typical of work and school environments while excluding numerous brief or incidental co-locations (e.g., on public transport or in transient settings) that are either less relevant for airborne

transmission or more difficult to recall and which might increase completion burden and recall bias^{1,2}. This duration criterion aligns with public-health guidance identifying ≥ 15 minutes of close contact as a minimal exposure threshold, while adopting a more conservative cut-off to account for longer-distance co-presence in shared indoor spaces. The approach follows practices in contact-survey and high-resolution sensing studies that operationalize infection-relevant exposure through cumulative time thresholds³⁻⁶.

The survey was tested on a pilot sample of respondents to control for completion time and flow. Results from the analysis of the pilot responses reported a median completion time of about 15 minutes. Post-collection analysis confirmed similar completion times for both waves.

Data cleaning

Before proceeding with the analysis reported in the main manuscript, we performed four main data-cleaning steps, displayed as a flowchart in Supplementary Figure 1.

In the first data-cleaning step, we tackled issues that could affect the reliability of contacts reported by some respondents; as an example, students reporting to have attended school during school closure periods (e.g. on a Sunday) were excluded from the results. Additionally, we identified four main categories of potential contact-specific problems that also resulted in the exclusion of the respondent:

- **Duplicated contacts:** The online survey platform applied checks to prevent the respondents from writing the same nickname twice, in order to avoid double-reporting of the same contact across different settings. Nevertheless, some respondents bypassed the quality check. Contacts for which respondents listed the same pair of nickname and age across multiple settings were considered duplicated contacts. The nickname check was bypassed by respondents in two ways:
 - The duplicates were listed in the “cohabitants” section (for which no check was implemented) and in at least another location section.
 - The duplicates are listed in different locations, with slight modifications of the nickname (e.g., “Alice a friend” and “Alice, a friend”, or “Mother” and “mother”).
- **Multiple contacts per entry:** some respondents reported more than one contact per line, using plurals, collective nouns, or providing the number of contacts (e.g., “10 friends”, “parents”, “clients”).
- **Settings and contexts:** some respondent reported the names of the context or setting where they encountered contacts (e.g., “the supermarket”, “Football”). This issue particularly affected contacts in crowded situations or where they could not easily be listed by the respondent.
- **Other issues:** other problematic entries which could not be otherwise classified. For instance, some respondents listed themselves among the contacts or reported “no one”. Others wrote sentences by using the different available lines, e.g., to express they did not want to disclose them (e.g., “no” – “don’t” – “declare”).

Note that answers from a single respondent were possibly affected by more than one issue at the same time.

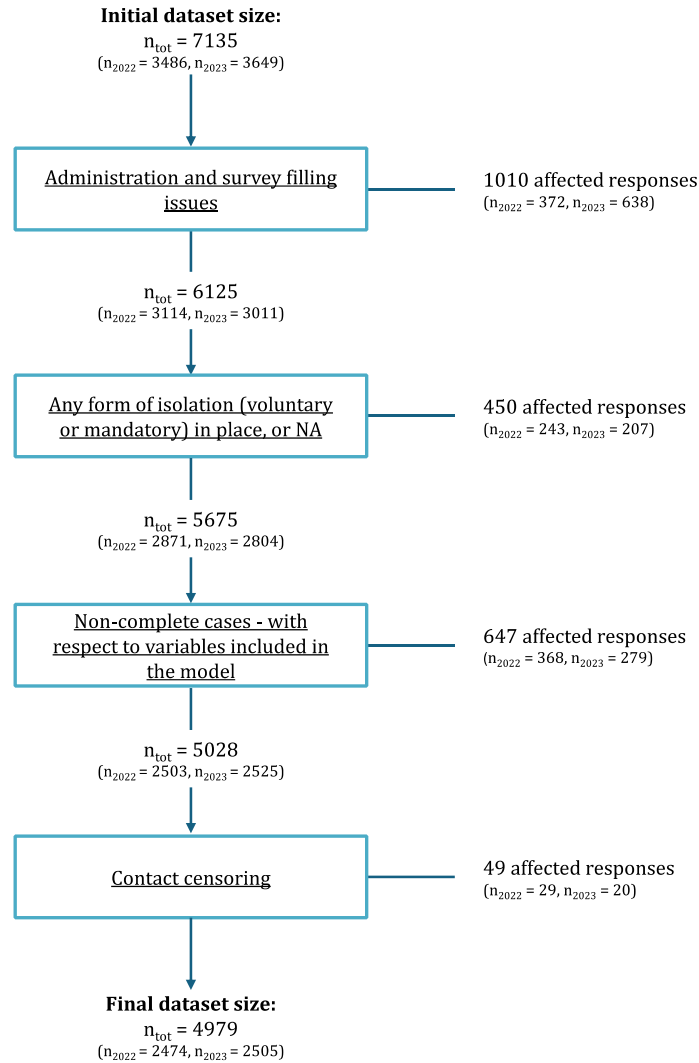
In the case of contacts responding in both waves, only the problematic response was deleted.

In the second step, we cleaned the dataset from responses declaring the adoption of any kind of isolation measure (whether mandatory or voluntary) on the previous day, or for which the information was missing.

In the third step, we dropped all responses for which any of the 35 variables considered in the statistical framework (see below) was missing.

Finally, we excluded 49 respondents who either reported more than 100 contacts or were children reporting 0 contacts.

At the end of the data cleaning process, we excluded 2339 responses, leaving a total of 4,979 unique responses. Supplementary Figure 1 shows the impact of each step of the cleaning procedure on the dataset for each wave.

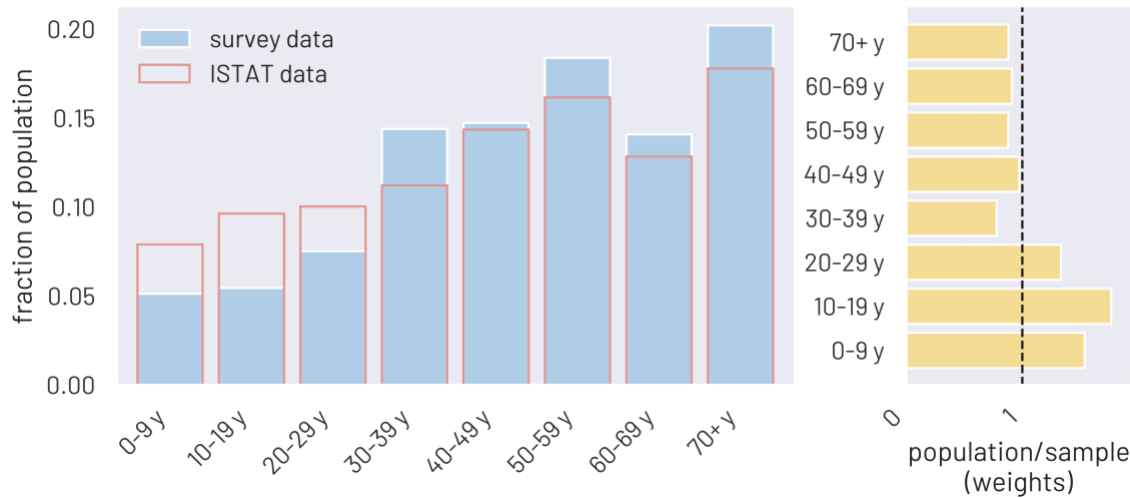


Supplementary Figure 1: Data cleaning procedure flowchart. This chart quantifies the impact of each cleaning step on the dataset size. On the right, at each step, we report the number of responses affected by the cleaning step (in parenthesis we report the affected responses for each wave separately, namely n_{2022} for the data from 2022 and n_{2023} for 2023).

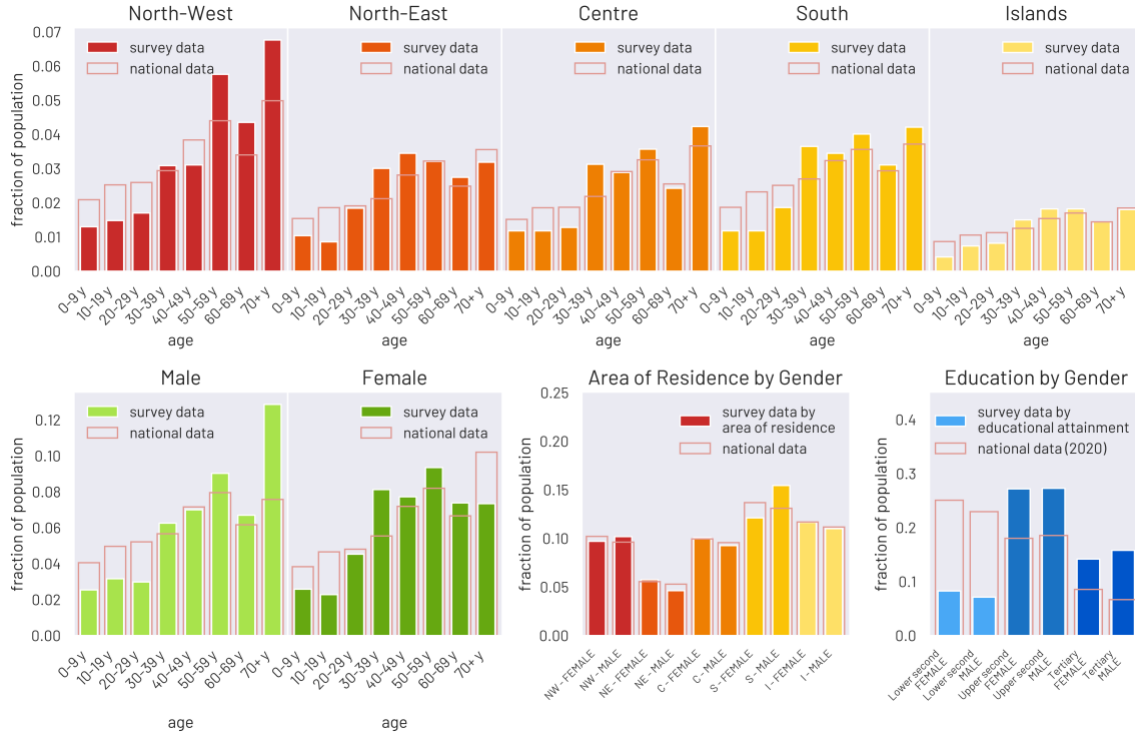
Data representativeness

In this section, we compare the characteristics of survey respondents who successfully completed the entire survey and passed all the quality checks described in the previous sections against official 2022 data from the European Union Statistical Office (EUROSTAT)⁷. Supplementary Figure 2 shows the fraction of respondents by age group (light blue bars) and the corresponding EUROSTAT figures (empty red bars) along with the resulting population-to-sample weights. We found a good population representativeness by age, with some deviations in the underage and younger adult population. Supplementary Figure 3 compares pair-wise combinations of age, area of residence, and gender for the respondent. Full-coloured bars show the fraction of each population

group within the survey respondents panel while empty-red bars report the corresponding European Union Statistical Office estimates for the Italian population. Age distribution stratified by area of residence is representative of the expected population distribution by age (as shown in Fig. SI2). Similarly, a gender-based stratification shows an underrepresentation of the female population group in the oldest age group. The “lower secondary and below” educational attainment group was underrepresented; this result is a known weakness of online surveys, which systematically show a lower level of participation from this population group.



Supplementary Figure 2: *Survey respondents by age against the Italian population.* Left: Light blue bars report the distribution of respondents by age group. Darker blue bars show the distribution by age of the respondents' reported contacts. The overlaid red bars report the fraction of the population by age group reported for 2022 by the Statistical Office of the European Union. Right: population-to-sample weights obtained as the ratio between red and light blue bars in the right panel.



Supplementary Figure 3: Survey respondents by age and area of residence, age and gender, area of residence and gender, and educational attainment and gender against the Italian population. Full-coloured bars show the distribution of the survey respondents; overlayed red bars report the corresponding values reported for 2022 by the Statistical Office of the European Union. Reference national values for educational attainment by gender are sourced for 2020 from the Italian National Statistical Office

1.2 Indirect contacts augmentation

As discussed in the main manuscript, the analyses performed in this work consider both direct contact information, as defined by traditional social contact surveys, and information about indirect contacts, defined as events of a minimum duration of 30 minutes, occurring in a closed environment (such as a house, restaurant, transportation means, etc.). Indirect contacts were reported in the form of a single numerical estimate without any additional information, e.g., about the setting in which they occurred or the contacts' characteristics. Thus, to compute social contact matrices that also include direct contacts, we augmented the available information by: i) determining how many of the indirect contacts were already reported as direct social contacts, and ii) assigning to indirect contacts information on where and with whom the interaction happened.

Direct and indirect contacts overlap

Respondents were requested to include in the estimate of indirect contacts also direct contacts that satisfied the indoor contacts' definition. A lower and an upper bound for the number of non-overlapping indirect contacts can be obtained by considering the two extreme cases:

1. all indoor direct contacts shared an indoor space for more than 30 minutes with the respondent.
2. none of the indoor direct contacts shared a space with the respondent for more than 30 minutes.

For example, if the reported direct contacts were $N=6$, of which 2 occurred indoors with cohabitants, 2 indoors at work, and 1 indoors at a leisure place (resulting in $X=5$ direct indoor contacts), and the indirect (indoor) contacts reported were $Y=21$, the two scenarios would translate into having a total number of social contacts equal to between 22 (*scenario 1*, with N direct contacts and $Y-X$ additional indirect contacts), and 27 (*scenario 2*, with N direct contacts and Y additional indirect contacts).

Where and with whom?

To effectively use the indirect contacts reported by a respondent, the contact information for additional indirect contacts had to be inferred. Two alternative approaches were considered in this work to assign setting and contact information to indirect contacts.

- A. The first assumes that indirect contacts had similar characteristics as direct contacts and were encountered in the same types of settings, excluding cohabitants (to avoid artificial inflation of within household contacts). Thus, if a respondent reported X direct indoor contacts and Y indirect contacts, the information on the Y indirect contacts would be augmented by sampling directly from the reported X direct indoor contacts, excluding contacts with cohabitants and those encountered outdoors.

Using the example from the paragraph above, contact information would have been sampled $Y-X=16$ times in contact *scenario 1*. In this case, augmentation would be done by randomly sampling contact information from all indoor direct contacts (resulting, e.g., in 11 indirect contacts sampled from work-related direct contacts, and 5 contacts sampled from indoor leisure-related contacts).

- B. The second approach assumes that all indirect contacts occurred in the setting where the majority of direct contacts were reported, excluding the household. Using the example above under *scenario 1*, this assumption translates into sampling 16 indirect contacts using only contact information from the indoor work setting.

Supplementary Table 1:
Description of the different scenarios for indirect contact inclusion.

		Including indirect contacts	
		Scenario 1 <i>Increment social contacts with $Y-X$ additional indirect contacts</i>	Scenario 2 <i>Increment social contacts with all Y indirect contacts</i>
Enriching indirect contacts	Scenario A <i>Sampling proportionally to indoor settings</i>	Scenario 1A <i>(Main analysis)</i>	Scenario 2A
	Scenario B <i>Sampling from dominant indoor setting</i>	Scenario 1B	Scenario 2B

In the main analysis, the total number of contacts considered direct and completely overlapping indirect contacts where contact information augmentation was performed proportionally to the setting (scenario 1A).

Sensitivity analyses were run for alternative assumptions (scenario 1B and scenario 2A) to assess their impact on the statistical model, the contact matrices, and the transmissibility reduction. Results are reported in section 2 of this Appendix.

1.3 Statistical Framework

In this section, we report detailed information about the model selection procedure and the covariate screening procedure.

We model individual number of contacts using a negative binomial distribution, a standard choice to model count data with potential overdispersion⁸. Let Y_{it} represent the total number of contacts for the individual i observed at wave t . We assume that Y_{it} follows a negative binomial distribution with mean μ_{it} and dispersion parameter ϕ :

$$Y_{it} | ui \sim NB(\mu_{it}, \phi)$$

with $ui \sim N(0, \sigma_u^2)$ being a random intercept that accounts for within-individual correlation across waves (σ_u^2). Note that, as observations may be repeated across waves, capturing within-individual correlation is essential to correctly account for baseline differences among individuals.

In this framework, the conditional expected value $E(Y_{it} | ui) = \mu_{it}$ is modelled as:

$$\log(\mu_{it}) = \boldsymbol{\beta} \cdot \mathbf{X}_i + \boldsymbol{\gamma} \cdot \mathbf{Z}_{it} + \delta \cdot \text{Wave}_t + \boldsymbol{\eta} \cdot (\mathbf{Z}_{it} \times \text{Wave}_t) + ui$$

where:

- $\mathbf{X}_i$ is a vector of individual-level covariates that are constant across waves (e.g., age, sex, and occupation).
- $\boldsymbol{\beta}$ is the vector of fixed effect coefficients for these fixed covariates.
- $\mathbf{Z}_{it}$ is a vector of time-varying covariates that may change across waves (e.g. attendance at work/school, occupation, whether the response was provided on Sunday, or whether the respondent recently tested positive to COVID-19).
- $\boldsymbol{\gamma}$ is the vector of fixed effect coefficients for these time-varying covariates.
- Wave_t is an indicator for wave, with coefficient δ , capturing systematic differences between waves.
- $\mathbf{Z}_{it} \times \text{Wave}_t$ represents the interaction terms between the wave indicator and each time-varying covariate Z_{it} .
- $\boldsymbol{\eta}$ is the vector of coefficients for these interaction terms, allowing us to test whether the effect of time-varying covariates is mediated by the time of the survey.
- $ui \sim N(0, \sigma_u^2)$ is the random intercept term.

This mathematical structure is referred to as Generalised Linear Mixed Effects Model (GLMM) with a negative binomial outcome distribution and a log link function.

Given the extensive set of 35 covariates (see Supplementary Table 6 for a full list of covariates), we first assessed each variable's association with the outcome using separate regression models. The model formulation reported above is general and can apply to different set of covariates. In this case, additionally to the specific variable screened, each separate model included a “wave” term and an interaction with the covariate to evaluate potential time-varying effects.

All covariates showing significant associations were included in the final multivariate negative binomial regression model presented in the main manuscript. The same covariates were used to model the different outcome variables discussed as robustness checks in Section 2.1 and 2.3.

1.4 Computation of contact matrices

We constructed age-specific matrices of average total contacts for the Italian population, stratified by 15 age groups (0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, and 70+ years old). Matrices were constructed by sampling 1000-times with replacement sets of social contact survey responses of the size of the cleaned survey responses. Then, matrices were normalised to account for reciprocal social contacts using national census population data aggregated by the same age groups (see below). Reciprocity-adjusted contact matrices resulting from each independent sampling were pooled together to provide age-stratified social contact average estimates and confidence intervals.

Reciprocity adjustment

The idea behind reciprocal normalisation is to account for differences between the sample age distribution and the age distribution of the population under study. This is done considering the probability of an individual being included in the sample. The procedure adopted in this work follows the standard procedure described in full in Trentini et al.⁹ and summarized as follows.

Let P_a denote the number of participants in the a -th age group and let $c_{a,\tilde{a}}(i)$ denote the number of contacts a specific study participant i of age within a had with individuals of the $\tilde{a}$ age group. The total number of contacts $T_{a,\tilde{a}}$ that all study participants of age a have with individuals of age $\tilde{a}$ can be computed as

$$T_{a,\tilde{a}} = \sum_{i=1}^{P_a} c_{a,\tilde{a}}(i)$$

The average contacts an individual of age group a has with individuals of age within $\tilde{a}$ can be approximated by the average contacts that a participant of age a with individuals of age $\tilde{a}$ as follows:

$$C_{a,\tilde{a}} = \frac{T_{a,\tilde{a}}}{P_a}$$

In principle, $T_{a,\tilde{a}}$ can be different from $T_{\tilde{a},a}$. However, in the case of social contacts, if we were to sample the entire Italian population this should not be the case as all reported contacts should be reciprocal. To correct matrices drawn from only a partial sampling of the population we can, however, reconstruct reciprocity by considering the probability of an individual being included in the sample and correcting it using the total number of contacts that all study participants of age a have with individuals of age $\tilde{a}$ as a weighted average of the total contacts reported by participants of these two ages as follows. This can be expressed in a formula as:

$$T_{a,\tilde{a}}^{corrected} = \frac{P_a N_a C_{a,\tilde{a}} + P_{\tilde{a}} N_{\tilde{a}} C_{\tilde{a},a}}{P_a + P_{\tilde{a}}}$$

where N_a is the population within the age group a in Italy as reported by the Statistics Agency of the European Union (Eurostat)⁷.

The adjusted average contacts an individual of age a has with individuals of age $\tilde{a}$ was finally computed as

$$C_{a,\tilde{a}}^{corrected} = \frac{T_{a,\tilde{a}}^{corrected}}{N_a}$$

Bootstrapping contact matrices

All the matrices presented in the main manuscript are computed by performing a 1000-fold bootstrapping of responses from both waves. The average number of contacts is computed as the average across the reciprocity-adjusted matrices originated from independent samples of survey responses. An average contact matrix is computed as the average across all bootstrapped samples and age groups: $\bar{C}_{a,\tilde{a}}^{corrected} = \frac{1}{Q} \sum_{i=1}^Q C_{a,\tilde{a}}^{corrected}$, with $Q=1000$ being the number of bootstrapped samples.

1.5 Effect of school and work attendance on the transmissibility of a generic respiratory virus

We assessed the effect of different scenarios of distance learning and work-from-home on the reduction of the reproduction number R of a novel respiratory virus spreading in a fully susceptible population in the absence of other interventions.

