

# Play and Physical Activity: Findings from the Third Ontario Parent Survey

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## Acknowledgements

We gratefully acknowledge the participation of caregivers who completed the survey, as well as the contribution of many parent/caregiver and child/youth organizations across the province who assisted with the launch, communication, and marketing of the Ontario Parent Survey. Funding for the survey was provided by the Public Health Agency of Canada to Drs. Andrea Gonzalez and Harriet MacMillan, along with support from the Canada Research Chairs program to Andrea Gonzalez.

We also express our gratitude to Dr. Andrea Gonzalez and Jacinda Burns at McMaster University for their collaboration.

Finally, a special thank you to Lauren Wong, data science research assistant at Maximum City and 2022 UDSC intern. Her work on OPS2 in 2022 profoundly guided and influenced this report, both in terms of allowing for statistical comparison as well as the aesthetics of the slidedeck itself.



### About the Urban Data Science Corps (UDSC)

“The **Urban Data Science Corps (UDSC)** is an internship program offered by the University of Toronto's School of Cities that pairs students with organizations in the public and nonprofit sector, allowing students to explore careers in data science by working with real world data.

For my internship, I worked with [Maximum City](#), a Toronto-based organization that focuses on education and urban planning from a highly interdisciplinary approach.

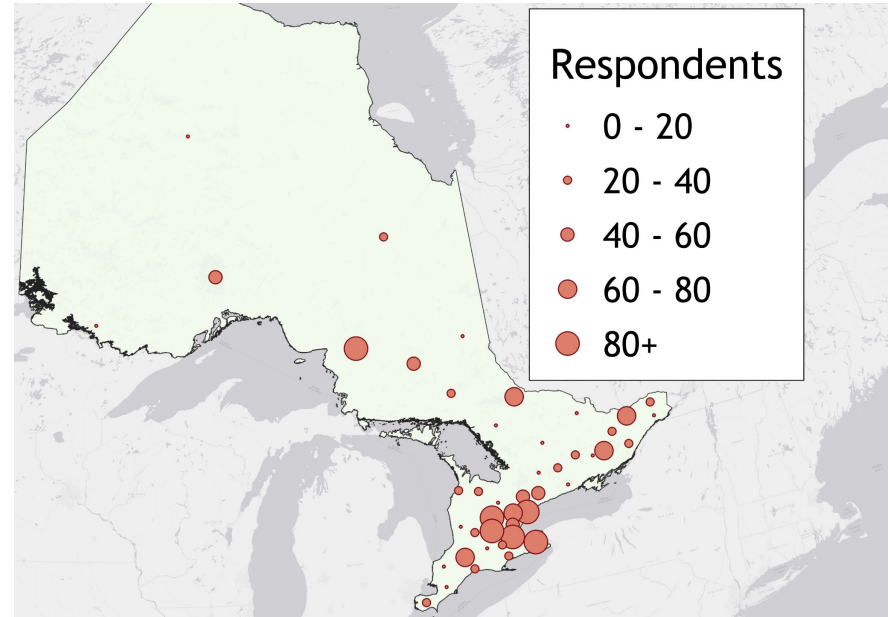
I would like to thank the School of Cities and Maximum City for the opportunity to work on this project.”

- Sami El Sabri, August 2023

## About the Ontario Parent Survey (OPS)

In Summer/Fall 2022 (after major COVID-19 related restrictions have been lifted), Maximum City partnered with researchers at McMaster University to conduct a survey of parents and caregivers across Ontario.

- **Research Question:** How much physical activity and outdoor time are children and youth getting?
- **Method:** Online questionnaire of parents and caregivers
- **Sampling method:** Convenience sample
- **Total responses:** Representing 3052+ children and youth
  - For this analysis only valid responses of children between the ages 5-17 were considered, leading to an analytical sample of **2093** responses.



See Appendix A for more information about the OPS.

Previous reports using OPS data can be found at Maximum City's website: <https://maximumcity.ca/play>

## Defining targets for physical activity and outdoor play

Our analysis looks at three results for physical activity: MVPA, LPA, and OP. Their targets are defined as:

Physical Activity	Meeting Targets	Extremely Under Target	Guidelines
<b>MVPA</b> Moderate to Vigorous Physical Activity	≥ 1 hour, <b>6-7 days a week</b> Getting at least an hour of MVPA on 6-7 days of the week	≥ 1 hour, <b>0 days a week</b> <i>Never getting an hour of MVPA, on any day of the week</i>	<ul style="list-style-type: none"> <li><a href="#">CSEP guidelines</a> recommend at least 60 mins per day.</li> </ul>
<b>LPA</b> Light Physical Activity	≥ <b>2.5 hours</b> per day	≤ <b>1 hour</b> per day	<ul style="list-style-type: none"> <li><a href="#">CSEP guidelines</a> recommend “several hours per day,” which has been interpreted elsewhere as more than 2 or 3 hours.</li> </ul>
<b>OP</b> Outdoor Play	> <b>1 hour</b> per day	≤ <b>15 minutes</b> per day	<ul style="list-style-type: none"> <li>No established guidelines in Canada. ParticipACTION operationalizes sufficient “active play” as more than 2 hours a day.</li> </ul>

### Past research findings

OPS2 findings suggested that **age, gender, population density, and parental factors** (depression, anxiety, physical activity, outdoor time, concern about education, concern about screen time) are related to physical activity and outdoor play.

