

Exposome changes in primary school children following the wide population non-pharmacological interventions implemented due to COVID-19 in Cyprus



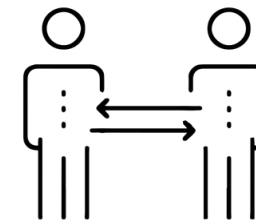
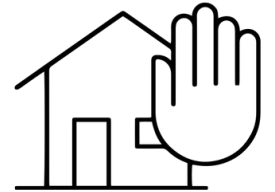
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COVID-19 & non-pharmacological interventions in Cyprus

- First COVID-19 cases in Cyprus: March 10 ⁽¹⁾
- Non-pharmacological interventions (NPI) to restrict the spread of the virus
 - school closures, closures of dining and recreation areas, lock-down
- Recommendations
 - limitations in the number of contacts
 - reinforcement of personal hygiene habits.

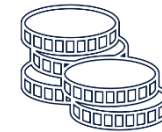


NPI measures – Changes in exposome of children?

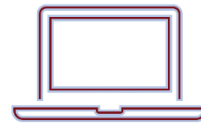
Exposome ^(2,3)



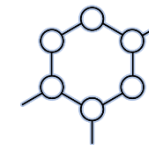
General external



Specific external



Internal



Exposome@School | COVID-19 - Objectives

Methodological framework
of the human exposome

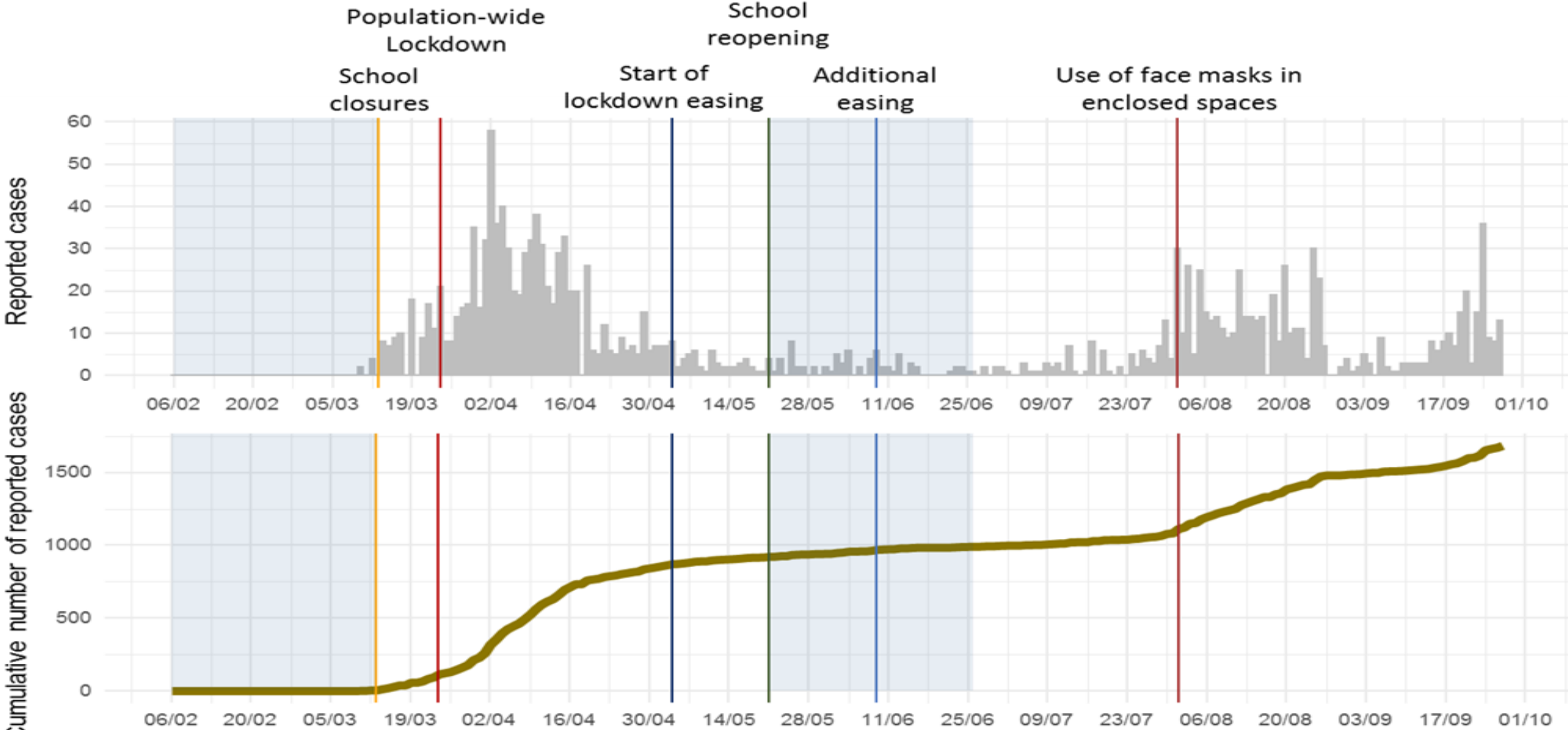


Assessment of the totality of
changes in lifestyle and behaviours

Describe the children's lifestyle and contacts at school and at home before and after the lockdown in Cyprus

Assess the children's compliance to the COVID-19 response protocols, related to personal hygiene and physical distancing at both school and home

Study periods in the context of COVID-19 epidemic in Cyprus



Methodology

Study design

- Online survey
- RedCAP
- June 1 – July 17, 2020
- Questions for 2 periods:
(1) before March 2020 (pre-lockdown)
(2) school re-opening period (May 21 – June 26)

Population