Baseline scenario (full in-person attendance)

In the baseline scenario ($s=0$ in equations reported in the main text), all students are assumed to attend school in person, and the in-person workforce is set at pre-pandemic levels. To define $N_i^P(s=0)$ and $N_i^{NP}(s=0)$, we considered the Italian population by age as reported by Eurostat for the year 2022, stratified into 15 age-groups N_i (0-4 years, 5-9, years, ..., 65-69 years, 70+ years). We estimated the proportion of individuals of age group i enrolled to education level k , denoted

by σ_i^k , based on data reported by Eurostat for the year 2021¹⁰. Specifically, we considered 5 different education levels:

1. early childhood education (International Standard Classification of Education, ISCED 0¹¹);
2. primary education (ISCED 1¹¹);
3. lower secondary education (ISCED 2¹¹);
4. upper secondary education (ISCED 3¹¹);
5. tertiary education (ISCED 5-8¹¹).

Students enrolled on ISCED level 4, which, in Italy, includes only the 1-year Higher Technical Education and Training track – IFTS, were neglected as they represent less than 0.03% of Italian students¹⁰. We further considered the age-specific proportion of individuals of age-group i working in-presence before the COVID-19 pandemic ($\omega_i^{\text{pre-pandemic}}$), as estimated by the Italian Workers Compensation Authority and reported in Marziano et al.¹². The number of individuals of age i attending schools or work in-person in the baseline scenario ($s=0$) is computed as:

$$N_i^P(s=0) = \left(\sum_{k=1}^{k=5} \sigma_i^k + \omega_i^{\text{pre-pandemic}} \right) N_i$$

and the number of individuals not attending is given by:

$$N_i^{NP}(s=0) = N_i - N_i^P(s=0).$$

Alternative scenarios

We then considered a set of alternative scenarios combining the physical closure of different education levels, starting from tertiary education and progressively including lower levels, with decreasing levels of in-person work attendance.

Specifically, we considered the following levels of school closure (i.e., distance learning):

- no education level closed;
- only tertiary education closed (ISCED 5-8);
- tertiary and upper secondary education closed (ISCED 5-8 and ISCED 3);
- tertiary; upper secondary; lower secondary education closed (ISCED 5-8 and ISCED 3, ISCED 2);
- tertiary; upper secondary; lower secondary, primary closed (ISCED 5-8 and ISCED 3, ISCED 2, ISCED 1);
- All education levels closed, i.e. tertiary; upper secondary; lower secondary, primary and early childhood (ISCED 5-8 and ISCED 3, ISCED 2, ISCED 1, ISCED 0).

We also considered three levels of in-person work attendance:

- “Pre-pandemic”, i.e. the age-specific proportion of in-person work attendance is set at pre-pandemic levels;

- “Sustainable”, reflecting the proportion of in-person workers observed in Italy after the reopening of economic activities following the 2020 COVID-19 lockdown on May 18, 2020;
- “Minimum”, where only essential workers are allowed to work in person, as during the COVID-19 lockdown.

The age-specific proportions of in-person workers associated with the “Sustainable” and “Minimum” scenarios ($\omega_i^{\text{sustainable}}$ and $\omega_i^{\text{minimum}}$) were estimated by the Italian Workers Compensation Authority and are available from Marziano et al.¹² and reported in Figure 3B in the main text.

The resulting 18 scenarios (including the baseline) are reported in Supplementary Table 2.

Supplementary Table 2: *Description of intervention scenarios considered.*

		Level of in-person work		
		Pre-pandemic	Sustainable (no closure of economic activities)	Minimum (only essential activities)
Level of school closure	No level closed	Scenario 0 (Baseline)	Scenario 1	Scenario 2
	ISCED 5-8 (tertiary)	Scenario 3	Scenario 4	Scenario 5
	ISCED 3-8 (tertiary and upper secondary)	Scenario 6	Scenario 7	Scenario 8
	ISCED 2-8 (tertiary; upper secondary; lower secondary)	Scenario 9	Scenario 10	Scenario 11
	ISCED 1-8 (tertiary; upper secondary; lower secondary; primary)	Scenario 12	Scenario 13	Scenario 14
	All levels closed (from early childhood to tertiary)	Scenario 15	Scenario 16	Scenario 17

Computation of the transmissibility reduction compared with the baseline scenario

If we denote by R_s the reproduction number associated with scenario s , the relative reduction α_s with respect to the baseline scenario with full school and work attendance can be computed as:

$$\alpha_s = 1 - \frac{R_s}{R_0} = 1 - \frac{\rho(\text{NGM}_s)}{\rho(\text{NGM}_0)}$$

where $\rho(\text{NGM}_s)$ and $\rho(\text{NGM}_0)$ represent the dominant eigenvalues of the Next-Generation Matrices associated with scenario s and with the baseline scenario, respectively.

To define the Next-Generation Matrix associated to each scenario s , we consider an SIR model where the population is divided into two subgroups: P, representing the population attending work or school in-person, and NP representing the population not attending work or school in-person in scenario s . Within each subgroup, individuals are further stratified by $n=15$ age groups (14 five-year age groups from 0 to 69 years plus one age group for individuals aged 70 years or older). We denote by S_i^P, I_i^P, R_i^P the numbers of susceptible, infectious, and removed individuals of age i in subgroup P, and by $S_i^{NP}, I_i^{NP}, R_i^{NP}$ the corresponding quantities in subgroup NP.

The system of model equations for subgroup P is then:

$$\begin{aligned}\dot{S}_t^P &= -\lambda_t^P S_t^P \\ \dot{I}_t^P &= \lambda_t^P S_t^P - \gamma I_t^P \\ \dot{R}_t^P &= \gamma I_t^P\end{aligned}\quad (1)$$

With force of infection:

$$\lambda_t^P = \beta \sum_j C_{i,j}^P \frac{I_j^P + I_j^{NP}}{N_j^P + N_j^{NP}}$$

Analogously, for subgroup NP:

$$\begin{aligned}\dot{S}_t^{NP} &= -\lambda_t^{NP} S_t^{NP} \\ \dot{I}_t^{NP} &= \lambda_t^{NP} S_t^{NP} - \gamma I_t^{NP} \\ \dot{R}_t^{NP} &= \gamma I_t^{NP}\end{aligned}\quad (2)$$

with

$$\lambda_t^{NP} = \beta \sum_j C_{i,j}^{NP} \frac{I_j^P + I_j^{NP}}{N_j^P + N_j^{NP}}$$

Here, γ is the recovery rate, β is a scaling factor for transmissibility, $C_{i,j}^P$ and $C_{i,j}^{NP}$ are the overall contact matrices estimated for subgroups P and NP, and N_j^P, N_j^{NP} are the population sizes of age group j in the two subgroups (which vary depending on the considered scenario).

To study the early dynamics of infection, we derive the Next Generation Matrix (NGM) using the methodology described in Diekmann et al. 2010¹³. Let

$$\mathbf{I} = (I_1^P, \dots, I_n^P, I_1^{NP}, \dots, I_n^{NP})^\top$$

be the vector of infectious individuals across age groups and subpopulations.

The system of equations for $\mathbf{I}$ thus reads as:

$$\dot{\mathbf{I}} = (\mathbf{T} + \mathbf{\Sigma})\mathbf{I}$$

where $\mathbf{T}$ describes the production of new infections (transmission matrix) and $\mathbf{\Sigma}$ the transitions of individuals out of the infectious compartments (transition matrix). Following this formalism, the NGM can be defined as:

$$\mathbf{NGM} = -\mathbf{T}\mathbf{\Sigma}^{-1},$$

The transmission and transition matrices of the linearized subsystem of Eq. 1 and 2 are:

$$\mathbf{T} = \beta \begin{pmatrix} \left[C_{i,j}^P \frac{N_i^P}{N_j} \right]_{i,j} & \left[C_{i,j}^P \frac{N_i^P}{N_j} \right]_{i,j} \\ \left[C_{i,j}^{NP} \frac{N_i^{NP}}{N_j} \right]_{i,j} & \left[C_{i,j}^{NP} \frac{N_i^{NP}}{N_j} \right]_{i,j} \end{pmatrix}$$

Where each block is an $n \times n$ matrix, and

$$\mathbf{\Sigma} = -\gamma \mathbf{I}_{2n \times 2n},$$

where $\mathbf{I}_{2n \times 2n}$ is the identity matrix.

Therefore, the Next Generation Matrix is

$$\mathbf{NGM} = -\mathbf{T}\mathbf{\Sigma}^{-1} = \frac{\beta}{\gamma} \begin{pmatrix} \left[C_{i,j}^P \frac{N_i^P}{N_j} \right]_{i,j} & \left[C_{i,j}^P \frac{N_i^P}{N_j} \right]_{i,j} \\ \left[C_{i,j}^{NP} \frac{N_i^{NP}}{N_j} \right]_{i,j} & \left[C_{i,j}^{NP} \frac{N_i^{NP}}{N_j} \right]_{i,j} \end{pmatrix}$$

If we consider heterogeneous susceptibility across age groups (as done in the sensitivity analyses for H1N1 and SARS-CoV-2), the formulation of the SIR model's force of infection changes as follows:

$$\lambda_i^P = \beta \sigma_i \sum_j C_{i,j}^P \frac{I_j^P + I_j^{NP}}{N_j^P + N_j^{NP}} \quad \text{and} \quad \lambda_i^{NP} = \beta \sigma_i \sum_j C_{i,j}^{NP} \frac{I_j^P + I_j^{NP}}{N_j^P + N_j^{NP}}$$

where σ_i represents the relative susceptibility to infection at age i , that is, the relative probability of becoming infected given exposure. Consequently, the formulation of the Next Generation Matrix (NGM) becomes:

$$\mathbf{NGM} = -\mathbf{T}\mathbf{\Sigma}^{-1} = \frac{\beta}{\gamma} \sigma_i \begin{pmatrix} \left[C_{i,j}^P \frac{N_i^P}{N_j} \right]_{i,j} & \left[C_{i,j}^P \frac{N_i^P}{N_j} \right]_{i,j} \\ \left[C_{i,j}^{NP} \frac{N_i^{NP}}{N_j} \right]_{i,j} & \left[C_{i,j}^{NP} \frac{N_i^{NP}}{N_j} \right]_{i,j} \end{pmatrix}$$

1.6 Modelling seasonal influenza A in Italy, 2023-2024

We developed a model for influenza A transmission, based on an age-structured SEIR scheme. The population of the model is divided in 30 classes (15 age groups x 2 subgroups based on attendance status, either “in person” and “not in person”). Mixing patterns are informed by the mean contact matrices estimated in this study for the two subgroups.

Transitions across different epidemiological classes can be summarized by the following ordinary differential equation system:

$$\begin{cases} \dot{S}_i^P = -\lambda_i^P S_i^P \\ \dot{E}_i^P = \lambda_i^P S_i^P - \omega E_i^P \\ \dot{I}_i^P = \omega E_i^P - \gamma I_i^P \\ \dot{R}_i^P = \gamma I_i^P \\ \dot{S}_i^{NP} = -\lambda_i^{NP} S_i^{NP} \\ \dot{E}_i^{NP} = \lambda_i^{NP} S_i^{NP} - \omega E_i^{NP} \\ \dot{I}_i^{NP} = \omega E_i^{NP} - \gamma I_i^{NP} \\ \dot{R}_i^{NP} = \gamma I_i^{NP} \end{cases}$$

where

- S_i^P and S_i^{NP} represent the number of individuals of age i susceptible to influenza A in subgroup P (in person) and NP (not in person), respectively;
- E_i^P and E_i^{NP} represent the number of individuals of age i infected but not yet infectious in subgroup P and NP , respectively;
- I_i^P and I_i^{NP} represent the number of individuals of age i infectious in subgroup P and NP , respectively;
- R_i^P and R_i^{NP} represent the number of individuals of age i who recovered from infection in subgroup P and NP , respectively;
- ω is the rate of transition between epidemiological classes E and I ;
- γ is the recovery rate.
- λ_i^P and λ_i^{NP} are the force of infection for subjects of age i in subgroup P and NP respectively, and are modeled as follows:

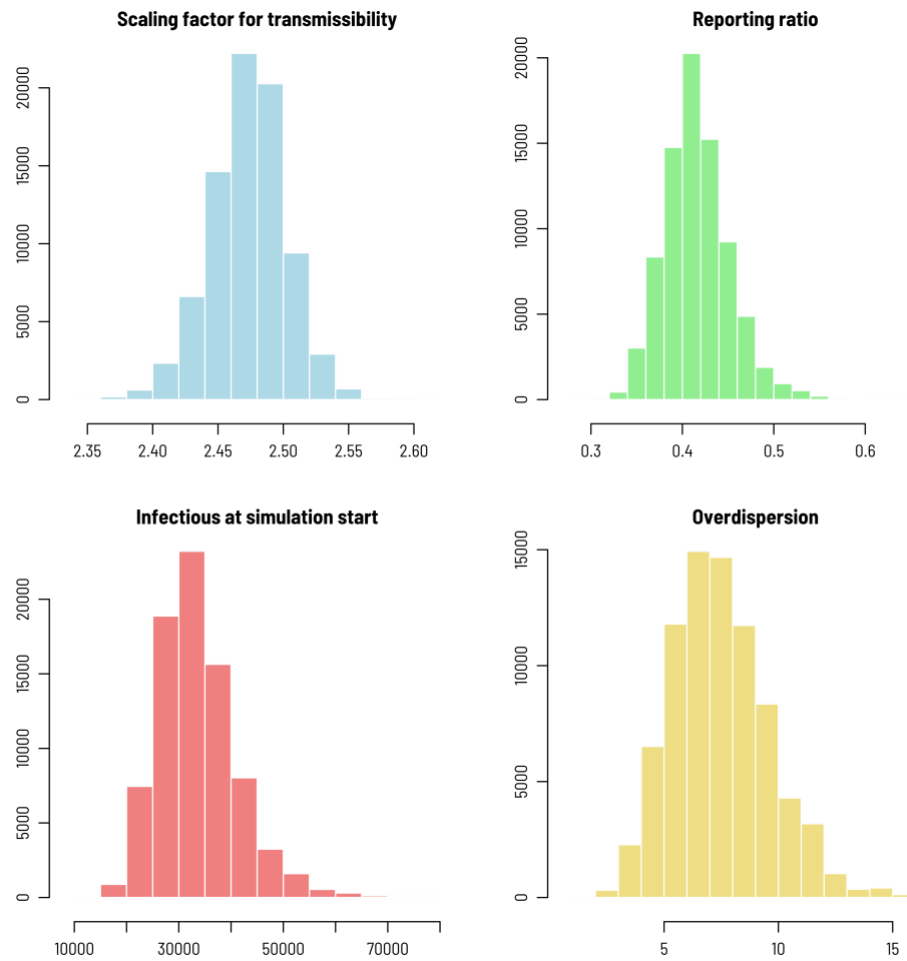
$$\lambda_i^P = \beta \sigma_i \sum_j C_{i,j}^P \frac{I_j^P + I_j^{NP}}{N_j^P + N_j^{NP}} \quad \text{and} \quad \lambda_i^{NP} = \beta \sigma_i \sum_j C_{i,j}^{NP} \frac{I_j^P + I_j^{NP}}{N_j^P + N_j^{NP}}$$

Here β represents a scaling factor for transmissibility, σ_i represents the relative susceptibility to infection with influenza A at age i ¹⁴, $C_{i,j}^P$ and $C_{i,j}^{NP}$ are the overall mean contact matrices estimated for subgroups P and NP , and N_j^P and N_j^{NP} is the population of age j in subgroups P and NP .

The Italian population was distributed across ages and the two subgroups as in the baseline, full-attendance, scenario (see Section 1.5). The simulation starts at week 46 of the year 2023 with a

number I_0 of initially infectious individuals, which was estimated during the calibration procedure.

We calibrated model parameters against the weekly incidence of influenza A provided by the Influcast project¹⁵ from week 46 of 2023 to week 17 of 2024 using a Markov Chain Monte Carlo (MCMC) approach with a negative binomial likelihood, reversible normal jumps, and a Metropolis-Hastings acceptance algorithm. Free model parameters were the transmissibility scaling factor (β), the influenza A reporting ratio, which is assumed constant over age and time, the number of infectious individuals at the start of the simulations, and the overdispersion of the negative binomial distribution which we use to compute the likelihood of observing the weekly incidence given the simulated one. Uninformative (uniform) priors were used for all parameters, with the additional constraints that all parameters be strictly positive and the reporting ratio bounded between 0 and 1. The MCMC was run for 100,000 iterations with a 20,000-iteration burn-in. Posterior distributions of the estimated parameters are shown in Supplementary Figure 4. Alternative scenarios were simulated by rerunning the model using all 80,000 parameter sets from the posterior distribution, while modifying the distribution of the Italian population across the “in-person”/“not-in-person” subgroups as described, in Section 1.5.



Supplementary Figure 4: Posterior distributions of the model parameters.

2. 19

2.1 Main analysis

Comparing the data with previous studies: POLYMOD⁸ and CoMix¹⁶

The data presented in the main manuscript complement previous social contact data, providing updated information collected during a period when COVID-19 measures in Italy (both at the governmental and individual level) were receding (wave 1) or had been removed altogether (wave 2). In particular, the data from the second wave were collected only one month before the WHO declared the end of the COVID-19 epidemic as a public health emergency of international concern¹⁷. We compared data with two previous social contact studies in Italy: POLYMOD⁸, a paper-based survey conducted in April 2006; and CoMix - Italy¹⁸, a series of online surveys conducted at different times during the pandemic. For CoMix, we selected Wave A6 and A7 as they took place in 2021 roughly in the same months as our study (part of the EpiPose Project Italy^{18,19}). As A6 and A7 only included adult respondents, we similarly pooled data about the underage population from waves C1 and C2 (survey waves focused on the underage population only). During this period, the SARS-CoV-2 Alpha variant was dominant in Italy, COVID-19 vaccination was being rolled out, and strict COVID-19 control measures were in place.

From now on, we will refer to our survey as “MixIT”, while we refer to “POLYMOD” and “CoMix” as the contact studies conducted by Mossong et al., 2008, and Coletti et al., 2020, respectively. Supplementary Table 3 compares the methodological aspects of the three main data collection run in Italy: POLYMOD, CoMix and MixIT. Supplementary Tables 4 and Supplementary Table 5 report the number of participants and average reported contacts for the three studies, stratifying the information by different groups of respondents. Data for comparison were obtained through the *socialmixr* project²⁰.

Supplementary Table 3: Methodological aspects of the three main data collection run in Italy: POLYMOD, CoMix, and MixIT (this study).

	POLYMOD	CoMix	MixIT
Recruitment method	Random digit dialling on fixed telephone lines	Combination of social media, web advertising, email campaigns	Representative survey company panel
Survey field work conducted by	CRA Research, www.cra-research.com	Ipsos Mori, www.ipsos.com/it-it	YouGov, it.yougov.com
Financial Incentives	None	Yes	Yes
Sampling method	Quota by age, sex, geographical region, rural/urban and day of the week	Quota by age, gender, geographic region, socioeconomic status	Quota by age, gender, geographical region, and weekday/weekend
Diaries delivered and collected by...	Paper/Mail	Online platform	Online platform
Time period of the survey and number of waves	May 2006	December 2020 – April 2021; 7 adult waves + 2 children waves, approximately every two weeks	2 waves: March 2022; March-April 2023
Respondent types – age groups	0-8 parental proxy reporting, 9-17 self-reporting children and teenagers, 18+ self reporting adults	0-17 parental proxy reporting, 18+ self-reporting adults	0-13 parental proxy reporting, 14-17 self-reporting with parental support, 18+ self-reporting adults
Maximum number of contact entries	45	100	150
Asked about duration of contacts	Yes	Yes	No
Definition of contact	<i>Direct contact</i> : a skin-to-skin contact (a physical contact), or a two-way conversation with three or more words in the physical presence of another person but no skin-to-skin contact (a nonphysical contact)	<i>Direct contact</i> but with the exchange of “at least a few words”	<i>Direct contact</i> but with the exchange of “at least 5 words”
Additional aggregate contact information	Yes: by physical/non physical distinction	Yes: by age group and setting	Yes: indoor prolonged contacts (>30 minutes)

Supplementary Table 4: *Survey respondents and average contacts by wave - comparing POLYMOD, CoMix, and MixIT (this study).* The table reports the sample size and average number of social contacts stratified by different respondent characteristics (95% Confidence Intervals are reported in parentheses): age, sex, household size, and day of the week.

		POLYMOD		CoMix		MixIT			
		April 2006		February-April 2021 (A6, A7, C1, C2)		March 2022		March-April 2023	
	Category	count	mean	count	mean	count	mean	count	mean
All	All	846	19.8 (19 - 20.6)	1883	3.6 (3.3 - 3.9)	2474	7.3 (6.9 - 7.7)	2505	7.8 (7.3 - 8.2)
	0-4	77	14.9 (12.7 - 17.2)	433	6.2 (5.3 - 7.2)	76	9 (7.2 - 10.9)	44	9.7 (6.8 - 13.4)
	5-17	112	20.7 (18.5 - 23)	161	5.7 (4.7 - 6.8)	208	10.6 (8.7 - 12.7)	181	11.1 (9 - 13.4)
	18-29	104	18.4 (16.5 - 20.4)	229	2.8 (2.2 - 3.6)	376	8 (6.9 - 9.3)	341	8.8 (7.7 - 10.2)
Age	30-39	119	19.3 (17.1 - 21.5)	198	2.4 (1.9 - 3.1)	381	6 (5.1 - 7.2)	353	6.7 (5.8 - 7.6)
	40-49	224	24.9 (23.3 - 26.5)	295	2.6 (2.3 - 3)	233	12.8 (11.4 - 14.3)	161	15 (12.9 - 17.1)
	50-59	105	18.9 (16.6 - 21.3)	151	2.8 (1.9 - 4.4)	432	6.3 (5.4 - 7.2)	484	7.6 (6.6 - 8.7)
	60+	98	13.7 (11.7 - 15.8)	407	1.9 (1.8 - 2.1)	768	5.5 (4.9 - 6.2)	941	5.9 (5.4 - 6.6)
Sex	NA	7	23.4 (16.9 - 29)	9	6 (1.9 - 13)	-	-	-	-
	Female	438	19.3 (18.1 - 20.4)	1176	4.3 (3.8 - 4.7)	1226	7.1 (6.6 - 7.7)	1233	7.3 (6.8 - 7.9)
	Male	401	20.3 (19.1 - 21.5)	703	2.4 (2.2 - 2.6)	1248	7.5 (6.9 - 8.1)	1272	8.2 (7.6 - 8.9)
	NA	7	23.4 (17 - 29.1)	4	13 (7 - 22.8)	-	-	-	-
Household Size	1	48	15 (11.8 - 18.4)	171	0.9 (0.6 - 1.1)	357	5.2 (4.5 - 6)	355	5.9 (4.9 - 7)
	2	110	17.2 (15.1 - 19.4)	439	2 (1.6 - 2.6)	745	5.7 (5 - 6.5)	844	6.5 (5.7 - 7.2)
	3	227	18.4 (16.9 - 20)	577	3.6 (3.1 - 4.1)	732	8.2 (7.3 - 9.1)	677	8.5 (7.6 - 9.4)
	4	333	21.7 (20.5 - 23)	555	5.1 (4.5 - 5.8)	502	9.1 (8.2 - 10.1)	492	9.6 (8.6 - 10.6)
Day	5	98	21.1 (18.4 - 23.9)	107	5.4 (4.1 - 7.3)	114	9.7 (8.1 - 11.7)	104	10.3 (8.4 - 12.6)
	6+	30	21 (16.7 - 25.5)	33	6.7 (5.2 - 8.8)	24	13.9 (8.2 - 22.3)	33	13.5 (9.6 - 17.9)
	NA	-	-	1	2 (1 - 2)	-	-	-	-
	weekday	620	21.1 (20.2 - 22.1)	1565	3.8 (3.5 - 4.1)	1827	7.4 (6.9 - 7.9)	1757	8.3 (7.8 - 8.9)
	weekend	226	16 (14.6 - 17.5)	318	2.6 (2.1 - 3.4)	647	7.2 (6.3 - 8.2)	748	6.5 (5.8 - 7.3)

Supplementary Table 5: Survey average contacts by wave and contact setting - comparing *POLYMOD*, *CoMix*, and *MixIT* (this study). The table reports the sample size and average number of social contacts in different location settings (95% Confidence Intervals are reported in parentheses): home, work, school, transportation means, leisure places, and other locations.

Setting	<i>POLYMOD</i>		CoMix		MixIT			
	April 2006		February-April 2021 (A6, A7, C1, C2)		March 2022 wave		March 2023 wave	
	count	mean	count	mean	count	mean	count	mean
home	781	3.8 (3.7 - 4)	1492	1.8 (1.7 - 1.9)	2204	4.3 (4 - 4.6)	2256	4.3 (4.1 - 4.6)
work	258	3.4 (2.9 - 3.9)	128	0.2 (0.1 - 0.4)	386	0.8 (0.7 - 1)	423	1 (0.9 - 1.2)
school	323	5.3 (4.7 - 5.9)	158	0.8 (0.6 - 1)	134	0.5 (0.4 - 0.6)	107	0.5 (0.4 - 0.6)
leisure	527	3.7 (3.3 - 4)	15	0 (0 - 0)	443	0.7 (0.5 - 0.8)	534	0.7 (0.6 - 0.8)
transport	162	0.5 (0.4 - 0.7)	23	0 (0 - 0)	136	0.2 (0.1 - 0.3)	154	0.1 (0.1 - 0.2)
other	490	3 (2.7 - 3.4)	469	0.7 (0.6 - 0.9)	702	0.8 (0.7 - 1)	781	1.1 (0.9 - 1.2)

Modelling the determinants of social contacts: covariates description

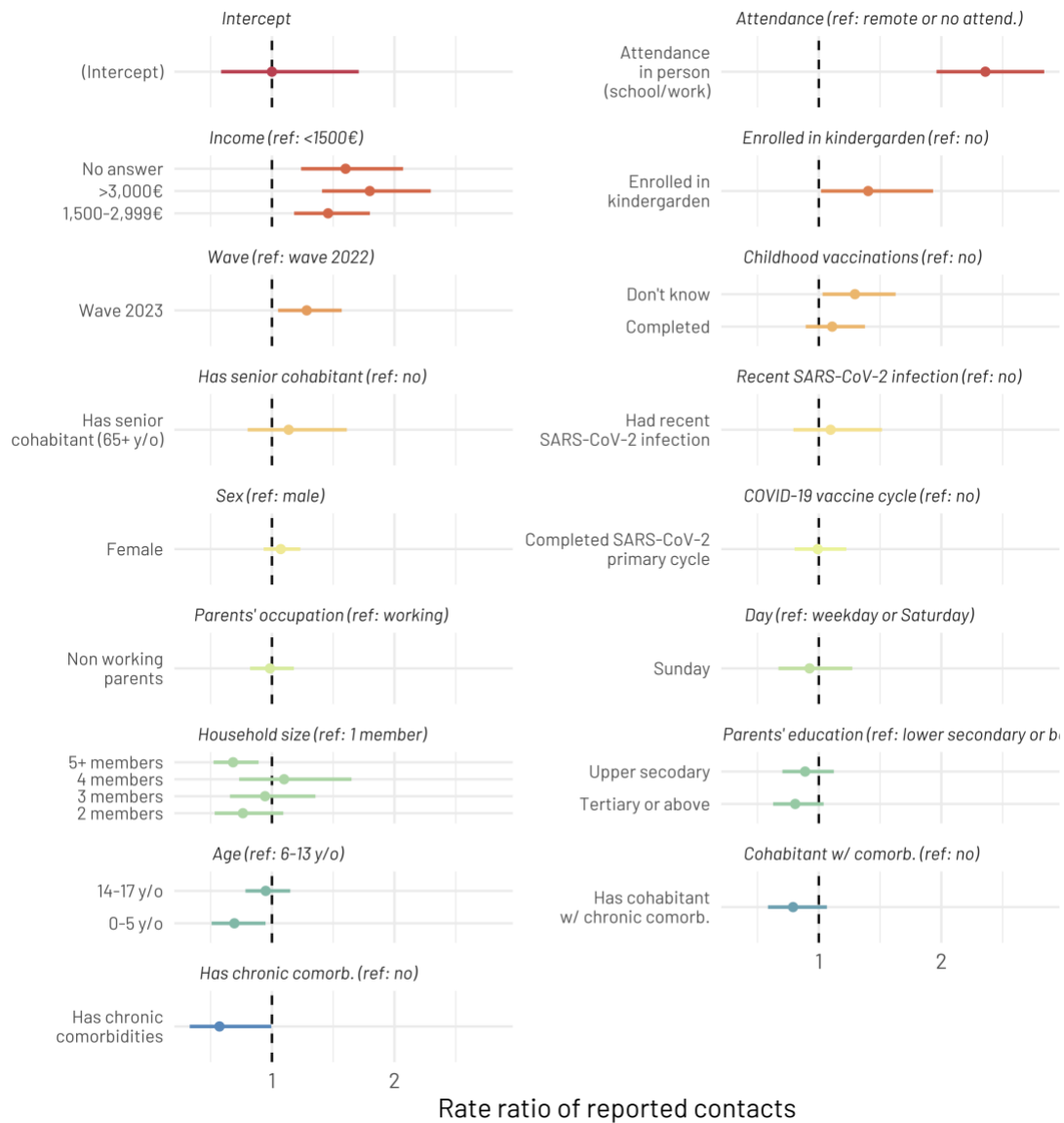
Supplementary Table 6: *Description of the covariates used in the statistical modelling framework.* The table reports the name, type, description, and possible values of all the covariates used in the negative binomial regression.

Name	Type	Description	Values
region_grouped_it	Categorical	Italian macro-region of residence of the respondent (ISTAT categorization)	• North-West • North-East • Center • South • Islands
respondent_gender	Binary	Gender of the respondent	• Male • Female
<u>education</u>	Categorical	Over 17: Educational level achieved by the respondent (ISCED categorization) Under 17: Educational level achieved by the respondent's parent (ISCED categorization)	• Lower secondary or below • Upper secondary • Tertiary or above
<u>occupation_agg</u>	Categorical	Over 16: Respondent's job category Under 16: Job category of the respondent's parent	• Employed • Home/family • Student • Retired • Inactive
d_occupation	Binary	Over 16: Respondent's job category Under 16: Job category of the respondent's parent	• Employed/student • Other (not working)
occupation_agg2	Categorical	Over 16: Respondent's job category Under 16: Job category of the respondent's parent	• Employed • Student • Other (not working)
<u>sunday</u>	Binary	Contact diary refers to Sunday	• Yes • No
weekend	Binary	Contact diary refers either to Saturday or Sunday	• Yes • No
worked_in_presence	Binary	Over 16: The respondent worked in-presence on the day prior to survey filling	• Yes • No (remote work, no work)
presence_school	Categorical	Under 16, students over 16: teaching method followed on the day prior to the survey filling	• In person • Remotely • Did not attend
<u>attend_in_presence</u>	Binary	The respondent worked or followed class at school in-presence the day prior to the survey filling	• Yes • No
<u>d_children</u>	Binary	The respondent lives with at least one minor in their household	• Yes • No
<u>d_senior65</u>	Binary	The respondent lives with at least one person aged 65 or more in their household	• Yes • No
d_senior70	Binary	The respondent lives with at least one person aged 70 or more in their household	• Yes • No
d_senior75	Binary	The respondent lives with at least one person aged 75 or more in their household	• Yes • No
d_senior80	Binary	The respondent lives with at least one person aged 80 or more in their household	• Yes • No
d_hh_size	Binary	The respondent has at least a cohabitant	• Yes • No
<u>d_vacc2</u>	Binary	The respondent has completed the primary cycle of COVID-19 vaccine	• Yes • No
vacc_covid_bin	Categorical	Number of doses of COVID-19 vaccine received by the participant	• No doses • 1 dose • 2 doses • 3 doses or more • Exempt
vacc_covid_bin_2	Categorical	Number of doses of COVID-19 vaccine received by the participant	• No doses • 1 or 2 doses • 3 doses or more
<u>hh_size</u>	Categorical	Household size (respondent included)	• 1 • 2 • 3

			• 4 • 5+
hh_size_det	Numeric	Household size (respondent included)	• [1-8]
<u>chronic_comorb_self2</u>	Binary	The respondent has at least a comorbidity known to be associated with severe COVID-19 outcomes*	• Yes • No
<u>chronic_comorb_cohab2</u>	Binary	At least one of the respondent's cohabitants has at least a comorbidity known to be associated with severe COVID-19 outcomes*	• Yes • No
covid	Binary	The respondent has been officially diagnosed with COVID-19 at least once	• Yes • No
time_since_covid	Categorical	Time passed since last officially diagnosed COVID-19 infection	• Had COVID-19 – less than 120 days ago • Had COVID-19 – more than 120 days ago • Had COVID-19 – but reported no date • Didn't have COVID-19
<u>d time since covid</u>	Binary	The respondent has been officially diagnosed with COVID-19 in the 4 months prior to the survey filling	• Yes • No
income_1000	Categorical	Respondent's family income	• <1000 eur • 1000-1999 eur • 2000-2999 eur • 3000-3999 eur • 4000-4999 eur • >5000 eur • Didn't answer
income	Categorical	Respondent's family income	• <1000 eur • 1000-1499 eur • 1500-1999 eur • 2000-2499 eur • 2499-2999 eur • 3000-3499 eur • 3500-3999 eur • 4000-4499 eur • 4500-4999 eur • >5000 eur • Didn't answer
<u>income_threecat</u>	Categorical	Respondent's family income	• <1500 eur • 1500-2999 eur • >3000 eur • Didn't answer
knows_severe	Binary	The respondent knows someone who was hospitalized/died due to COVID-19	• Yes • No
<u>age_group_10</u>	Categorical	Age group of the respondent	• 0-17 y • 18-29 y • 30-39 y • 40-49 y • 50-59 y • 60-69 y • 70+ y
age_group_25	Categorical	Age group of the respondent	• 0-17 y • 18-44 y • 45-69 y • 70+ y
<u>wave</u>	Categorical	Survey wave	• 1 • 2
<u>EPID</u>	-	Alphanumeric code that uniquely identifies respondents across survey waves	-

* Alcohol or drug consumption abuse; Sickle cell disease or thalassemia; Neurological diseases; Pregnancy; AIDS/HIV infection; Chronic liver diseases; Chronic kidney diseases; Chronic lung diseases (e.g., COPD, asthma, cystic fibrosis, etc.).

Modelling the determinants of social contacts for the underage population under scenario 1A assumptions

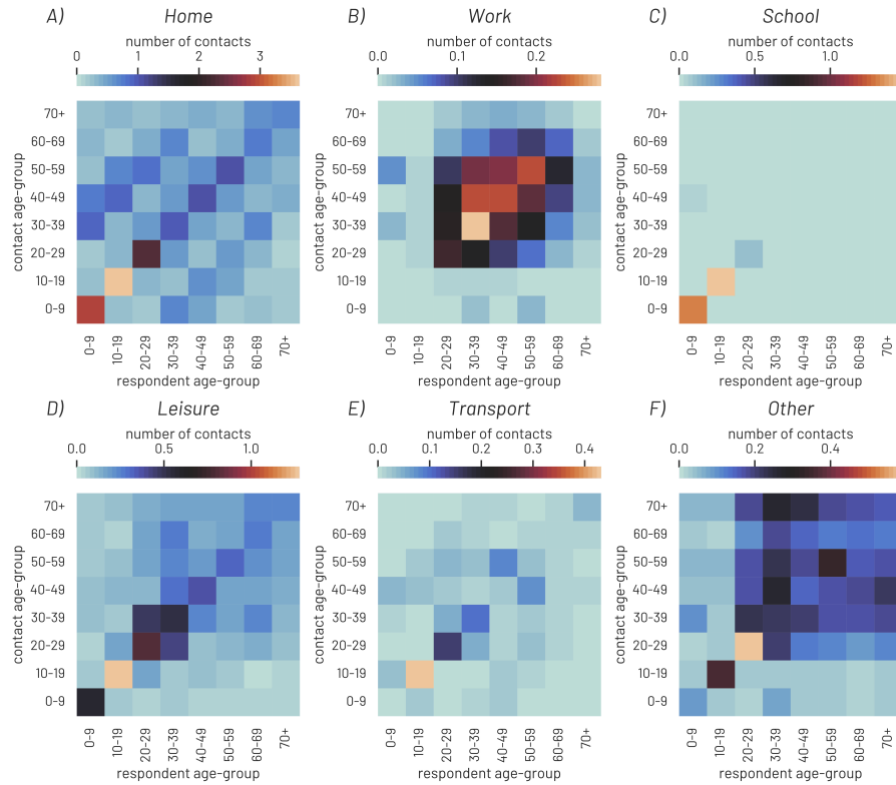


Supplementary Figure 5: Model results for the underage population under scenario 1A assumptions. Each panel in the figure shows the rate ratio for the number of direct and indirect social contacts in the underage population using prolonged proportional contacts for each of the model's covariates.

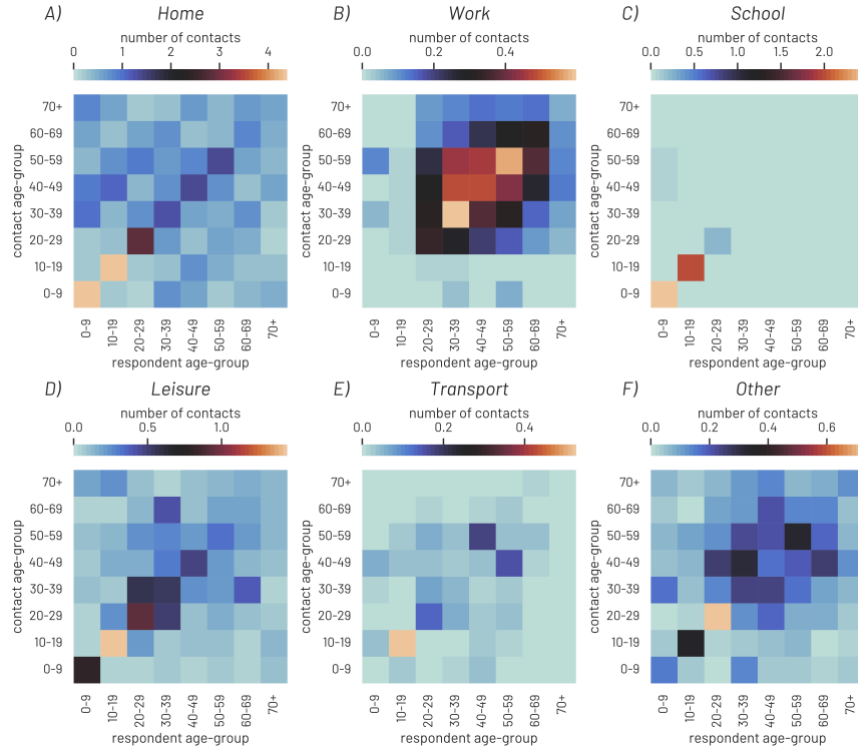
Contact matrices by setting

This section reports the contact matrices by setting the total number of social contacts under the assumptions described as *scenario 1A* (see section 1.2 and Supplementary Table 1).

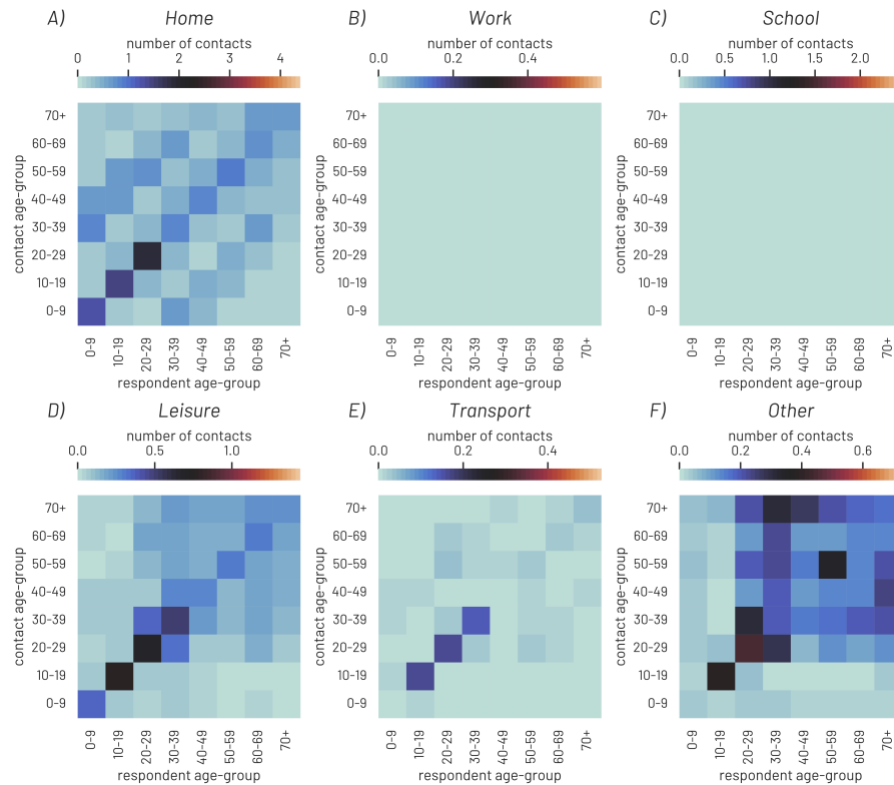
Supplementary Figure 6 shows the contact matrices for the entire survey population. Supplementary Figures 7 and 8 show the contact matrices for the survey respondents attending and not attending in-person to work or school activities.



Supplementary Figure 6: Contact matrices by setting under scenario 1A assumptions on social contacts.



Supplementary Figure 7: Contact matrices by setting of individuals working or attending school in-person under scenario 1A assumptions.



Supplementary Figure 8: Contact matrices by setting for individuals not working or attending school in-person under scenario 1A assumptions.

2.2 Additional details on direct and indirect social contacts

In this section, we separately report contact information stratified by respondent characteristics for direct and indirect contacts. The numbers reported in Supplementary Table 7 and 8 show the average reported contacts for the two contact types. Supplementary Table 9 report the contacts by setting for direct, indirect and the minimum set union, i.e. the total social contacts as presented in the main manuscript, for the different settings.

Supplementary Table 7: *Survey average contacts by wave and contact type.* The table reports the average number of direct and indirect social contacts (95% Confidence Intervals are reported in parenthesis) stratified by different respondent characteristics: age, sex, household income, and household size.