- Primary school children living in Cyprus
- Respondents: parents
- Emails sent to primary schools to forward link to parents

Data collection

- Questions from validated questionnaires
 - EU Health survey
 - EU Urban Health survey
 - US Nurses' Health study
 - PAQ-C
 - Diary for contacts

Statistical analysis

- Descriptives
 - Chi-square, Wilcoxon, % change
- ExWAS
 - Compliance ~ Lifestyle/ Demographics parameters
 - Adjusted for age, sex, days since school re-opening and parents' educational level

Exposome domains and their specific components/variables included in the survey

Exposome domain	Study group of components	Variables
General external	Socio-economic status	Parents' educational level
Specific external	Lifestyle (children)	Exercise, diet, screen time, digital communication
Specific external	Lifestyle (children) – related with NPI measures	Personal hygiene, number of contacts, time spent at home weekdays and weekend
Specific external	Lifestyle (parents)	Parents' smoking and household cleaning activities frequency
Internal	Anthropometrics	Weight, height
Internal	Medical history	Chronic disease, vaccination
Internal	Background characteristics	Age, sex, place of birth, years living in Cyprus, city of residence, municipality, postal code, school name

Results

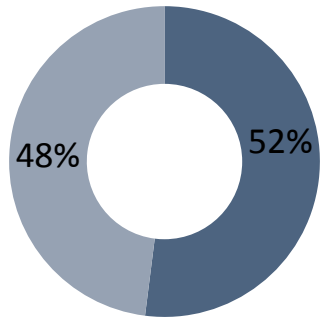
Contacted 336 schools

253 schools agreed to forward the study link

Received responses from a minimum of 181 schools

1509 participants

Demographics and other characteristics of 1509 participants

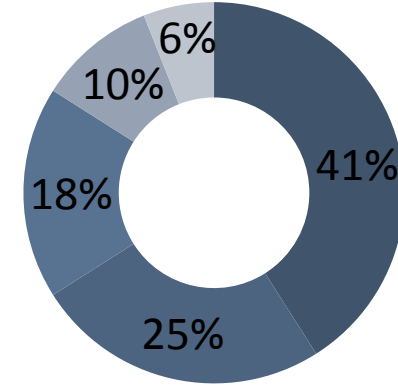


■ Males
■ Females

Mean age
10 years (SD:1.7)