Variables	March 2022 wave		March 2023 wave	
	Direct Contacts (95% C.I.)	Indirect Contacts (95% C.I.)	Direct Contacts (95% C.I.)	Indirect Contacts (95% C.I.)
Total	4.6 (4.4 - 4.8)	5.7 (5.2 - 6.1)	4.9 (4.7 - 5.1)	6 (5.6 - 6.4)
<u>Age group</u>				
0-9	6.8 (5.8 - 7.8)	9.7 (8.2 - 11.3)	7.2 (6.2 - 8.4)	10.6 (8.5 - 12.9)
10-19	6.7 (5.9 - 7.6)	11 (9.2 - 12.9)	7 (5.9 - 8.4)	13.3 (10.8 - 16)
20-29	5.1 (4.6 - 5.7)	8.8 (6.9 - 11)	5.5 (4.9 - 6.1)	9.5 (7.3 - 12)
30-39	5.1 (4.7 - 5.5)	6.3 (5.2 - 7.6)	5.5 (5 - 6)	7 (5.8 - 8.2)
40-49	4.3 (3.9 - 4.7)	4.5 (3.6 - 5.6)	4.6 (4.2 - 5)	5.1 (4.3 - 6.1)
50-59	4.2 (3.8 - 4.6)	4.6 (3.8 - 5.5)	4.9 (4.5 - 5.3)	6 (5.1 - 7.1)
60-69	4.1 (3.7 - 4.5)	4.7 (3.6 - 5.9)	4.4 (4 - 4.8)	4.5 (3.6 - 5.5)
70+	3.4 (3.1 - 3.7)	3 (2.4 - 3.7)	4.2 (3.8 - 4.6)	3.7 (3.1 - 4.4)
<u>Sex</u>				
Male	4.5 (4.3 - 4.7)	5.7 (5.2 - 6.3)	5 (4.8 - 5.3)	6.3 (5.7 - 7)
Female	4.7 (4.5 - 5)	5.6 (5 - 6.2)	4.8 (4.6 - 5.1)	5.7 (5.2 - 6.2)
<u>Household income</u>				
<1,500 euro	3.7 (3.4 - 4)	4.3 (3.6 - 5.2)	3.9 (3.6 - 4.2)	4.8 (4 - 5.7)
1,500-2,999 euro	4.8 (4.5 - 5)	5.7 (5.1 - 6.5)	5.1 (4.8 - 5.4)	5.8 (5.3 - 6.4)
>3,000 euro	5.8 (5.4 - 6.2)	7 (6 - 8)	6.2 (5.8 - 6.6)	8.2 (7 - 9.4)
Doesn't answer	4.1 (3.7 - 4.5)	5.8 (4.8 - 6.8)	4.3 (3.9 - 4.7)	5.2 (4.3 - 6.2)
<u>Household size</u>				
1	3.4 (3 - 3.8)	3.5 (2.8 - 4.3)	3.5 (3.2 - 3.9)	4.4 (3.5 - 5.5)
2	3.6 (3.3 - 3.8)	4.2 (3.5 - 4.9)	3.9 (3.7 - 4.2)	5 (4.2 - 5.7)
3	4.8 (4.5 - 5.1)	6.5 (5.7 - 7.5)	5.3 (4.9 - 5.7)	6.6 (5.8 - 7.5)
4	5.9 (5.5 - 6.3)	7.4 (6.5 - 8.4)	6.4 (6 - 6.8)	7.5 (6.6 - 8.5)
5+	7.4 (6.7 - 8.2)	8 (6.2 - 10.2)	7.6 (6.7 - 8.6)	8.4 (6.6 - 10.5)
<u>NUTS1 region</u>				
North-West	4.9 (4.5 - 5.2)	6.6 (5.7 - 7.6)	4.9 (4.6 - 5.3)	5.9 (5.1 - 6.8)
North-East	4.9 (4.5 - 5.3)	5.7 (4.8 - 6.7)	4.9 (4.6 - 5.3)	6.2 (5.3 - 7.2)
Center	4.4 (4.1 - 4.8)	4.9 (4.3 - 5.6)	5.1 (4.7 - 5.6)	6.6 (5.6 - 7.6)
South	4.5 (4.2 - 4.8)	5.3 (4.4 - 6.2)	5 (4.7 - 5.4)	5.7 (4.9 - 6.6)
Islands	4.1 (3.6 - 4.5)	5.2 (4.1 - 6.6)	4.4 (3.9 - 4.8)	5.5 (4.2 - 6.9)

Supplementary Table 8: Survey average contacts by wave and contact type. The table reports the average number of direct and indirect social contacts (95% Confidence Intervals are reported in parenthesis) stratified by different respondent characteristics, only for respondents aged 18 and older: educational attainment, occupation, working mode (e.g. remotely or in-presence), teaching method (e.g. distance or in-presence learning), COVID-19 vaccinal status, and COVID-19 verified infections.

Variables	March 2022 wave		March 2023 wave	
	Direct Contacts (95% C.I.)	Indirect Contacts (95% C.I.)	Direct Contacts (95% C.I.)	Indirect Contacts (95% C.I.)
<u>Total</u>	4.3 (4.1 - 4.5)	5 (4.6 - 5.4)	4.7 (4.5 - 4.9)	5.5 (5 - 5.9)
<u>Educational attainment</u>				
Lower secondary or below	3.5 (3.2 - 3.9)	4.4 (3.4 - 5.6)	3.8 (3.4 - 4.2)	4.1 (3.2 - 5.2)
Upper secondary	4.2 (4 - 4.4)	4.5 (4 - 5.1)	4.6 (4.4 - 4.8)	5 (4.5 - 5.5)
Tertiary or above	4.8 (4.5 - 5.1)	6.1 (5.2 - 7)	5.4 (5 - 5.7)	6.9 (6 - 7.9)
<u>Employment status</u>				
Employed (full or part-time)	5 (4.8 - 5.3)	5.8 (5.2 - 6.5)	5.4 (5.1 - 5.7)	6.7 (6.1 - 7.4)
Looking after home/family	3.5 (3.1 - 3.9)	2.7 (2.2 - 3.2)	4.1 (3.7 - 4.6)	4.5 (3.5 - 5.6)
Student (full- or part-time)	4.8 (4.1 - 5.6)	10.6 (7.4 - 14.4)	5.4 (4.5 - 6.3)	10.3 (6.6 - 14.6)
Retired	3.4 (3.1 - 3.7)	3.3 (2.6 - 4)	4.1 (3.7 - 4.4)	3.5 (2.9 - 4.1)
Inactive	3.3 (3 - 3.7)	4.5 (3.1 - 6)	3.2 (2.9 - 3.6)	3.7 (2.8 - 4.6)
<u>Working mode (only employed respondents during weekdays)</u>				
Remote or did not attend	3.5 (3.1 - 3.9)	3.5 (2.7 - 4.3)	4 (3.5 - 4.5)	4.1 (3.2 - 5.2)
In-presence	5.9 (5.5 - 6.2)	6.4 (5.6 - 7.3)	6.4 (6 - 6.8)	8 (7 - 9.1)
<u>School attendance (only student respondents during weekdays)</u>				
In-presence	5.5 (4.1 - 6.9)	13.6 (8.6 - 19.2)	5.9 (4.7 - 7.3)	14 (7.9 - 21.3)
Remote attendance	3.4 (2.5 - 4.4)	6.2 (3.2 - 10.2)	-	-
Did not attend	4.7 (3 - 6.6)	8.1 (2.4 - 14.8)	4.9 (3.5 - 6.5)	5.1 (2.9 - 8.4)
<u>COVID-19 vaccination status</u>				
None	3.8 (3.2 - 4.5)	4 (2.8 - 5.5)	3.6 (3.1 - 4.1)	3.2 (2.5 - 4.1)
1 dose	3.5 (1.9 - 5.2)	2.1 (0.8 - 3.6)	5.3 (3.4 - 7.7)	4.8 (2.5 - 7.7)
2 doses	4 (3.6 - 4.5)	5.3 (3.9 - 7.1)	4.8 (4.3 - 5.4)	5.8 (4.5 - 7.3)
3 doses or more	4.4 (4.2 - 4.6)	5.1 (4.6 - 5.6)	4.8 (4.6 - 5)	5.6 (5.1 - 6.1)
Vaccine Exemption	2.1 (1.3 - 2.9)	5.4 (0.9 - 13.6)	8.3 (4 - 12.9)	11.3 (2.2 - 28.4)
<u>COVID-19 previous infection</u>				
Yes	4.8 (4.4 - 5.2)	5.8 (4.6 - 7)	4.9 (4.7 - 5.2)	6 (5.4 - 6.7)
No	4.2 (4 - 4.4)	4.8 (4.4 - 5.3)	4.5 (4.3 - 4.8)	4.9 (4.4 - 5.5)

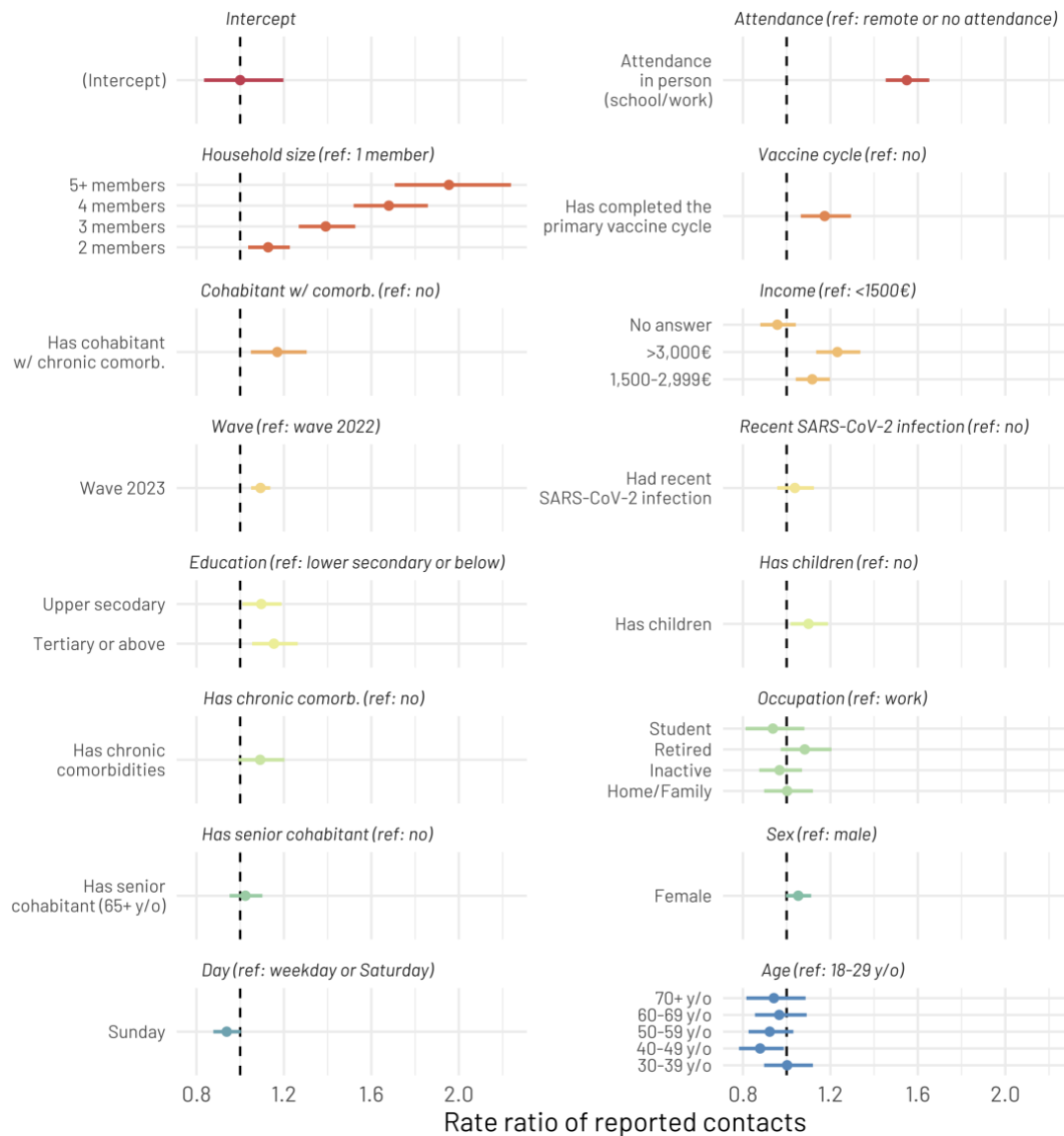
Supplementary Table 9: *Survey average contacts by wave and contact setting.* The table reports the average number of direct, indirect, and total social contacts (95% Confidence Intervals are reported in parenthesis) in different location settings: home, work, school, leisure places, transportation means, and other locations.

Variable	March 2022 wave			March 2023 wave		
Contacts	Direct (95% C.I.)	Indirect (95% C.I.)	Total (95% C.I.)	Direct (95% C.I.)	Indirect (95% C.I.)	Total (95% C.I.)
Total	4.6 (4.4 - 4.8)	5.7 (5.2 - 6.1)	7.3 (6.9 - 7.8)	4.9 (4.7 - 5.1)	6 (5.6 - 6.4)	7.8 (7.3 - 8.2)
Contact setting						
Home	3 (2.9 - 3.1)	2.9 (2.6 - 3.2)	4.3 (4 - 4.6)	3.1 (3 - 3.3)	2.9 (2.6 - 3.1)	4.3 (4.1 - 4.6)
Work	0.5 (0.4 - 0.6)	0.8 (0.7 - 1)	0.8 (0.7 - 1)	0.6 (0.5 - 0.6)	1 (0.8 - 1.2)	1 (0.9 - 1.2)
School	0.2 (0.2 - 0.3)	0.5 (0.4 - 0.6)	0.5 (0.4 - 0.6)	0.2 (0.1 - 0.2)	0.5 (0.4 - 0.7)	0.5 (0.4 - 0.6)
Leisure	0.4 (0.3 - 0.4)	0.5 (0.4 - 0.7)	0.7 (0.5 - 0.8)	0.4 (0.4 - 0.5)	0.6 (0.5 - 0.7)	0.7 (0.6 - 0.8)
Transport	0.1 (0.1 - 0.1)	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)	0.1 (0.1 - 0.1)	0.1 (0.1 - 0.2)	0.1 (0.1 - 0.2)
Other	0.5 (0.4 - 0.5)	0.7 (0.6 - 0.8)	0.8 (0.7 - 1)	0.6 (0.5 - 0.6)	0.9 (0.7 - 1)	1.1 (0.9 - 1.2)

2.3 Sensitivity analysis on direct contacts only

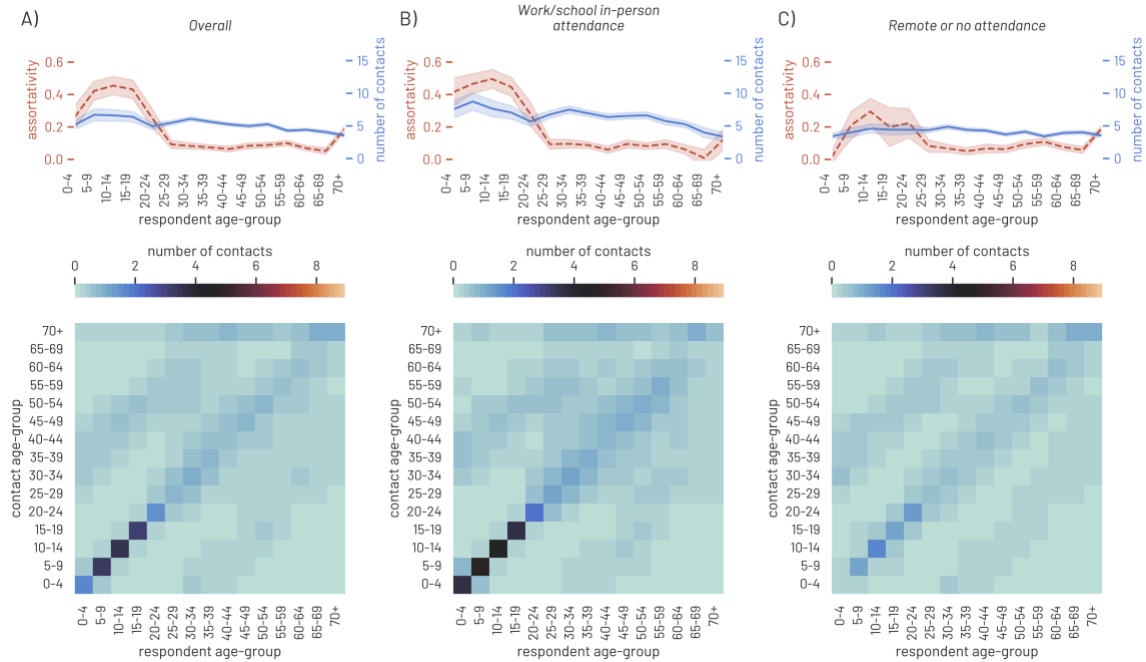
Direct contacts are the most commonly used definition for social contacts^{8,16,21} and, compared to a definition of social contacts that also includes indirect contacts, they always consist of a smaller number of face-to-face encounters. In this section, we provide results for the analysis using direct contacts only. Also in this case, the statistical analysis reaffirms the importance of in-person attendance in determining a higher number of social contacts (Supplementary Figure 9). Mixing patterns for direct contacts are similar to the main analysis, except for the significantly lower numbers of social contacts and higher values of assortativity in younger age groups (Supplementary Figure 10). Transmissibility results featured minor changes across all explored scenarios when compared to the main analysis (Supplementary Figure 11).

Modelling the determinants of direct social contacts



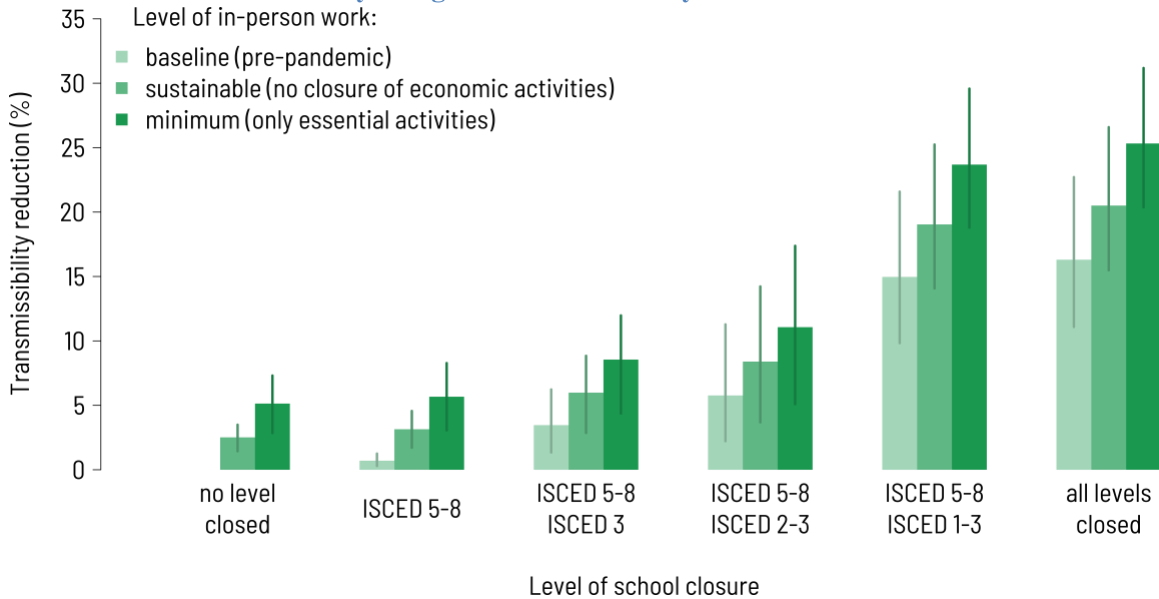
Supplementary Figure 9: Model results for the direct social contacts of the adult population. Each panel in the figure shows the rate ratio for the number of direct social contacts in the adult population for each of the model's covariates.

Social contacts matrices for direct contacts



Supplementary Figure 10: Contact matrices for direct-only social contacts. A) Overall direct contacts, B) Contacts of respondents who attended in-person work or school activities, C) Contacts of respondents who did not attend work/school in-person.

Reduction in transmissibility using direct contacts only

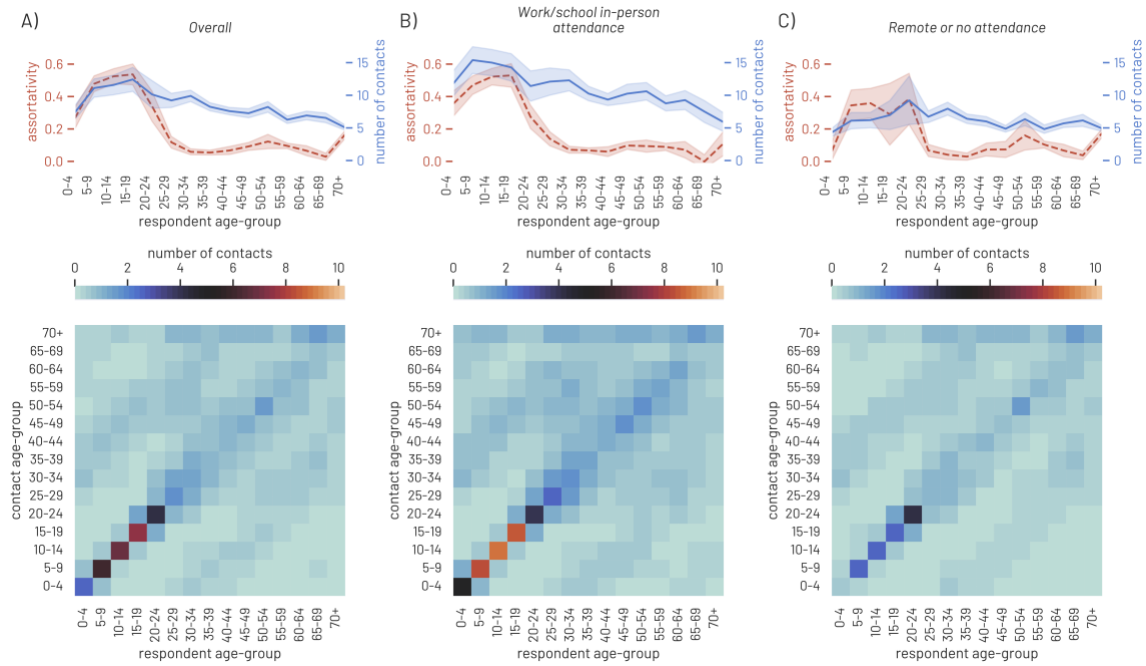


Supplementary Figure 11: Transmissibility reduction under different scenarios of work/school attendance in the sensitivity analysis considering direct contacts only. The Figure shows the relative reduction in transmissibility associated with intervention scenarios combining different levels of school closures and in-person work, compared to a baseline scenario where the proportion of in-person workers is set at pre-pandemic levels¹² and students across all education levels attend in person.

2.4 Sensitivity analysis for social contacts under scenario 1B

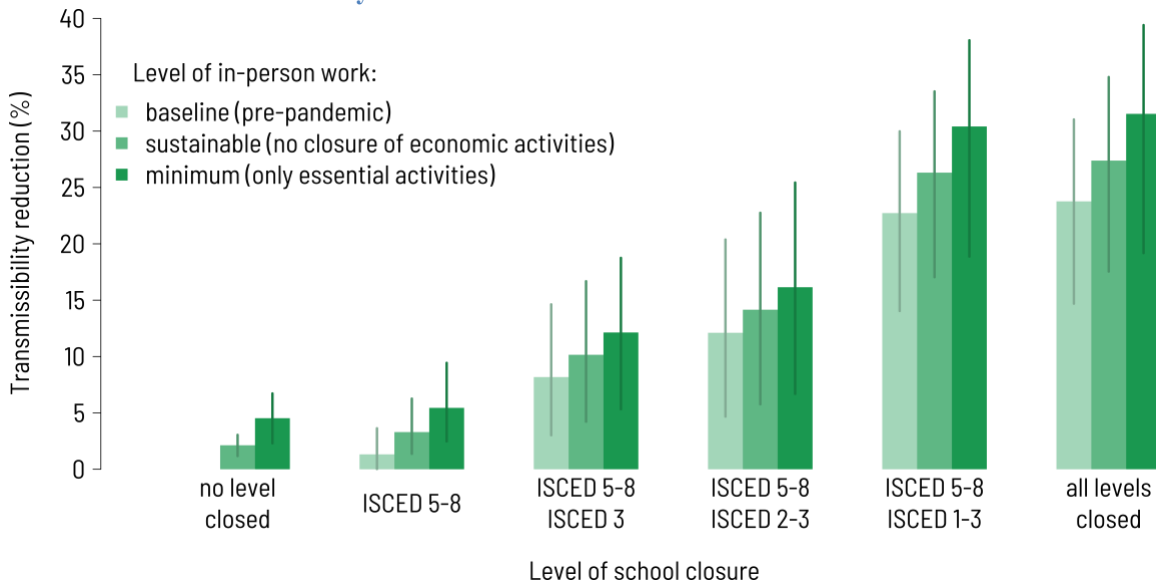
This section is devoted to presenting the same analyses under scenario 1B for the augmentation of indirect social contacts, where indirect contacts are assumed to occur in the setting where most of the direct contacts occurred (see Section 1.2). In this scenario, the total number of contacts does not change; therefore, the statistical model in this scenario remains unaltered. Contacts show similar mixing patterns as in the main analysis but with higher assortativity (Supplementary Figure 12), particularly for the younger age groups. Transmissibility results featured minor changes across all explored scenarios when compared to the main analysis (Supplementary Figure 13).

Social contacts matrices for scenario 1B



Supplementary Figure 12: Contact matrices for social contacts under scenario 1B assumptions. A) Overall direct and indirect 1B social contacts, B) Contacts of respondents who attended in-person work or school activities, C) Contacts of respondents who did not attend work or school activities in-person.

Reduction in transmissibility for scenario 1B



Supplementary Figure 13: *Transmissibility reduction under different scenarios of work/school attendance under scenario 1B assumptions.* The Figure shows the relative reduction in transmissibility associated with intervention scenarios combining different levels of school closures and in-person work, compared to a baseline scenario where the proportion of in-person workers is set at pre-pandemic levels¹² and students across all education levels attend in person.

2.5 Sensitivity analyses considering age-specific susceptibility to infection

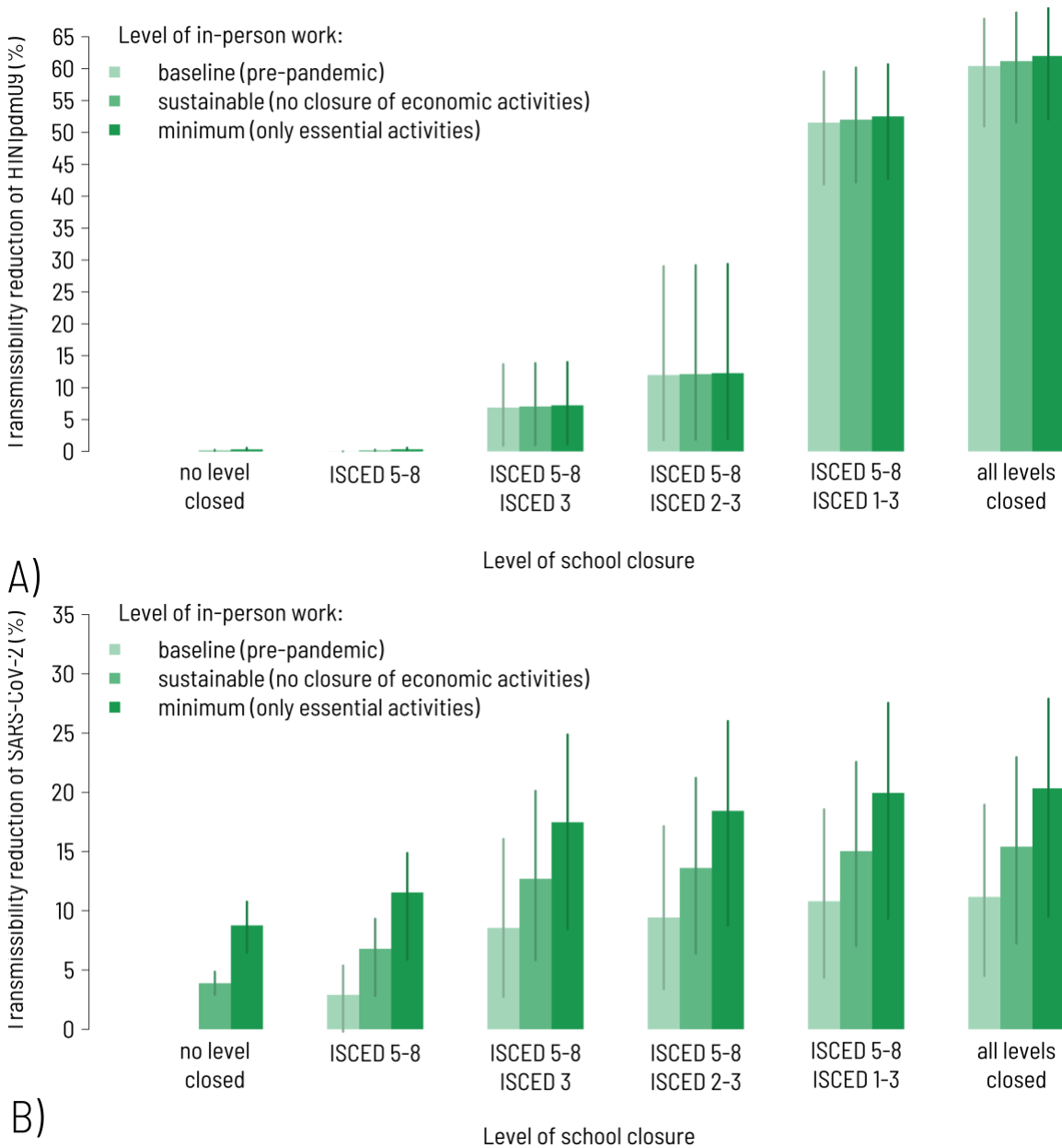
In this section, we present the results of two additional sensitivity analyses considering age-specific susceptibility profiles, as estimated for the influenza A(H1N1)pdm09 virus and for SARS-CoV-2 ancestral lineages^{22,23}.

These two viruses represent contrasting examples: for H1N1, susceptibility to infection is higher among children than among adults and the elderly, whereas for SARS-CoV-2 ancestral lineages, susceptibility is higher among the elderly compared with children and adults.

Specifically, for H1N1, we set the relative susceptibility to infection to 1 for individuals aged <5 years (reference group), 0.82 for those aged 5–14 years, 0.25 for ages 15–64 years, and 0.13 for ages ≥65 years²². While for SARS-CoV-2 we set the relative susceptibility to infection to 0.58 for individuals aged <15 years, 1 for those aged 15–64 years (reference group), and 1.65 for ages ≥65 years²³. Using H1N1 estimates, we found that interventions targeting only in-person work were much less effective, whereas measures affecting school attendance had a substantially stronger impact compared to results from the main analysis (Supplementary Figure 14A). Specifically, in the absence of school closures, limiting in-person work to essential workers reduced the reproduction number by less than 1% (vs. 5.5% in the main analysis). In contrast, combining full school closure with in-person attendance restricted to essential workers yielded an average reduction of 62.0% (95%CI: 52.1–69.8%), nearly twice the effect estimated under the homogeneous susceptibility assumption (about 30%).

Conversely, when adopting SARS-CoV-2 susceptibility estimates, where the elderly are more susceptible compared to adults and children, interventions targeting workers produced more

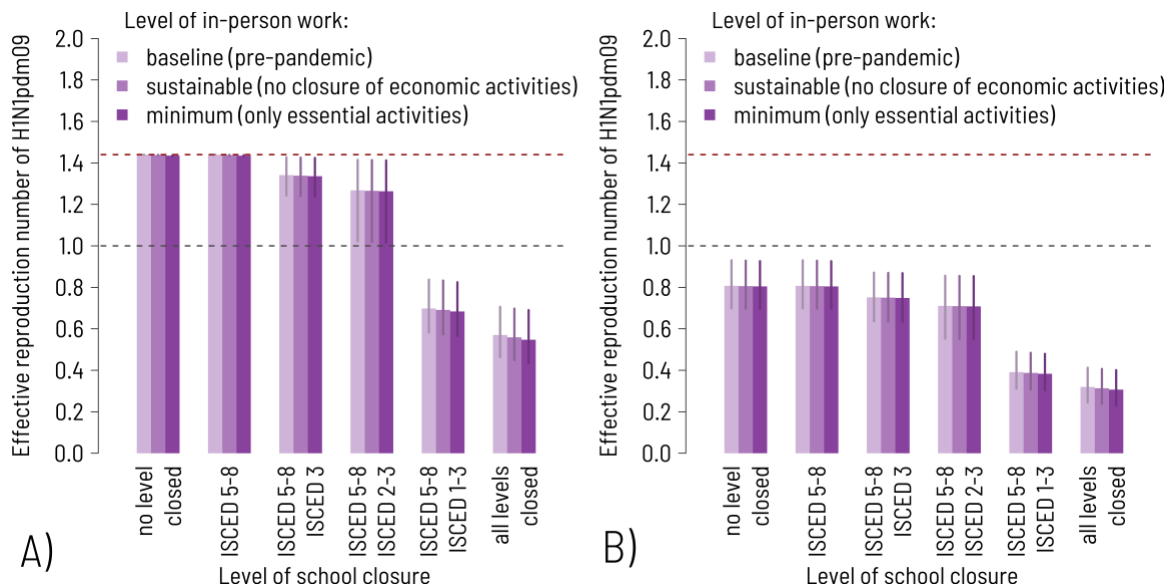
pronounced effect compared with the main analysis (Supplementary Figure 14B). Without school closures, limiting in-person work to essential workers reduced R by 8.8% (95%CI: 6.5–10.8%), higher than the 5.5% estimated in the main analysis. However, combining full school closure with the minimum level of in-person work resulted in a reduction of R of 20.3% (95%CI: 9.5–29.1%), smaller than the 29.1% obtained under homogeneous susceptibility, due to the reduced susceptibility of children.



Supplementary Figure 14. Transmissibility reduction under different scenarios of work/school attendance considering age-specific susceptibility A) Transmissibility reduction of H1N1pdm09 associated with intervention scenarios combining different levels of school closures (including distance-learning mandates) and in-person work, compared to a baseline scenario where the in-person workers are set at pre-pandemic levels and students across all education levels attend in person. B) As A) but for SARS-CoV-2

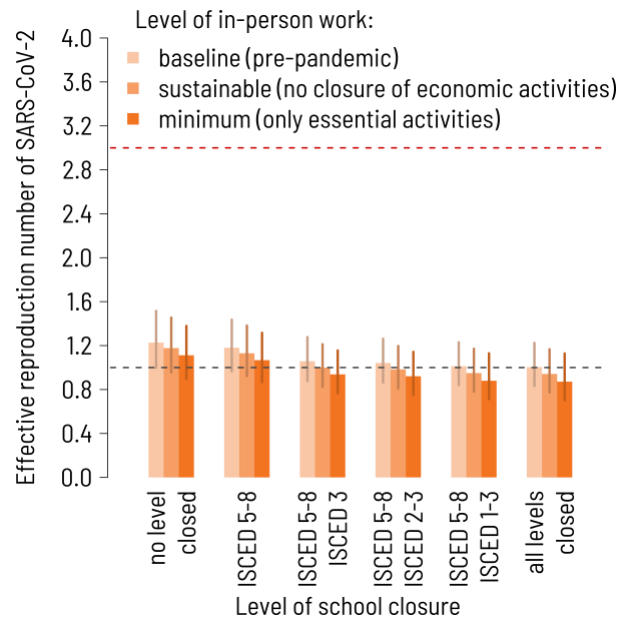
In addition, since estimates of the reproduction number are available for H1N1 and SARS-CoV-2, we evaluated how the reductions shown in Supplementary Figure 14 translate into changes in the reproduction number.

For H1N1 we considered a basic reproduction number of 1.44, as estimated for Italy²². As shown in Supplementary Figure 15A, for a virus with these transmissibility features, closing schools from the primary level upwards would bring the effective reproduction number below the epidemic threshold of 1. When interpreting these results, it is important to note that the intervention scenarios considered here only act on the redistribution of individuals between in-person and remote attendance. They do not assume any additional restrictions on social interactions, nor the implementation of further infection-prevention measures, whether spontaneous or mandated, such as mask use in public places (e.g., public transport, supermarkets, schools, workplaces), hand hygiene, surface sanitation, isolation of cases or quarantine of contacts, and so on. During the COVID-19 pandemic, this combination of measures was estimated to reduce SARS-CoV-2 transmissibility by approximately 44% (95%CI: 36–52%)¹². Considering a similar reduction also for H1N1, we estimated that the effective reproduction number would fall below the epidemic threshold even in the scenario with full in-person attendance (Supplementary Figure 15B). However, it should be noted that the 44% reduction was estimated for SARS-CoV-2. The set of infection-prevention measures that would be acceptable to apply in the case of a virus such as H1N1 would likely be more limited and would thus result in more contained reductions than that estimated for SARS-CoV-2. Therefore, the effective reproduction numbers shown in Supplementary Figure 15B should be interpreted as a lower bound for H1N1.



Supplementary Figure 15. A) Effective reproduction number of H1N1pdm09 associated with intervention scenarios combining different levels of school closures and in-person work. B) Effective reproduction number of H1N1pdm09 associated with intervention scenarios combining different levels of school closures and in-person work and considering an additional reduction in transmissibility due to other infection-prevention measures of 44% (95%CI: 36–52%)¹². In both panels, the red dotted line corresponds to the value of the basic reproduction number estimated for H1N1 in Italy²² and the black dotted line denotes the epidemic threshold of 1.

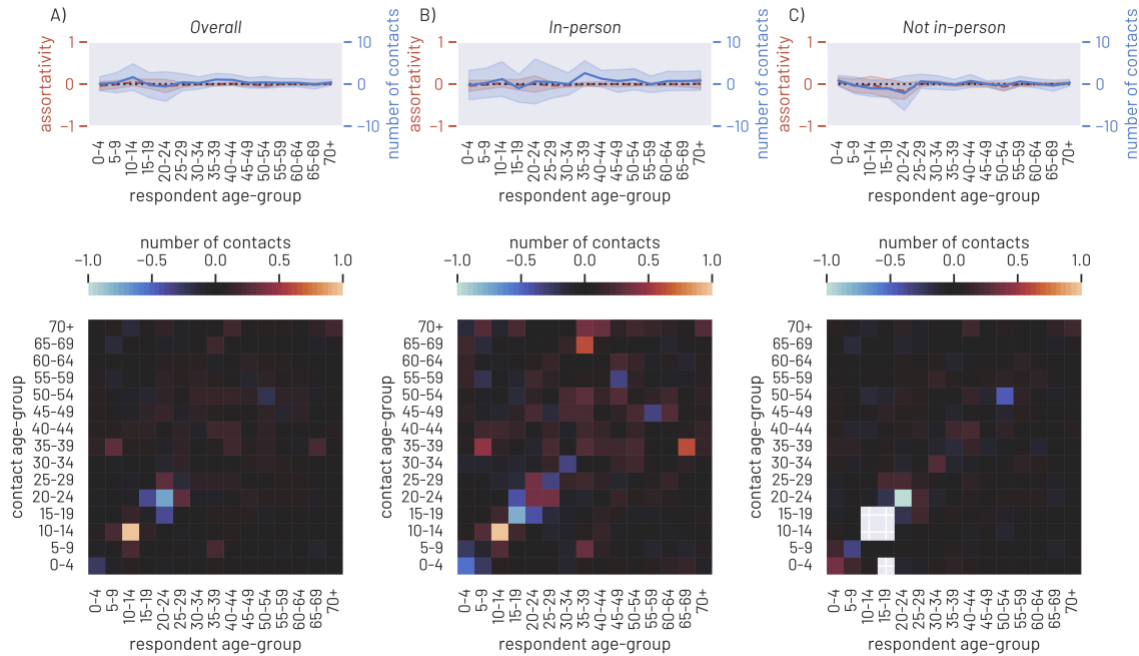
In the case of SARS-CoV-2, we considered a basic reproduction number of 3²⁴. As anticipated above, we assumed a 44% (95%CI: 36–52%) reduction in transmissibility associated with infection-prevention measures. In addition, we considered a 90% reduction in “other” community contacts (including leisure activities, public transport, and other social settings), as estimated for Italy during the first months of the pandemic¹². Under these assumptions, model results indicate that the SARS-CoV-2 epidemic would likely not have been controlled without strong reductions in in-person work and the implementation of extensive school closures (Supplementary Figure 16).



Supplementary Figure 16. Effective reproduction number of SARS-CoV-2 associated with intervention scenarios combining different levels of school closures and in-person work, considering a 44% (95%CI: 36–52%) reduction in transmissibility due to infection-prevention measures, and an additional 90% reduction in “other” community contacts¹². The red dotted line corresponds to the value of the basic reproduction number for SARS-CoV-2²⁴ and the black dotted line denotes the epidemic threshold of 1.

2.6 Using responses from the 2023 wave only

In the main manuscript analysis, we leveraged the statistical power of both waves to provide a more precise contact pattern description with an age stratification in groups of 5 years. In this section, we provide additional evidence that the differences between the contact patterns when leveraging data from the 2023 wave only, compared to pooling both waves together, do not show substantial differences in terms of the average number of social contacts by age-group and by in-presence attendance. Supplementary Figure 17 shows the differences between contact matrices computed using only data from the 2023 wave and those from both waves (as in the main analysis). Minimal differences exist both in the number of contacts and in the assortativity estimates. Note that when only employing 2023 wave data some elements of the “not in-presence” matrix have missing values. This does not occur in the case of pooled contact data.



Supplementary Figure 17: *Differences between contact matrices computed using wave 2 vs, both waves under scenario 1A assumptions.* A) Overall direct and indirect social contacts, B) Contacts of respondents who attended in-person work or school activities, C) Contacts of respondents who did not attend work or school activities in person. Grey squares show elements without any contact information available for the 2023 wave data. The top panels show the average difference in the number of reported social contacts. Shaded areas show the 95% C.I. computed through 1000 bootstrap iterations.

2.7 Comparing 2022 and 2023 waves: panel and longitudinal contacts breakdown

In Supplementary Tables 7-9 we show the number of contacts reported through a sociodemographic breakdown by survey wave. In Supplementary Table 10, we complement the analysis focusing on the two types of respondents in our sample: “panel” (respondents who only participated to one of the two waves) and “longitudinal” (respondents who participated to both waves).

Supplementary Table 10: *Survey average contacts by wave and respondent type.* The table reports the average number of total social contacts (95% Confidence Intervals are reported in parenthesis) stratified by different respondent characteristics: age, sex, household income, household size, NUTS1 region, and COVID-19 vaccination status.