92% healthy

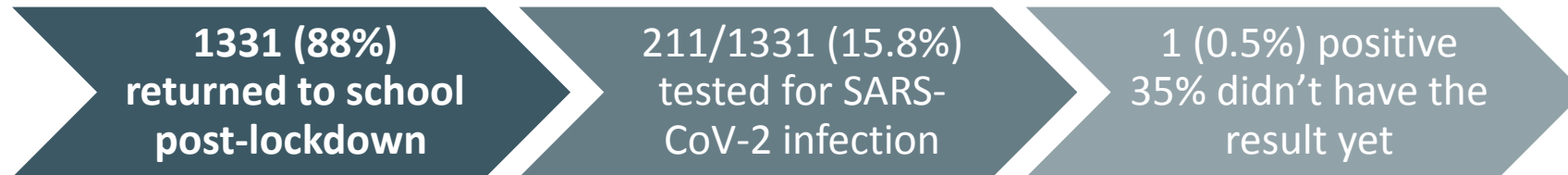
93% vaccinated



■ Nicosia
■ Limassol
■ Larnaca
■ Famagusta
■ Paphos

Males	Females
<input type="checkbox"/> 54% normal BMI	<input type="checkbox"/> 60% normal BMI
<input type="checkbox"/> 23% overweight	<input type="checkbox"/> 23% overweight
<input type="checkbox"/> 18% obese	<input type="checkbox"/> 10% obese

Mother	57% University
	32% High school/Other non-uni diploma
Father	44% University
	48% High school/Other non-uni diploma



Exposome profile in the post-lockdown period

Parameters	N (%) / Median [Q1, Q3]	Change compared to the pre-lockdown period*
Physical activity during free time	51% little physical effort 22% 1-2 times/week doing sports	Decrease
Spare time activity score	1.38 [1.25, 1.62]	Decrease
School break activity	46% sitting 27 % running or playing a little	Decrease
Screen time	62% 1-3 hours/day 25% 4-7 hours/day	Increase
Ready-made food	44% 1 time/week 29% 2-3 times/month	Decrease
Foods containing sugar	37% everyday 27% 2-3 times/week	Increase
Vegetables	31% everyday 29% 2-3 times/week	-
Fruits	54% everyday 18% 2-3 times/week	-
Washing hands with soap	51% 4-7 times/day 26% >7 times/day	Increase
Use of hand antiseptic	44% 1-3 times/day 30% 4-7 times/day	Increase

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Vegetables	31% everyday 29% 2-3 times/week	-
Fruits	54% everyday 18% 2-3 times/week	-
All cleaning activities	20 [14, 26] times/week	Increase
Washing hands with soap	51% 4-7 times/day 26% >7 times/day	Increase
Use of hand antiseptic	44% 1-3 times/day 30% 4-7 times/day	Increase