<u>Variables</u>	<u>Panel respondents</u>		<u>Longitudinal respondents</u>	
	March 2022 wave	March 2023 wave	March 2022 wave	March 2023 wave
<u>Age Group</u>				
0-9 y	10.2 (8.6 - 11.9)	12.5 (9.8 - 15.6)	13.6 (10.3 - 17.2)	12.8 (9.5 - 16.2)
10-19 y	13.6 (11.4 - 16)	16.6 (13.3 - 20.4)	10 (7.9 - 12.3)	12.4 (8.8 - 16.6)
20-29 y	11.3 (8.8 - 14.1)	11 (8.5 - 14)	8.7 (6 - 12.5)	11 (7.5 - 15.2)
30-39 y	7.9 (6.5 - 9.7)	8.9 (7.5 - 10.4)	8.1 (6.5 - 10)	8.8 (6.9 - 11)
40-49 y	5.7 (4.6 - 7.1)	6.5 (5.2 - 7.9)	6.4 (5.1 - 8.3)	6.8 (5.8 - 8.1)
50-59 y	7.1 (5.6 - 8.8)	7.8 (6.4 - 9.4)	5.7 (4.7 - 6.8)	7.3 (5.9 - 8.9)
60-69 y	6.5 (4.7 - 8.6)	6.9 (5.1 - 9.1)	6.5 (5.2 - 8)	5.9 (5 - 7)
70+ y	5.3 (4 - 6.8)	5.5 (4.6 - 6.5)	4.5 (3.9 - 5.3)	5.9 (4.8 - 7)
<u>Sex</u>				
Male	7.9 (7.1 - 8.8)	8.8 (7.8 - 9.9)	7.1 (6.3 - 8)	7.7 (6.9 - 8.6)
Female	8.3 (7.4 - 9.3)	7.7 (7 - 8.5)	5.9 (5.3 - 6.6)	6.9 (6.1 - 7.7)
<u>Net household income (euros per month)</u>				
<1,500 euro	7.3 (5.8 - 8.9)	6.4 (5.3 - 7.6)	4.6 (4 - 5.2)	6.3 (5.1 - 7.6)
1,500-2,999 euro	7.8 (6.9 - 8.7)	8 (7.2 - 8.9)	7.2 (6.2 - 8.2)	7.2 (6.5 - 8.1)
>3,000 euro	9.9 (8.5 - 11.4)	11.4 (9.6 - 13.4)	8 (6.8 - 9.4)	9 (7.6 - 10.5)
Undisclosed	8 (6.6 - 9.6)	6.8 (5.6 - 8.1)	5.9 (4.9 - 7.1)	6.7 (5.3 - 8.4)
<u>Household size</u>				
1	5.3 (4.2 - 6.6)	4.7 (3.8 - 5.7)	5.2 (4.2 - 6.2)	7 (5.4 - 9)
2	6 (4.9 - 7.2)	6.8 (5.7 - 8.1)	5.5 (4.7 - 6.5)	6.1 (5.2 - 7.1)
3	9.2 (8 - 10.6)	9.1 (7.9 - 10.5)	6.9 (5.9 - 8.2)	7.7 (6.7 - 8.9)
4	9.6 (8.3 - 10.9)	10.4 (9 - 11.8)	8.6 (7.3 - 10)	8.7 (7.5 - 10)
5+	11.8 (9.1 - 15)	11.8 (9.2 - 14.8)	8.2 (6.6 - 9.8)	9.8 (7.8 - 12)
<u>NUTS1 region</u>				
North-West	9.6 (8.2 - 11.2)	7.9 (6.7 - 9.2)	7 (5.9 - 8.2)	7.3 (6.2 - 8.6)
North-East	8 (6.8 - 9.3)	8.1 (6.8 - 9.7)	7.1 (5.9 - 8.6)	7.9 (6.7 - 9.2)
Center	6.5 (5.6 - 7.5)	8.8 (7.5 - 10.3)	6.5 (5.6 - 7.4)	7.8 (6.5 - 9.2)
South	8.1 (6.7 - 9.7)	8.1 (7 - 9.4)	5.8 (4.9 - 7)	7.1 (5.9 - 8.5)
Islands	7.8 (5.9 - 10)	8.3 (6.1 - 11)	5.7 (4.3 - 7.5)	5.8 (4.6 - 7.2)
<u>COVID-19 vaccination status</u>				
No doses	8 (6.2 - 10.1)	7.6 (5.9 - 9.6)	5.4 (4.2 - 6.8)	5.1 (4 - 6.3)
One dose	7.1 (4.1 - 10.1)	8.9 (4.5 - 14.1)	7.5 (2.8 - 14.5)	6.9 (3.9 - 10.1)
Two doses	9.5 (8 - 11.2)	9.2 (7.4 - 11.3)	7.5 (5.3 - 10.3)	7.8 (6.2 - 9.6)
Three doses or more	7.8 (7 - 8.6)	7.9 (7.2 - 8.6)	6.4 (5.9 - 7)	7.3 (6.7 - 8)
Exempt	9.3 (7.3 - 11.8)	12.7 (8.5 - 17.9)	9.3 (6.2 - 12.7)	13.6 (9.6 - 17.9)

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3. Social contact survey: English translation

Social Contacts Patterns – Italy, March2022 and March2023

Country	Italy
Subject	Social contacts mixing patterns

#Demographic info

Adult Respondent (18+yo)

Info	PDL VARIABLE
Date	
gender	gender
Age	age
Province	GeoPC_Region2_it
Education	education_EN
Occupation	workstatus_EU

Child Respondent (0-17 yo)

Info	PDL VARIABLE
Date	
gender	<u>childgenders_EU_1 to</u> <u>childgenders_EU_5</u>
Age	child_ages_mc_2019_EU (computed PDL)
Occupation	workstatus_EU =if childage>=16

NOTES:

- Whenever questions have “# **Receiver if not adult: parent** ”, please insert a warning message in bold-red to let the respondent understand the question is being asked to the parent not the child. Warning message if childage=0to13: “ **This question is about you as a parent or guardian of the minor** ”, Warning message if childage=14to17: “ **This question is about \$pipein [“your mom”, if gender=2, “your dad” if gender=1], please let \$pipein [“she”, if gender=2, “he” if gender=1] answer it** ”
- Whenever respondent_type=1 and “# **Receiver if not adult IS NOT parent** ”, we need another warning message (in bold blue color), as follows: “This question concerns [“your child” if childgender=1] [“your daughter” if childgender=2] [\$pipe-in:childage] years old”
- Added a warning message:
whenever respondent_type =2 (receiver aged 14-17) (and “# **Receiver if not adult IS NOT parent** ”, we need another warning message (in bold blue color), as follows: “This question is about you, [“child” if childgender=1] [“daughter” if childgender=2] of [\$pipe-in:childage] years as a recipient of this survey”
- Adapt age-specific and gender-specific wording:
Age_gender: wording change: from “Are you...?” to “What is your sex?”

#Questionnaire START (FOR RECONTACTS)

[TEST MODE VARIABLE]: based on who we're inviting to answer

[respondent_type] respondent

<1>0-13 yo (via parent)

<2>14-17 yo (kids survey)

<3>Adult (18+)

toscripting, INTRO TEXT 1. show only recontacted respondents from wave 1

respondent_type=3 (adult 18+) version

Dear respondent,

in March 2022 you were kind enough to respond to a survey conducted by the Bruno Kessler Foundation (Trento) and Bocconi University, on the topic of health.

We would greatly appreciate your participation in a second phase of the research and therefore ask you to be available to take part in this new survey. The questions will be the same, precisely because the purpose of the research is to understand if and how people's behaviour evolves over time.

Click on ">" to proceed

toscripting, INTRO TEXT 1. show only recontacted respondents from wave 1

respondent_type=1 (0-13yo kid) version

Dear respondent,

*in March 2022 you were kind enough to answer a survey **together to [pipe-in: "your son" if childgender=1 or "your daughter" if childgender=2] (or acting on his behalf), who at the time of completion was [pipe-in number from chldage] years old** . The survey , on the topic of health, was conducted by the Bruno Kessler Foundation (Trento) and Bocconi University.*

*We would greatly appreciate your participation in the second phase of the research. We would therefore like **to reinvite** you and **[pipe-in: "your son" if childgender=1 or "your daughter" if childgender=2] a of \$pipein [chldage] years (as of March 2022)** , if possible, to take part in the survey. The questions will be*

the same, precisely because the purpose of the research is to understand if and how people's behaviour evolves over time.

We will be asking for \$pipe1_kid_gender's opinion on a variety of health-related topics. Many of the questions will be directly about \$pipe1_kid_gender, while others will be about you as a parent/guardian. To make it easier to distinguish, [*red colour*: “questions about you will be marked in red”], while [*blue colour*: “questions about [pipe-in: “him” if childgender=1, “her” if childgender=2] will be marked in blue”]

We invite you, if possible, to complete the questionnaire with his/her assistance (where necessary).

You will be the one to answer, acting as pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] of \$pipein [childage] years.

In addition to requesting your consent to proceed, we also need \$pipe1_kid_gender to have the will to participate. For this reason, we have created a privacy notice ADD PRIVACY NOTICE that informs you about what we will ask for and how we will use the information.

Click on “>” to proceed

*#toscripting, INTRO TEXT 1. show only recontacted respondents from wave 1
respondent_type=2 (14-17yo kid) version*

Dear respondent,

a few months ago, you and [pipe-in: “your son” if childgender=1 or “your daughter” if childgender=2] of [pipe-in number from childage] years old at the time of filling out the form were kind enough to respond to a survey on the topic of health conducted by the Bruno Kessler Foundation (Trento) and Bocconi University.

*greatly appreciate your participation in the second phase of the research. We would therefore like to **invite** you and [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] of \$pipein [childage] years (in March 2022) to take part in the survey. The questions will be the same, precisely because the aim of the research is to understand if and how people's behaviour evolves over time.*

<u>Many of the questions will be addressed directly to \$pipe1_kid_gender </u>, **we encourage you to give** [pipe-in: “ **your son** ” if childgender=1, “ **your daughter** ” if childgender=2] **your smartphone/computer/tablet** directly and have [pipe-in: “him” if childgender=1, “her” if childgender=2] fill out the questionnaire directly.

Some questions will, however, be directed at you as a parent or guardian, so we ask that you remain with \$pipe1_kid_gender throughout the entire survey.

To make it easier to distinguish, [*blue colour*: questions regarding [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] will be marked in blue], while [*red colour*: “those regarding you as a parent will be marked in red”].

In addition to requesting your consent to proceed, we also need \$pipe1_kid_gender to have the will to participate. For this reason, we have created a privacy notice [ADD PRIVACY NOTICE image link] which informs you about what we will ask for and how we will use the information.

Click on “>” to proceed

Questionnaire START (FOR FRESH RESPONDENTS)

[TEST MODE VARIABLE]: based on who we're inviting to answer

[respondent_type] respondent

<1>0-13 yo (via parent)

<2>14-17 yo (kids survey)

<3>Adult (18+)

#TOSCRIPING: please create another test mode variable where you exactly indicate age (or childage), gender (or child gender), region of the respondent

#TOSCRIPING: AS 0-13YO RESPONDENT SURVEY WILL BE handles via "Lingua" (parents are asked to answer about their children rather than on themselves), we need a test mode variable that tells us the "child receiver" **gender**. As there will be two languages: one for males 0-13 the other for females 0-13, as Italian language differentiates genders, we need to avoid using slashes "figlio/a" (that means son/daughter).

#page_1

#Question type: INTERLUDE TEXT FOR **CHILDREN (AGED 0-13)** -> this will be shown if
respondent_type = 1

You recently told us that you have [pipe-in: "a son" if childgender=1, "a daughter" if childgender=2] aged \$pipein [childage] years living in your household.

We are conducting a survey where we will ask \$pipe1_kid_gender's opinion on a range of health-related topics. We would like to invite you and [pipe-in: "your son" if childgender=1, "your daughter" if childgender=2] aged \$pipein [childage] to take part in the survey. Many of the questions will directly concern \$pipe1_kid_gender, while others will concern you as a parent/guardian. To make it easier to distinguish, [red colour: "questions about you will be marked in red"], while [blue colour: "questions about [pipe-in: "him" if childgender=1, "her" if childgender=2] will be marked in blue"]

We invite you, if possible, to complete the questionnaire with his/her assistance (where necessary).

You will be the one to answer, acting as pipe-in's representative: "your son" if childgender=1, "your daughter" if childgender=2] aged \$pipein [childage] years.

In addition to requesting your consent to proceed, we also need \$pipe1_kid_gender to have the will to participate. For this reason, we have created a privacy notice *ADD PRIVACY NOTICE image link* that informs you about what we will ask for and how we will use the information.

BASED ON CHILD GENDER
PRIVACY LINK TO BE PROVIDED

#page_2

#Question type: INTERLUDE TEXT FOR **CHILDREN (AGED 14-17)** -> this will be shown if
respondent_type = 2

You recently told us that you have a [pipe-in: “a son” if childgender=1, “a daughter” if childgender=2] aged \$pipein [childage] years living in your household.

We are conducting a survey where we will ask \$pipe1_kid_gender's opinion on a variety of health-related topics.

We would like to invite you and [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] aged \$pipein [childage] to take part in the survey. <u>Many of the questions will be directed to \$pipe1_kid_gender </u>, ***we encourage you to hand your smartphone/computer/tablet directly to*** [pipe-in: “***your son***” if childgender=1, “***your daughter***” if childgender=2] and have [pipe-in: “him” if childgender=1, “her” if childgender=2] fill out the questionnaire.

Some questions will, however, be directed at you as a parent or guardian, so we ask that you remain with \$pipe1_kid_gender throughout the entire survey.

To make it easier to distinguish, [*blue colour*: questions regarding [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] will be marked in blue], while [*red colour*: “those regarding you as a parent will be marked in red”].

In addition to requesting your consent to proceed, we also need \$pipe1_kid_gender to have the will to participate. For this reason, we have created a privacy notice [ADD PRIVACY NOTICE image link] which informs you about what we will ask for and how we will use the information.

#Base: Children aged 14-17 yo
#Filter: childage =14to17
#Receiver if not adult: parent
#Question type: single

[child1417_presence] Are you available and willing on the part of [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] aged \$pipein [childage] to participate in this survey?

Please select one response only .

<1>Yes, [pipe-in: “my son” if childgender=1, “my daughter” if childgender=2] is available to answer the survey now.

<2>Yes, but [pipe-in: “my son” if childgender=1, “my daughter” if childgender=2] CANNOT answer the survey now

<3>No, I don't want [pipe-in: “my son” if childgender=1, “my daughter” if childgender=2] to answer the survey.

#TOSCRIPING: screenout if child1417_presence=3, go to page “notthere” if child1417_presence=2

#Base: Children aged 14-17 yo
#Filter: childage =14to17 and child1417_presence=2
#Receiver if not adult: parent
#Question type: interlude page

[notthere] You said that [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] from \$pipein [childage] is not currently present (or unavailable to respond). You can resume the survey when [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] is available by clicking the invitation link you received by email, which will take you back to this page.

Remember to read the privacy notice and when [pipe-in: “your son” if childgender=1, “your daughter” if childgender=2] is available to respond, click the “>” arrow at the bottom.

Select only one answer .

“>” continue button

#Question type: INTERLUDE TEXT FOR ALL

Dear respondent,

#skip this paragraph if respondent=recontact

in the context of a research project carried out by the Bruno Kessler Foundation (Trento) and Bocconi University (Milan) we are conducting a survey on the topic of health.

The aim of the research is to deepen our knowledge of the interactions between people that carry the transmission of infectious diseases.

You will be credited \$points points for completing the survey.
We have tested the questionnaire and it takes on average about \$time_var minutes to complete.

If necessary, you can interrupt the questionnaire and resume later.<p></p>The questionnaire is completely anonymous and you will NOT be identified IN ANY WAY [*#to scripting* : rewording of this sentence from “the questionnaire” to “identified” for **respondent_type=1** : “The questionnaire is completely anonymous and neither you nor \$pipe1_kid_gender will be identified IN ANY WAY”]. Please complete the entire questionnaire, including the questions that help us better understand your profile. The success of the research depends on the completeness of the answers given by each individual respondent.<p></p>Your contribution is greatly appreciated! We thank you very much for participating in our survey.

#TOSCRIPING: show if respondent_type=3

<i>We will take all precautions to ensure that your anonymity is preserved during every phase of the research. Further information is available on the privacy and cookies notice page.

By clicking “>” you confirm that you wish to participate in the survey. </i>

#Base: 0-5 yo
#Filter: if *childage* =0to5
#Receiverif not adult : parent
#Question type: single
#alternativetextif *childage* =5 “[pipe-in: “Your child” if *childgender* =1, “Your daughter” if *childgender* =2] of \$ pipein [*childage*] years goes to kindergarten or school? ”

[*occupation_05*] [pipe-in: “Your son” if *childgender*=1, “Your daughter” if *childgender*=2] of \$pipein [*childage*] years old goes to kindergarten (daycare or preschool)?

<1>Yes

<2>No

#Base: All
#Filter:
#Receiver if not adult: child if *respondent_type* = 2 (and *childage* = 16,17), parent if *respondent_type* =1 or if *respondent_type* =2 (and *childage* =14,15). Adult him/ herself if *receiver_type* =3.,
if *respondent_type_LF* =2 -> In case of *respondent_type* =2 (and *childhood* =14,15), “ Warning message if *childage*=14to17” needs to appear as per word page 1 instructions
if *respondent_type* =2 and *childage* =16,17 insert blue bold warning message “This question concerns you, [“child” if *childgender*=1] [“daughter” if *childgender*=2] of [\$pipe-in:*childage*] years old as the recipient of this survey”
if *respondent_type* =2 and *childage* =16,17 AND code selected IS NOT 5: display warning message:
“You are under 18 years old and have stated that he or she does not attend school . This answer is plausible, but please review it to ensure it is accurate. Please check your answer and continue.”
#Question type: single
#code 4 amend Italian wording (without ending point): “I am a househusband, I take care of the family”
#if *RESPONDENT*=*RECONTACT* pre-fill the answer option with wave 1 code selection and pipe-in text below all question text (bold and underscored): “A few months ago you selected the answer below, if it is still valid, continue without changing your answer, otherwise change it by selecting the relevant option”

#TOSCRIPTING: INSERT PDL “ *workstatus_EU* ” and rename it [*occupation*]

Type in the question wording of pdl, please amend: “Which of these options best describes your employment situation?”

[*employment*] {single varlabel =“work status”} Which of these BEST applies to you

<1>Working full time (30 or more hours per week) including temporarily off work

<2>Working part-time (8 to 29 hours per week) including temporarily off work

<3>Working part-time (less than 8 hours a week including temporarily off work)

<4>Looking after the home or family

<5>Full-time education

<6>Part time Student (working more than 30 hours per week)

<7>Part time Student (working less than 30 hours per week)

<8>Retired from paid work

<9>Unemployed

<10>Not working due to long term illness/incapacity/disability
<11>Not working for other reasons
<96> Other

#page_8

#Base: Employed 16+ yo

#Filter: if occupation = (or)1,2,3,6,7 (deleted code 4) and age or childage >=16

#Receiver if not adult: child (if childage >=16), parent if childage <=15, if respondent_type_LF =2
if respondent_type =2 and childage =16,17 insert blue bold warning message "This question is about
you, ["child " if childgender=1] ["daughter" if childgender=2] of [\$pipe-in:childage] years old as the
recipient of this survey"

#Question type : single

#if RESPONDENT=RECONTACT pre-fill the answer option with wave 1 code selection and pipe-in
text below all question text (bold and underscored): "A few months ago you selected the answer
below, if it is still valid, continue without changing your answer, otherwise change it by selecting the
relevant option"

[occupation_category] Which job category best describes your primary occupation?

Select one answer.

- <1>Agriculture, livestock, fishing and forestry
- <2> Hotel and catering
- <3> Administrative and service support activities
- <4> Arts, Entertainment and Recreation
- <5> Activities of non-territorial bodies and organisations
- <6> Domestic work activities
- <7> Real estate activities
- <8> Scientific-technical professional activities
- <9> Wholesale and retail trade, repair of motor vehicles and motorcycles
- <10> Construction
- <11> Mining and quarrying, mining industry
- <12> Finance and insurance
- <13> Computer science and communication
- <14> Instruction
- <15> Logistics, transport and storage
- <16> Manufacturing
- <17> Public Administration, Defense, Compulsory Social Security
- <18> Electricity, gas, steam and air conditioning resources
- <19> Water resources, sewerage, waste management and remediation activities
- <20> Health and social services
- <21> Other services
- <955 fixed > Other occupation not listed above [SPECIFY]

#page_9

#Base: Total

#Filter:

*#Receiver if not adult: parent if respondent_type_LF =2 ->
#Question type: please insert " education_IT " pdl
#if RESPONDENT=RECONTACT pre-fill the answer option with wave 1 code selection and pipe-in text
below all question text (bold and underscored): "A few months ago you selected the answer below, if it is
still valid, continue without changing your answer, otherwise change it by selecting the relevant option"*

[instruction]

#TOCLIENT: we insert our database variable that will be recoded as per request into [middle school
diploma or less, high school diploma, degree or more]

#TOSCRIPING: education =1 'lower' if education_level_IT =1,2,3; education =2 'mid' if
education_level_IT =4,5,6, education =3 'higher' if education_level_IT =7to12, education =4 'other/no
answer' if education_level_IT =13,14

[education_level_it] {single} What is the highest level of education or qualification you have achieved?

- <1> No diploma
- <2> Elementary school diploma
- <3> Middle school diploma
- <4> High School Diploma
- <5> Apprenticeship Diploma
- <6> Technical Institute
- <7> Bachelor's Degree
- <8> Single-cycle master's degree
- <9> Old system degree
- <10> First level Master
- <11> Specialist degree/ Master's degree
- <12> Doctorate / second level master's degree
- <13> Other
- <14> I prefer not to answer

#page_10

#Base: Total

#Filter:

#Receiverif not adult : parent

#Question type: Single

*#if RESPONDENT=RECONTACT pre-fill the answer option with wave 1 code selection and pipe-in
text below all question text (bold and underscored): "A few months ago you selected the answer
below, if it is still valid, continue without changing your answer, otherwise change it by selecting the
relevant option"*

**[income] FAMILY income is the combined income of all earners in a household from all sources
(including wages and annuities). What is the NET monthly household income (i.e. excluding
taxes) of your household?**

If you live with people who are not part of your household, exclude them from the calculation.

Select one answer only.

- <1>< EUR 1,000
- <2> EUR 1,000-1,499
- <3> EUR 1,500-1,999
- <4> EUR 2,000-2,499

<5> EUR 2,500-2,999
<6> EUR 3,000-3,499
<7> EUR 3,500-3,999
<8> EUR 4,000-4,999
<9> > EUR 5,000
<933>I prefer not to answer

#page_11

#Base: Total

#Filter:

#Receiver if not adult: if chldage between 0 and 13: parent - if chldage between 14 and 17: child
if respondent_type = 2 insert blue bold warning message "This question is about you, ["son" if
chldgender=1] ["daughter" if chldgender=2] aged [\$pipe-in:chldage] as the recipient of this
survey"

#Question type : Single

**[perceived_income] From 1 to 5, what level of economic well-being would you place yourself in
compared to the Italian population?**

Select only one answer.

<10> 1 = very low well-being
<11> 2 = low well-being
<12> 3 = average well-being
<13> 4 = high well-being
<14> 5 = very high well-being
<933>I prefer not to answer

**#to scripting: BEFORE ASKING ANY QUESTION ON COHABITANTS (ie before
profile_household_size_EU), we need a complex pipe in exercise in order to remind the
respondents their cohabitants (as stated by themselves in wave 1)**

#page_12

Please show a page with the below text (it means "you declared in March 2022 you live with..."

#Base: Total

#Filter:

#Receiver if not adult: child if respondent_type =2, adult if respondent_type =1

#Question type: MULTIPLE

**[coviventi_check]The people listed below are those you declared you were living with in March 2022.
Please read carefully and answer the following question:**

#[show a list where you pipe-in age (coviventi_eta) and c_coviventi_name]

#list example below:

John of 8 yo

Wife of 45 yo

....

Do you still live with all of the above people? Select the appropriate option(s).

<1>Yes, there have been no changes [EXCLUSIVE] [IF SELECTED SKIP ALL THE COHABITANTS QUESTIONS]

<2>One or more of the above persons no longer live with me

<3>I live with one or more new people [if selected GO TO....]

<4>None of the above people are my cohabitants anymore [EXCLUSIVE] [IF SELECTED ASK ALL THE COHABITANTS QUESTIONS]

#page_13

#Base: Who has at least one less cohabitant

#Filter: if [cohabitants_check]= 2

#Receiver if not adult: child if respondent_type =2, adult if respondent_type =1

#Question type : multiple - required soft

[cohabitants_check_2] Which of the following people NOT live with you anymore? Select all that apply.

If you made a mistake in the previous question and all the people below still live with you, proceed without selecting any people.

#[show a list where you pipe-in age (conviventi_eta) and c_coviventi_name] and make multiple answer options selectable

→cohabitants that were selected in conviventi_check_2 will have to be removed from c_conviventi (ie they should not be considered cohabitants anymore)

#page_14

#Base: Who has at least one more cohabitant

#Filter: if [cohabitants_check]= 3

#Receiver if not adult: child if respondent_type =2, adult if respondent_type =1

#Question type : single - required soft

[conviventi_check_3] How many new people do you live with in addition to those listed below? Select only one answer option.

If you made a mistake in the previous question and do not live with any new people, proceed without selecting an answer.

#[show a list where you pipe-in age (conviventi_eta) and c_coviventi_name] – NOT SELECTABLE

<1>1

<2>2

<3>3

<4>4

<5>5

→if code 1,2,3,4,5 is selected re-ask conviventi_eta and conviventi_name just for the new cohabitants (1,2,3,4 or 5 depending on code selected in conviventi_check_3)

→after the respondent will have indicated these new cohabitants age (conviventi_eta) and name (conviventi_name) they have to be added to c_conviventi list (ie added to the new cohabitants list)

COMPUTE A VARIABLE [CONVIVENTI_excl_parentANDunderage] THAT IS =
[PARTNERS] number (excl code 98 and 95) – [profile_household_child_respon_EU] number (code
number -1, up to code 6 only) – 1 (parent him/herself)

#Base: 0-13yo

#Filter: if cohabitants >1 AND respondent_type =1

#Receiver if not adult: PARENT (SHOW WARNING MESSAGE)

#Question type: single grid

#TOSCRIPING: valid for “conviventi_eta_013yo to conviventi_eta_18+”, client noticed that a pipe-in is in place not only for rows _0 and _1 (or just for row _0 in conviventi_eta_18+), but also for other possible children (take from childhoods pdl) . That could be ok, and facilitate respondents answer, BUT as of now we have some “bug”: eg A parent has two underage children and lives in a household of 5 people including him/herself: now have two pipes-in (for the underage children) and three empty spaces. We should now have 3 pipes-in (1 is the parent, 2 are for the underage children)

[conviventi_eta_013yo] How old are the people you live with?

Select an answer for convivente.

pipes-in info (not counted in rows)

You pipe-in VISIBLE to respondent: this is age from parent panellist years

“Your son involved in this survey/Your daughter involved in this survey” (according to [childgender]=1 or 2 of receiver) + pipe in from [childage] – visible to respondent if cohabitants>1 years

“Your son/daughter” [pipe-in [childage]], as many pipe-in here as we have in profile_household_child_respon_EU (-1 of the child receiver)

-[cohabitants_age_013yo_1] Other cohabitant as many rows (_2, _3 and so on) a the number of this computed variable [CONVIVENTI_excl_parentANDunderage]

[open integer] (min 0 max 110)

#Base: 14-17yo

#Filter: if cohabitants >1 AND respondent_type =2

#Receiver if not adult: child

if respondent_type = 2 insert blue bold warning message “This question is about you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single grid

[conviventi_eta_1417yo] How old are the people you live with?

Select an answer for cohabitant.

pipes-in info (not counted in rows)

You pipe-in VISIBLE to respondent: this is age from parent panellist years

“Your father involved in this survey/Your mother involved in this survey” (according to [childgender]=1 or 2 of receiver) + pipe in from [childage] – visible to respondent if cohabitants>1 years

“Your brother/sister/partner” [pipe-in [childage]], as many pipe-in here as we have in
profile_household_child_respon_EU (-1 of the child receiver)

-[cohabitants_age_1417yo_1] Other cohabitant as many rows (_2, _3 and so on) a the number of this
computed variable [CONVIVENTI_excl_parentANDunderage]
[open integer] (min 0 max 110)

#page_18

#Base: adults 18+
#Filter: if cohabitants >1 AND respondent_type =3
#Receiver if not adult:
#Question type: single grid
#TOSCRIPING: pipes-in for underage children (childage pdl)
apply here too
[cohabitants_age_18+] How old are the people you live with?
Select an answer for cohabitant.

pipes-in info (not counted in rows)

You pipe-in VISIBLE to respondent: this is age from parent panelist years
“Your son/daughter” [pipe-in [childage]], as many pipe-in here as we have in
profile_household_child_respon_EU

-[cohabitants_age_18+_1] Other cohabitant as many rows (_2, _3 and so on) a the number of this computed
variable [CONVIVENTI_excl_parentANDunderage]
[open integer] (min 0 max 110)

#page_19

#Base: Total
#Filter: if aft least one “Other cohabitant” is shown in conviventi_eta_xxx question
#Receiverif not adult: **PARENT if respondent_type =1, child if respondent_type =2**
if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if
childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this
survey”
#Question type: open text boxes

[c_coviventi_name] Enter the name of each cohabitant listed below. Only one name per box.
**You do not need to enter their real name; it can also be a nickname that will help you distinguish
these people in the next phase of the questionnaire.**

[in rows]: as many rows as “Other cohabitant” as we have in conviventi_eta_xxx question
[pipe-in: name wording from conviventi_eta_xxx] + “di” + “pipes-in: age from conviventi_eta” +
“anni”

[In columns]: open text boxes

#toscripting: c_conviventi_name (as written in open boxes here) will have to appear in closed to
c_vaccino questions as it happens for names that are filled in c_home to c_otheroutdoor questions:
Note: please update on timing

#Module 1B: Health and covid questions

#to scripting, changed 4 questions order: **THESE are TO BE KEPT AT THE END after income received**

- implicit_acute_pathologies
- implicit_chronic_pathologies
- implicit_pathologies_acute_cohabitant
- implicit_pathologies_croniche_cohabitant

#page_20

#Base: Total

#Filter:

#Receiverif not adult: child - if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"

#Question type: multiple, randomize rows – skip option health

[acute_pathologies] Are you currently experiencing one or more of the following symptoms?

Select all that apply.

<1>No clinical condition fixed and exclusive (please note: delete former code 2: no clinical condition, that was repeated from code 1)

<2>Chills

<3>General weakness

<4>Diarrhea

<5>Difficulty breathing

<6>Fever (37.5°C or higher)

<7>Sore throat

<8>Muscle ache

<9>Loss of taste

<10> Loss of smell

<11> Pneumonia

<12> Confusional state or delirium

<13> Cough

<14> Vomit

<955 fixed >Other clinical conditions

#page_21

#Base: Total

#Filter:

#Receiverif not adult: child, if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"

#Question type: multiple, randomize rows – skip option health

[chronic_pathologies] Indicate if you have one or more of the following pathologies or are in one of the following conditions?

Select all that apply.

<1>No pathology fixed and exclusive

<2> Alcohol or other drug abuse shown if respondent_type = 2,3

- <3> Other immunodeficiencies (e.g. transplant patient, long-term use of immunosuppressant drugs)
fixed above code 955
- <4> Sickle cell anemia or thalassemia
- <5> Heart conditions (e.g., heart failure, coronary artery disease, cardiomyopathy, or hypertension)
- <6> Neurological conditions
- <7> Diabetes (type 1 or type 2)
- <8> Smoker *shown if respondent_type = 2.3*
- <9> Pregnancy *fixed above code 955 – show if: gender=2(female) and if respondent_type = 3*
- <10> Stroke or cerebrovascular disease
- <11> HIV/AIDS infection
- <12> Chronic liver disease
- <13> Chronic kidney disease
- <14> Chronic lung diseases (e.g. COPD, asthma, cystic fibrosis, etc.)
- <15> Overweight and obesity
- <16> Tumors
- <955 *fixed* >Other clinical conditions

#page_22

#Base: *Who lives with someone*

#Filter: *if cohabitants>1*

#Receiver *if not adult: parent - if respondent_type_LF =1 -> child if respondent_type_LF =2 (rewording not needed)*

no blue warning here for resp type=1,2

#Question type: *multiple, randomize rows – skip option health*

#oscripting: we miss underline in cohabitant

[pathologies_acute_cohabitant] Indicate whether at least one of your cohabitants has one or more of the following symptoms these days.

Select all that apply.

- <1>No clinical condition *fixed and exclusive*
- <2>Chills
- <3>General weakness
- <4>Diarrhea
- <5>Difficulty breathing
- <6>Fever (37.5°C or higher)
- <7>Sore throat
- <8>Muscle ache
- <9>Loss of taste
- <10> Loss of smell
- <11> Pneumonia
- <12> Confusional state or delirium
- <13> Cough
- <14> Vomit
- <955 *fixed* >Other clinical conditions
- <977 *fixed* >I don't know

#page_23

#Base: Who lives with someone
 #Filter: if cohabitants>1
 #Receiver if not adult: parent - if respondent_type_LF =1 -> child if respondent_type_LF =2 (rewording not needed)
 no blue warning here for resp type=1,2
 #Question type: multiple, randomize rows – skip option health
[cohabitant_chronic_pathologies] Indicate whether at least one of your cohabitants has one or more of the following pathologies or is in one of the following conditions.
Select all that apply.

- <1>No pathology fixed and exclusive
- <2>Abuse of alcohol or other drugs
- <3>Other immunodeficiencies (e.g. transplant patient, long-term use of immunosuppressant drugs) fixed above code 955
- <4>Sickle cell anemia or thalassemia
- <5>Heart conditions (e.g. heart failure, coronary artery disease, cardiomyopathy, or hypertension)
- <6>Neurological conditions
- <7>Diabetes (type 1 or type 2)
- <8>Smoker
- <9>Pregnancy fixed above code 955
- <10> Stroke or cerebrovascular disease
- <11> HIV/AIDS infection
- <12> Chronic liver disease
- <13> Chronic kidney disease
- <14> Chronic lung diseases (e.g. COPD, asthma, cystic fibrosis, etc.)
- <15> Overweight and obesity
- <16> Tumor
- <955 fixed >Other pathologies
- <977 fixed >I don't know

#page_24

#Base: Total
 #Filter
 #Receiver if not adult: child, if respondent_type_LF =1 ->
 if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”
 #Question type: single – skip option health
[covid] Have you ever contracted COVID-19, diagnosed by antigen or molecular swab?
Select only one answer.

- <1>Yes
- <2>No, never

#page_25

#Base: Who has been diagnosed with COVID
 #Filter: if covid=1
 #Receiver if not adult: child, if respondent_type_LF =1 ->
 if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: double dropdown menu – skip option health – dk option: “I don't remember”. Dates are in English, please put in Italian

[covid_date] **When were you diagnosed with COVID-19?**

If you have had it multiple times, think about the last time. Select only one answer by clicking the box below.

[FIRST DROP DOWN: MONTHS+YEAR FROM: March 2020 to SAME DAY OF INTERVIEW]

[SECOND DROP DOWN: DAY ,from 0 to 31 according to months (exclude numbers on relevant months)
+ Don't Know option]

#page_26

#Base: Who has been diagnosed with COVID

#Filter: if covid=1

#Receiverif not adult: child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single – skip option health

[covid_ospedale] **Have you EVER been hospitalized for COVID-19?**

Select one answer only.

<1>Yes

<2>No, never

#page_27

#Base: Total

#Filter:

#Receiverif not adult: child if kilometer =14,15,16,17, parent if childage =0to13

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: multiple, random order

[info] **Which of the following media do you regularly use as a source of information?**

Select all that apply.

<1>Paper newspapers or magazines

<2> Online newspapers or magazines (including apps and blogs)

<3> Television

<4> Radio (live)

<5> Podcast or radio podcast

<6> Instagram

<7> Facebook

<8> Twitter

<9> Whatsapp (for example through “groups”)

<10> Telegram

<11> Tik Tok

<12> YouTube

<955 fixed>Other (not listed above) [SPECIFY]

#Module 2A: Questions about “YESTERDAY”

#TOSCRIPING: we have to check if the day when respondent started the first question of module 2A is the same with the day when he answered the last question of module 2A, if it's different respondent is screened out.

#TOSCRIPING: please create a test mode variable called [date_module2A] that will indicate the date in which those questions were answered.

#page_28

#Interludetext: txt4

The next questions refer to events that happened YESTERDAY.

We kindly ask you to complete the questions in this section today .

#TOSCRIPING: made the above part bold – wording updated

#Base: Total

#Filter

#Receiver if not adult: child, if respondent_type_LF = 1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single – skip option health

[isolation] Yesterday, were you in...?

Select one answer only.

- <1>Fiduciary isolation (for positivity)
- <2> Self-surveillance (as per the legislative decree of 30 March 2022)
- <3> At home due to illness (but not in isolation due to positivity)
- <4> None of these options

#Base: Employed 16+ yo not in isolation/quarantine or on sick leave YESTERDAY

#Filter: if (employment = (or)1,2,3, ,6,7 (deleted code 4) and age or childage >=16) AND isolation != 1,3

#Receiver if not adult: child (if childage >=16)

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single, randomize (\$RAND=2)

[presence_work] What mode did you work in YESTERDAY?

Select one answer only.

- <1>I have worked exclusively remotely
- <2> I have worked entirely or partly in person
- <3> I didn't work yesterday #TOSCRIPING: FIXED

#Base: Students not in isolation/quarantine or on sick leave YESTERDAY

#Filter: if [(age/ childage >=16 AND occupation = (or)5,6,7) OR childage =6to15 OR (childage =0to5 AND occupation_05=1)] AND isolation !=1,3

date (new dates added):in case respondent type = 2 (14-17 yo)

date is 15 March to 20 March + 22 March to 27 March + 29 March to 03 April + 05 April to 10 April (Tuesdays to Sundays)

in case respondent type =1,3 (0-13yo or 18+) date is 15 March to 19 March + 22 March to 26 March + 29.03 to 02 April + 05 April to 09 April (Tuesdays to Saturdays)

#Receiver if not adult: child, if respondent_type_LF = 1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single randomize (\$RAND=2)

[presence_school] What type of teaching did you do YESTERDAY?

Select one answer only.

<1> Exclusively remotely (distance learning/DAD)

<2> In whole or in part in presence

<3> None (e.g. school/university was closed, I was sick) *#TOSCRIPTING: FIXED*

#Module 2 A.2: Contact Flow

#TOSCRIPING: question order: please leave c_home first, then randomize c_school and c_work as second, randomize other questions in third place, finally randomize c_other_indoor and c_other_outdoor in last place.
c_otherindoor, c_otheroutdoor, c_restaurant, transport, leisure: max 10 each
c_shopping, c_homeguest, c_home, c_work, c_school: max 20 each

#TOSCRIPING: In any circumstances, for the questions **c_home to c_otheroutdoor** we need to NOT allow respondents to use a same exact name within the same questions and also between these questions. Eg we can never have a duplicate name like "John husband" twice.
I confirm this is required even if it's only applicable to same exact wording like "john" and "john" warning message in Italy n: "You have already written the name [pipe-in: duplicated name(s)] once. Please review your answer."

#page_32

#Question type: INTERLUDE TEXT if respondent_type_LF = 1 ->

Now we will ask you some questions about the close contacts you had YESTERDAY.

Please read the following carefully.

A **CLOSE CONTACT** is defined as:

- a) a **physical interaction** with another person (e.g. a handshake, a pat on the back, a hug, a kiss, etc.); or
- b) an interaction with a **person physically present** in which at least **5 words are exchanged** (for example: "Hello!" "Hello!" "How are you?" "Good and you?"). In this case it is not necessary that there has been physical contact with the person.

#TOSCRIPING: added bold in green parts

please create a drop-down box visible in each question from c_home to c_otheroutdoor question, to let the respondent take a second look, if they feel they need to, at the definition of "contact "CLOSE CONTACT" from this interlude

(ie "A CLOSE CONTACT is defined as:

- a) a physical interaction you had with another person (e.g. a handshake, a pat on the back, a hug, a kiss, etc.); or
- b) an interaction with a physically present person in which you exchanged at least 5 words (for example: "Hello!" "Hi!" "How are you?" "Good and you?"). In this case it is not necessary that there was physical contact with the person.")

#TOSCRIPING: as done for the pop up message "Click here to review the definition of "close contact".
Client also asked to have another pop up... if two pop ups are too much and cause crashes, we can condense working into one single pop up. The wording link for pop up would change into: "Click here to review the definition of "close contact" and reread the instructions on how to enter names"

The wording to add in the pop up message is above is this one “ **ATTENTION** Enter a unique generic name to identify each person contacted. If necessary, you can differentiate people by adding a name or initials (for example: friend Francesco, colleague Anna etc) . ”

#TOSCRIPTING: here we would need like 5 boxes by default, but the important “trick” would be that once the respondent fills the fifth, then a sixth appears. If they fill a 6th then a 7th appears and so on.

#page_33

#Base: Total

#Filter

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single grid

[c_conviventi] Indicate which of the following people you live with have had close contact at home YESTERDAY and which have not.

#toscripting: resp_type=1 rewording: see excel file

#toscripting:

[In rows]: in case of You, Your son/daughter: same “pipes-in” as in conviventi_eta_xxx questions (names + age numbers pipes-in). In case of “other cohabitant” in conviventi_eta_xxx, please pipe-in written name from [c_conviventi_name] and age from conviventi_eta_xxx . Please exclude the receiver pipe-in: receiver will be excluded from pipe-in rows: if respondent_type=2,3 they will not see “You”, if respondent_type=1 (0-13yo) they will not see “My son/daughter involved in this survey”). Logic is we weed all cohabitants to appear, excluding the receiver of the survey.

Example for respondent_type=1 rows

<1>I had close contact yesterday (physical contact or exchange of at least 5 words)

rewording: see excel file

<2>I didn't have close contact yesterday

rewording: see excel file

#page_34

#Question type: INTERLUDE TEXT if respondent_type_LF =1 ->

In the following questions we will ask you to list all the people with whom you had close contact YESTERDAY in different places (for example: at your home, at other people's homes, at school/work, in shops, on public transport, etc.).

Identify each **person – separately** - with a generic name (*for example: friend, colleague, plumber, shop assistant*), you will need to distinguish them in the next phase of the questionnaire.

ATTENTION, the generic name must be unique (you cannot repeat the same name twice), if necessary you can differentiate people by adding a name or initials (*for example: friend Francesco, colleague Anna, etc.*).

#toscripting: if respondent is child (childage=5to13)

NOTE: *If [pipe-in: "your son" if childgender=1, "your daughter" if childgender=2] is not [pipe-in: "stato" if childgender=1, "stata" if childgender=2] present so far, we invite you to answer the next questions with its support.*

#page_35

#Base: Total

#Filter

#Receiver if not adult: child, if respondent_type_LF =1 ->

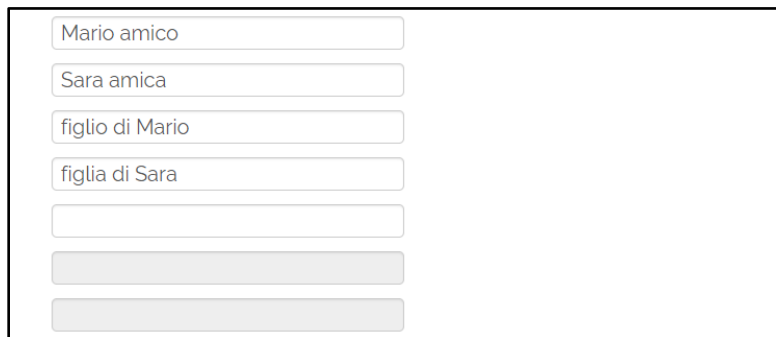
NO WARNING MESSAGE (neither for resp type =1 nor 2)

#Question type : single

[contact_compilation] This is a TEST question that helps us to fill out the questionnaire CORRECTLY.

In the next questions we will ask you to list the people with whom you have had close contact in different contexts. For example, if you have had close contact with 4 people (Mario, Sara, Mario's son and Sara's daughter), you will have to fill in 4 boxes , as shown in the image below.

#toscripting: place image in this position



Now answer this question: How many people you have had close contact with can you fit in each box ? Select one answer only

<1>Only one person per box

<2>Up to two people per box

<3>How many people do I want per box?

*#toscripting: **warning message** if code is not 1: "In the next questions, in which you will have to list the people with whom you had close contact yesterday, **YOU WILL HAVE TO INSERT ONE PERSON PER BOX**", correct your answer to continue". **Do not let respondent proceed if keep selecting code 2 or 3.***

#Base: Total

#Filter

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [Spine-in:childage] as the recipient of this survey”

#Question type: open text boxes,

[**c_home**] Think of all the people who DO NOT LIVE with you with whom you have had close contact YESTERDAY AT YOUR HOUSE and list them below one per box .

(for example friends or relatives who came to visit, neighbors, boiler man, postman, plumber, cleaner, etc.).