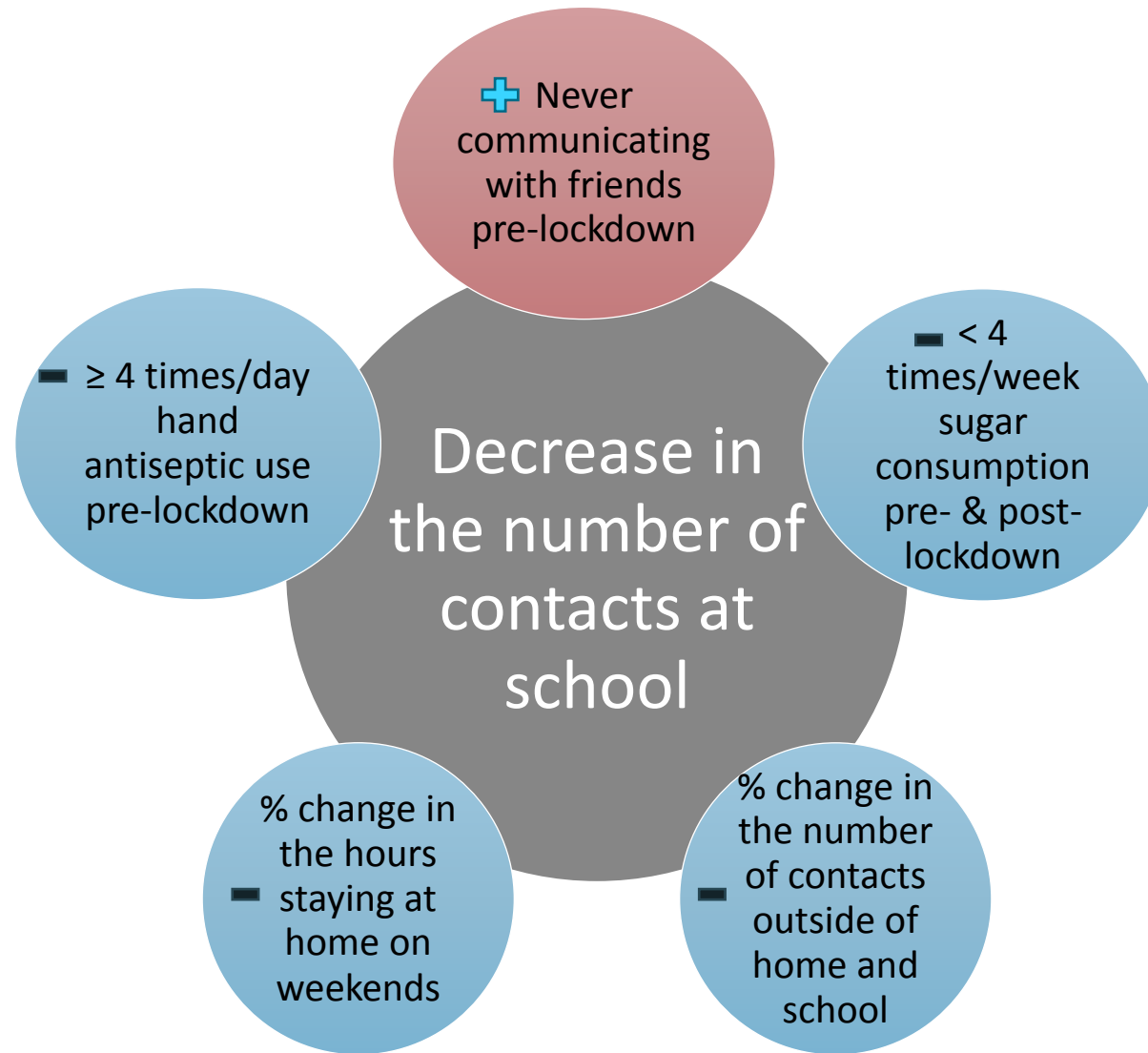
ExWAS Analysis - Compliance

Outcome	Overall N (%)	Males N (%)	Females N (%)
Increase in hours staying at home – weekdays (n=1509)	1096 (72.9)	562 (72.4)	515 (72.9)
Decrease in number of vulnerable contacts at home - weekdays (n=1190)	573 (48.2)	308 (48.4)	257 (48.2)
Decrease in number of contacts at school (n=1330)	1100 (85.1)	569 (85.1)	516 (84.9)
Increased frequency of hand hygiene using soap or antiseptic (n=1509)	1099 (74.4)	549 (71.5)	532 (77.2)

Parameters associated with compliance (1)



Parameters associated with compliance (2)



Conclusions - Discussion

Impact of COVID-19 pandemic and its associated NPI measures (lockdown, school closures) on children's exposome profile

- physical activity
- diet
- digital communication
- screen time
- personal hygiene habits
- number of contacts
- hours staying at home
- parents' frequency of household cleaning activities

Children's compliance to NPI measures associated with:

- Higher consumption of sugar and meat
- Using less hand antiseptic in the pre-lockdown period
- Never communicating with friends in the pre-lockdown period
 - May be driven by recommendations to stay at home and reduce contacts at school

Decreased degree of compliance to NPI measures and recommendations:

- Children living in smaller urban settings
 - Maybe because of easier access to green/blue spaces and more social relationships

Discussion

Combination of sedentary lifestyle and increased sugar consumption

- Needs to be reassessed whether these changes persist in the long-term
- Assess impact on later in life odds of developing chronic diseases
- Inform future policy making of promoting healthy lifestyle for children as part of a comprehensive response to epidemic waves

Use of exposome tools

- Identify susceptible sub-population groups
- Facilitate the deployment of site-tailored public health measures
- Promote a healthier lifestyle when physical distancing measures are necessary

Decrease of vulnerable contacts at home

- the least degree of compliance among all four indicators → need to consider for better protecting vulnerable groups during epidemics

Other studies

- COVID-19 confinement may have affected specific parameters in children's lifestyle e.g. decreased physical activity and increased sedentary behaviour (4-9), increased sleep time (5,7) and diet changes (5,8)

Limitations

- Recall bias
- Parents as respondents
- Access to the internet
- Cross-sectional design

Thank you for your attention!

Many thanks to:

- Parents and children
- Schools headmasters
- Ministry of Education, Culture, Sports and Youth



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