[rewording to update]

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> Not applicable: I did not have any close contact at my home with non-cohabiting people yesterday
MOVE ABOVE

#Base: Who work and have not worked remotely yesterday

#Filter: if presence_work =2

#Receiverif not adult : child (only when childage >=16)

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [Spine-in:childage] as the recipient of this survey”

#Question type: open text boxes

[**c_work**] Think of all the people you had close contact with YESTERDAY AT WORK and list them, one per box , in the boxes below.

If you had close contact with a significant number of people during your work day (e.g. customers for a clerk/front-office worker or students for a teacher), list only the most relevant ones (interactions lasting more than 15 continuous minutes).

Note: if there are any of these people that you have already included previously, DO NOT include them in the list below . #Toscripting: this part “exclude contact from the list below” has to be removed: in all these c_xxx questions

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#Base: All students who went to school yesterday

#Filter: if Presence_School =2

and date (date based on Presence_School which will automatically filter this question)

#Receiver if not adult: child, if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: open text boxes

note: please make sure of bold symbols

[**c_school**] Think about all the people you have had close contact with YESTERDAY AT SCHOOL (including nursery, kindergarten, elementary, middle, high school and university) and list them, one per box , in the boxes below.

If yesterday, during your school day you had close contact with a considerable number of people, report only the most significant ones (interactions lasting more than 15 continuous minutes).

Note: if among these people there is one that you have already included previously, DO NOT include them in the list below.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#page_39

#Base: Total

#Filter: if isolation != 1

#Receiver if not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: open text boxes

[**c_homeguest**] Think of all the people you had close contact with YESTERDAY at OTHER PEOPLE'S HOUSES and list them, one per box , in the boxes below.

Note: If any of these people are people you have already listed, DO NOT list them in the following list.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#page_40

#Base: Total

#Filter: if isolation != 1

#Receiver if not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter” if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: open text boxes – 20 boxes

[c_restaurant] If **YESTERDAY** you went to any **RESTAURANT PLACE** (for example, bar, restaurant, ice cream parlor, pizzeria, pastry shop), think back to any people with whom you had **close contact** on these occasions (for example, with people sitting at the table/counter with you, with waiters or shop assistants) and list them, one per box, in the boxes below.

Note: if among these people there is one that you have already included previously, DO NOT include them in the list below.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#page_41

#Base: Total

#Filter: if isolation != 1

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: open text boxes 20 boxes

[c_leisure] If **YESTERDAY** you did any **SPORTS OR PLEASURE ACTIVITY** (for example, you went to the cinema, to the gym/swimming pool, to the park, you volunteered, etc.) think back to the people with whom you had **close contact** on all these occasions and list them, one per box, in the boxes below.

Note: if among these people there is one that you have already included previously, DO NOT include them in the list below.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#page_42

#Base: Total

#Filter: if isolation != 1

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: open text boxes

[c_shopping] If **YESTERDAY** you went **SHOPPING** (in shops, supermarkets, markets, shopping centres), think back to the people with whom you had **close contact** on these occasions (for example, with people who accompanied you, shop assistants or other customers) and list them, one per box, in the boxes below.

Note: if among these people there is one that you have already included previously, DO NOT include them in the list below.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report

MOVE UP

#page_43

#Base: Total

#Filter: if isolation != 1

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"

#Question type: open text boxes

[c_transport] If YESTERDAY you used one or more MEANS OF TRANSPORT (including a car), think back to the people you had close contact with on those occasions and list them, one per box , in the boxes below.

Note: if any of these people are those you have already included previously, DO NOT include them in the list below.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report

MOVE UP

#page_44

#Base: Total

#Filter: if isolation != 1

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"

#Question type: open text boxes

[c_otherindoor] If YESTERDAY you had close contact INDOOR occasions other than those presented so far list the people with whom you have had them, one per box , in the boxes below.

Note: if among these people there are any that you have already entered previously, DO NOT enter them in the list below.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#page_45

#Base: Total

#Filter: if isolation != 1

#Receiverif not adult : child , if respondent_type_LF =1 ->

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: open text boxes

[c_otheroutdoor] If **YESTERDAY** you had close contact OUTDOORS other than those presented so far , please list the people with whom you had them, one per box , in the boxes below.

Note: If any of these people are people you have already listed previously, DO NOT list them in the following list.

[possible contact 1]

[possible contact 2]

[possible contact 3]

[possible contact 4]

[possible contact 5]

... etc ...

<966> No new contacts to report **MOVE ABOVE**

#page_46

#TOSCRIPTING :

PLEASE CREATE A **TEST MODE** VARIABLE WHERE THERE WILL BE THE TOTAL COUNT (SUM) OF CONTACTS WRITTEN IN ALL THE ABOVE MODULE 2B OPEN QUESTIONS
(eg 3 open boxes filled in c_home + 2 filled in c_work = 5 in total)

[total_contacts] [TOTAL COUNT TO APPEAR] – please insert also c_coviventi rows=1 in the count

#page_47

#TOSCRIPTING :

PLEASE IN **TEST MODE** LET ALL THE CONTACTS APPEAR (all the contacts filled in c_home to c_otheroutdoor questions)

[contacts_name] [total contact list to appear] please insert also c_cohabitants rows=1 in the count

#toscripting: from closed to c_vaccino questions , please also add pipe in names as they appear from c_conviventi rows=1

#page_48

#Base: Had at least one close contact

#Filter: [total_contacts]>=1
 #Receiverif not adult : child , if respondent_type_LF =1 ->
 if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if
 childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this
 survey”
 #Question type: single grid – ~~random rows~~, please make the contact names in bold, leave [place]pipes in
 not in bold

**[closed] Please indicate which of the following contacts occurred mostly indoors and which mostly
 outdoors. Select one response per line.**

-[closed_1]#TOSCRIPING: insert **Contact name 1** had \$pipein[PLACE]
 -[closed_2]#TOSCRIPING: insert **Contact name 2** had \$pipein[PLACE]
 -[closed_3]#TOSCRIPING: insert **Contact name 3** had \$pipein[PLACE]
 -[closed_4]#TOSCRIPING: insert **Contact name 4** had \$pipein[PLACE]
 -[closed_5]#TOSCRIPING: insert **Contact name 5** had \$pipein[PLACE]
 ... **AND SO ON** depending on number of contacts in [total_contacts]

#TOSCRIPING: **[PLACE]** TABLE:

Please note you've inverted c_home and c_homeguest pips in

*In which question was Text to write in rows \$ pipein
 contact written*

C_cohabitants	had at home
C_home	had at home
C_school	had at school
C_work	had at work
C_transport	had on a means of transport
C_shopping	got while shopping
C_restaurant	had in a catering establishment
C_leisure	had in my spare time
C_homeguest	had at someone else's house
C_otherindoor	#as by email Mar 1, please do not show this but count it in total_contacts_indoor
C_outdoor	#as by email Mar 1, please do not show this

<1>Indoors

<2>Outdoor

#page_49

#TOSCRIPING :

PLEASE CREATE A **TEST MODE** VARIABLE WHERE THERE WILL BE THE TOTAL COUNT (SUM)
 OF CONTACTS THAT HAD CODE 1 “AL INDOORS” IN [CLOSED] QUESTION

[total_contacts_indoor] /TOTAL COUNT TO APPEAR/

#page_50

#Base: Total

#Filter

*#Receiverif not adult : child , if respondent_type_LF =1 ->
if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if
childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this
survey”
#Question type : open integer – min 0 – max 15000,
REMOVE WARNING MESSAGE, LEAVE THE RESPONDENT FREE (WITHIN 0 AND 15K
INTEGER):*

**[c_sharedindoor] HOW MANY PEOPLE DID YOU SHARE INDOOR SPACES WITH
YESTERDAY for an extended period of time (more than 30 minutes)?**

**Please also include the close contact people listed above if you shared an indoor space with them
for more than 30 minutes.**

**For example, classmates if you are a student, or office/work colleagues if you are a worker, a
compartment in a transport vehicle, etc.**

*Please provide your best estimate in the box below.
#toscripting: re-shape this with the spaces as above*

[INTEGER NUMBER]

#Module 2B: QUESTIONS BY CONTACT

*#TOSCRIPTING: in all these module questions please show contacts in rows (randomize order and keep same order on different questions).
freeze the TOP row of grid*

#page_51

*#Base: Had at least one close contact
#Filter: [total_contacts]>=1
#Receiver if not adult: child
#Question type: open integer grid, ~~random rows~~
#toscripting: please do not show cohabitants (cohabitants) here as we already know their age, cohabitants will be shown from c_fisico on*

[c_age] How old are the following people? Write the age of each person in the appropriate box. If you don't know the exact age, write the age you think they are.

-[c_eta_1]contact name 1
-[c_eta_2]contact name 2
-[c_eta_3]contact name 3
-[c_eta_4]contact name 4
-[c_eta_5]contact name 5

*... AND SO ON DEPENDING ON [total_contacts]
[TYPE NUMBER] (FROM 0 TO 100)*

#page_52

*#Base: Had at least one close contact
#Filter: [total_contacts]>=1
#Receiver if not adult : child , if respondent_type_LF =1 ->
if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"*

#Question type: single grid, ~~random rows~~

[c_fisico] There was physical contact of any kind (e.g. ~~did you touch each other~~) in yesterday's meeting with the following people? Select one answer per person.

-[c_fisico_1]contact name 1
-[c_fisico_2]contact name 2
-[c_fisico_3]contact name 3
-[c_fisico_4]contact name 4
-[c_fisico_5]contact name 5

... AND SO ON DEPENDING ON [total_contacts]

<1>Yes
<2>No

#page_53

*#Base: Had at least one close contact
#Filter: [total_contacts]>=1
#Receiver if not adult : child , if respondent_type_LF =1 ->
if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"*

#Question type: single grid, ~~random rows~~, random reverse order for columns

[c_mask] Which of you wore a mask the entire time? Select one answer per person.

-[c_mask_1]contact name 1

-[c_mask_2]contact name 2

-[c_mask_3]contact name 3

-[c_mask_4]contact name 4

-[c_mask_5]contact name 5

... AND SO ON DEPENDING ON [total_contacts]

<1>Neither *fixed*

<2>Only me

<3>Only this person

<4>Both

<977 fixed>I don't remember

#page_54

#Base: Had at least one close contact

#Filter: [total_contacts]>=1

#Receiver if not adult: child, if respondent_type_LF =1 AND **childage** >=5 ->

#Question type: single grid,

if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"

[c_reddito_percepito] In your opinion, on a scale of 1 to 5, what level of economic well-being do the following people rank in relation to the Italian population?
Select one answer per person.

-[c_received_income_1]contact name 1

-[c_received_income_2]contact name 2

-[c_received_income_3]contact name 3

-[c_received_income_4]contact name 4

-[c_received_income_5]contact name 5

... AND SO ON DEPENDING ON [total_contacts]

<1>1 = very low well-being

<2>2 = low well-being

<3>3 = average well-being

<4>4 = high well-being

<5>5 = very high well-being

<977>I don't know

#page_55

#Base: Had at least one close contact

#Filter: [total_contacts]>=1

#Receiver if not adult: child

#Question type: single grid

[c_istruzione] What is the highest level of education achieved by the following people?
Select one answer per person.

-[c_istruzione_1]contact name 1 *\$pipe-in [c_age] as follows, in every row: contact name 1 (\$pipe-in years)*

-[c_statement_2]contact name 2 *same \$pipe-in in all rows*

-[c_istruzione_3]contact name 3

-[c_instruction_4]contact name 4
 -[c_istruzione_5]contact name 5
 ... AND SO ON DEPENDING ON [total_contacts]
 <1>Middle school diploma (or less)
 <2>High school diploma (lyceum, technical or vocational institute) *not selectable if [c_eta] (same row)<=17*
 <3>Degree or higher (master's, doctorate, etc.) *not selectable if [c_eta] (same row)<=20*
 <977>I don't know
 #TOSCRIPING: warning message if inconsistency in code 2 and code 3: "Some of the education levels listed are not plausible for the age of the person in question, please review your answers"
 PLEASE ALLOW THE RESPONDENTS TO go ahead after showing warning message twice.

#page_56

#Base: Had at least one close contact
 #Filter: [total_contacts]>=1
 #Receiverif not adult : child , if respondent_type_LF =1 ->
 if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter"if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"
 #Question type: single grid, Required=SOFT (leave it =SOFT, but adapt warning message " Please provide a response for at least one contact ", make the message appear ONLY IF respondent does not select any answer in any row)

[c_relationship] What is your relationship with the person contacted? Select one answer per person.

-[c_relation_1]contact name 1
 -[c_relation_2]contact name 2
 -[c_relation_3]contact name 3
 -[c_relationship_4]contact name 4
 -[c_relation_5]contact name 5
 ... AND SO ON DEPENDING ON [total_contacts]
 #oscripting: auto-assign code 1 for rows coming from c_coviventi in this question
 <1>Cohabiting relative/family member or roommate
 <2>Non-cohabiting relative/family member
 <3>Friend or acquaintance
 <4>Co-worker #show if respondent_type=3 AND [occupation]=1,2,3,6,7,8,9. or Show if respondent_type=2 AND childage respondent >=16 AND [occupation]=1,2,3,6,7,8,9
 <5>School/College Mate #show if respondent_type=1 or (respondent_type=2 childage respndent=14,15) or (respondent_type=2,3 AND occupation=5,6,7
 <6>Other

#page_57

#Base: Had at least one close contact
 #Filter: [total_contacts]>=1
 #Receiverif not adult : child , if respondent_type_LF =1 ->
 if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if childgender=1] ["daughter"if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey"

#Question type: single grid (drop down menu), Required= SOFT (leave it =SOFT, but adapt warning message " Please provide a response for at least one contact ", make the message appear ONLY IF respondent does not select any answer in any row)

[c_frequency] On how many days have you had close contact with this person in the past 14 days (including today)? Select one answer per person.

If you don't remember the exact number, select your best estimate.

-[c_frequency_1]contact name 1

-[c_frequency_2]contact name 2

-[c_frequency_3]contact name 3

-[c_frequency_4]contact name 4

-[c_frequency_5]contact name 5

... AND SO ON DEPENDING ON [total_contacts]

<1>1

<2>2

<3>3

<4>4

<5>5

<6>6

<7>7

<8>8

<9>9

<10> 10

<11> 11

<12> 12

<13> 13

<14> 14

#page_58

#Base: Had at least one close contact

#Filter: [total_contacts]>=1

*#Receiver if not adult: no need for warning message on receiver here, no need for rewording too
if respondent_type = 2 insert blue bold warning message "This question is about you, ["son" if
childgender=1] ["daughter"if childgender=2] aged [\$pipe-in:childage] as the recipient of this
survey"*

*#Question type: single grid, Required=SOFT (leave it =SOFT, but adapt warning message " Please
provide a response for at least one contact ", make the message appear ONLY IF respondent does not
select any answer in any row)*

[c_gender] What is the gender of the following people? Select one answer per person.

-[c_gender_1]contact name 1

-[c_gender_2]contact name 2

-[c_gender_3]contact name 3

-[c_gender_4]contact name 4

-[c_gender_5]contact name 5

... AND SO ON DEPENDING ON [total_contacts]

<1>Male

<2>Female

#page_59

#Base: Had at least one close contact
 #Filter: [total_contacts]>=1
 #Receiverif not adult: child , if respondent_type_LF =1 ->
 if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if
 childgender=1] ["daughter"if childgender=2] aged [\$pipe-in:childage] as the recipient of this
 survey"
 #Question type: single grid)
 if c_fisico_rows=1 don't ask question for the same row, auto assign code 1 Required=SOFT (leave it
 =SOFT, but adapt warning message "Please provide a response for at least one contact ", make the
 message appear ONLY IF respondent does not select any answer in any row)
[c_distance] What minimum distance was maintained during the following non-physical contacts?
Select one answer per person. If you do not remember, select the "I do not remember" option or
simply do not answer for that person.

-[c_distance_1]contact name 1
 -[c_distance_2]contact name 2
 -[c_distance_3]contact name 3
 -[c_distance_4]contact name 4
 -[c_distance_5]contact name 5
 ... AND SO ON DEPENDING ON [total_contacts]
 <1>Less than 1 meter
 <2>Between 1 meter and 2 meters
 <3>More than 2 meters
 <977 fixed>I don't remember

#page_60

#Base: Had at least one close contact
 #Filter: [total_contacts]>=1
 #Receiver if not adult: child
 #Question type: single grid, ~~random rows~~ Required=SOFT (leave it =SOFT, but adapt warning
 message "Please provide a response for at least one contact ", make the message appear ONLY IF
 respondent does not select any answer in any row)
[c_vaccino] Have the following people already received one or more doses of the COVID-19
vaccine? Select one answer per person. If you do not remember, select the option "I don't know/I
don't remember."
 -[c_vaccine_1]contact name 1
 -[c_vaccine_2]contact name 2
 -[c_vaccino_3]contact name 3
 -[c_vaccino_4]contact name 4
 -[c_vaccino_5]contact name 5
 ... AND SO ON DEPENDING ON [total_contacts]
 <1>Yes
 <2>No
 <977>I don't know/I don't remember

#page_61

#Base: Children aged 5-13 yo
 #Filter: if receiver is child and childage =5to13
 #Receiver if not adult: parent

#Question type : single

[child013_presence] Were you able to get the support of [pipe-in: "your son" if childgender=1, "your daughter" if childgender=2] of \$pipein [childage] years in answering the questions just asked about contacts made yesterday?

If [pipe-in: "your son" if childgender=1, "your daughter" if childgender=2] was not [pipe-in: "could" if childgender=1, "could" if childgender=2] present, this is not a problem .

<1>Yes, he was present

<2>No, he wasn't present

#TOSCRIPING: AT THE END OF MODULE B, PLEASE INSERT A CHECK VARIABLE TO SEE HOW MANY RESPONDENTS END HERE THE SURVEY (IE DROP-OUT RATE)

#TOSCRIPING: PLEASE INSERT A TEST MODE VARIABLE TO SEE HOW MANY MINUTES THE RESPONDENTS TOOK TO ANSWER MODULE 2B called [minutes_module2B], AND ALL MODULE 2 (2A.1 + 2A.2 + 2B) called [minutes_module2]

#Module 3: PERCEIVED RISK OF INFECTION

#TOSCRIPTING: show this module only to adults AND children whose childhood>=14

#page_62

#Base: Total (respondent (aged 14+)

#Filter: age or child age >=14

#Receiverif not adult : child (if child age >=14), if childage <=13: parent

if respondent_type = 2 insert blue bold warning message “This question concerns you, [“son” if childgender=1] [“daughter”if childgender=2] aged [\$pipe-in:childage] as the recipient of this survey”

#Question type: single grid, randomize rows (same order of pers_risk rows) – skip option health

[inf] Do you personally know at least one person who has contracted, been hospitalized, or died from each of the following diseases? Select one answer per disease.

-[inf_sarscov] COVID-19

-[inf_flu]Influenza

-[inf_measles]Measles

<1>I only know someone who has contracted the disease

<2>I also know someone who has been hospitalized (but no one who has died)

<3>I also know someone who died

<4>*I don't know anyone who has contracted the disease* # toscripting : make italic

#Base: Total (5+)
#Filter: if age or chldage >=5
#Receiver if not adult: child, if respondent_type_LF =1 ->
if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if
childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:chldage] as the recipient of this
survey"
#Question type: single - skip option health
[vacc_covid] What is your SARS-CoV-2 (COVID-19) vaccination status?
Select one answer only.
<1>I am not vaccinated by choice
<2> I am not vaccinated because I have a health exemption
<3> I have already booked the appointment for the first dose
<4> I got the first dose, but not the second
<5> I did the second dose, but not the booster (third dose)
<6> I did the booster but not the fourth dose
<7> I did the booster and the fourth dose
<955fixed>Other (specify) [SPECIFY]

#Base: Total (5+)
#Filter: if age or chldage >=5, if vacc_covid =1
#Receiver if not adult: PARENT, if respondent_type_LF =1 OR 2 ->
#Question type: multiple, randomize - skip option health
[no_vax_reason] What motivated your choice not to get vaccinated?
Select all that apply.
<1>I have doubts about the effectiveness of the vaccine
<2>I have doubts about the (health) safety of the vaccine
<3>I am against mandatory vaccination
<4>I am against it because covid-19 does not pose a serious threat to my health.
<5>I am against the green pass
<6>I was advised against it by an acquaintance
<7>I haven't had time to inform myself properly yet
<8>I think the vaccine is a waste of money for the benefit of big pharmaceutical companies
<955fixed>Other (specify) [SPECIFY]

#Base: Total
#Filter:
#Receiver if not adult : child , if respondent_type_LF =1 ->
if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if
childgender=1] ["daughter" if childgender=2] aged [\$pipe-in:chldage] as the recipient of this
survey"
#Question type: single - skip option health

[vacc_altri] Are you vaccinated against at least one of the following diseases: Human Papilloma Virus (HPV), Meningococcus, Pneumococcus, Hepatitis A, Herpes Zoster/Shingles?
Select one answer only.

- <1>Yes
<2>No
<977>I don't know/I don't remember

#page_66

#Base: Total

#Filter:

#Receiverif not adult : child if childage =14,15,16,17; parent if childage =0to13 (if childage =0to13)
if respondent_type = 2 insert blue bold warning message "This question concerns you, ["son" if
childgender=1] ["daughter"if childgender=2] aged [\$pipe-in:childage] as the recipient of this
survey"

#Question type: single - skip option health

[refuse] Have you ever actively refused a vaccine when it was offered to you?
Select one answer only.

- <1>Yes
<2>No
<977>I don't know/I don't remember

#page_67

#TOSCRIPING: FINAL TEXT

[txt_final] You have completed the questionnaire, we thank you very much for your contribution!

#TOSCRIPING: this will be the last thing respondents see, do not add pdls at the end of the survey (eg
now we have IT_voted2018)