We also found that in 2021, the **majority** of children and youth (65-87%) weren't meeting the recommended targets for physical activity and outdoor play.

We looked at the same relevant factors and evaluated any significant trends comparing OPS2 and OPS3

**Factors investigated:**

1. Gender
2. Age
3. Parental factors
4. Population density



# My analysis

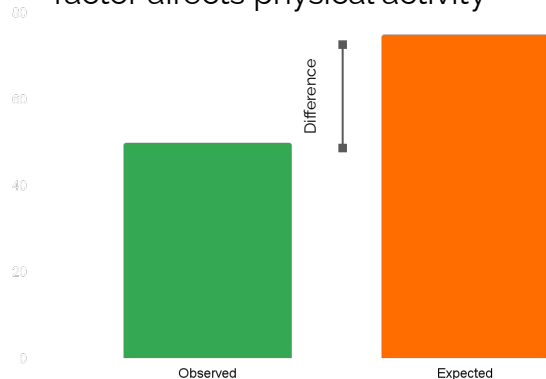


## Data analysis methodology

Most statistical analysis was performed in RStudio, using Chi-Square analysis or Jonckheere's trend test to assess the statistical significance of relationships found in the data.

### Chi-square analysis

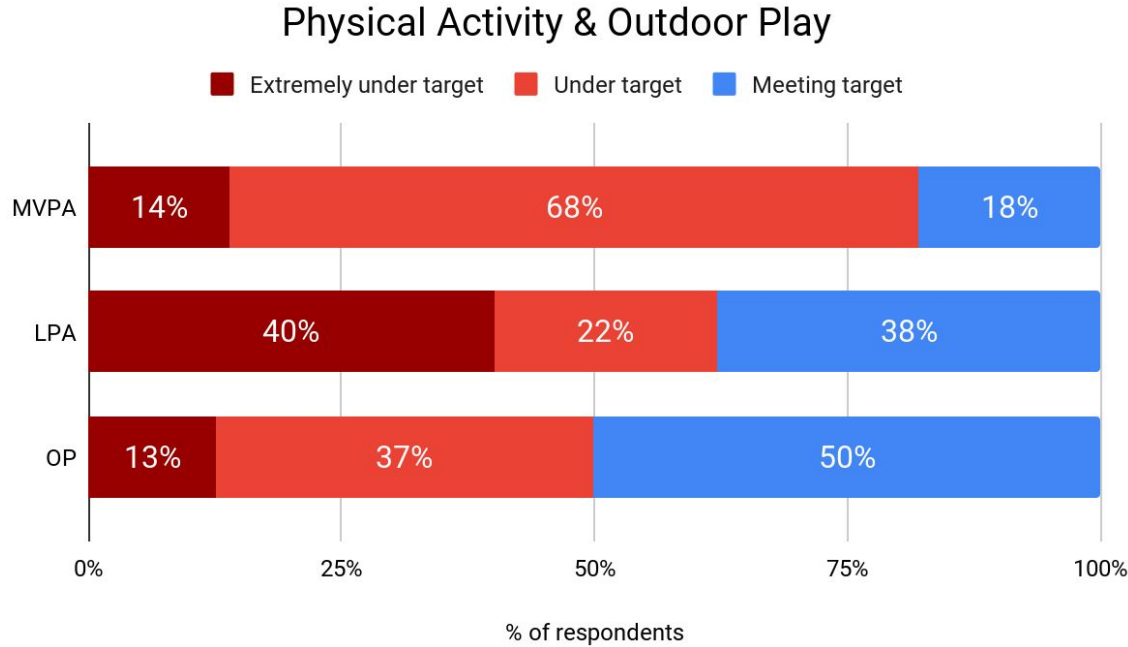
- Calculates the likelihood of difference between observed values vs. expected values, to allow for claims that a certain factor affects physical activity



### Jonckheere's trend test

- Tests for the ordered difference between medians and is used if both independent and dependent variable are ordinal in nature (e.g. Likert-scale and physical activity category)
- Determines whether there is a significant trend (e.g. if the Likert-scale variable increases, physical activity category increases)

## Meeting Physical Activity and Outdoor Play Targets



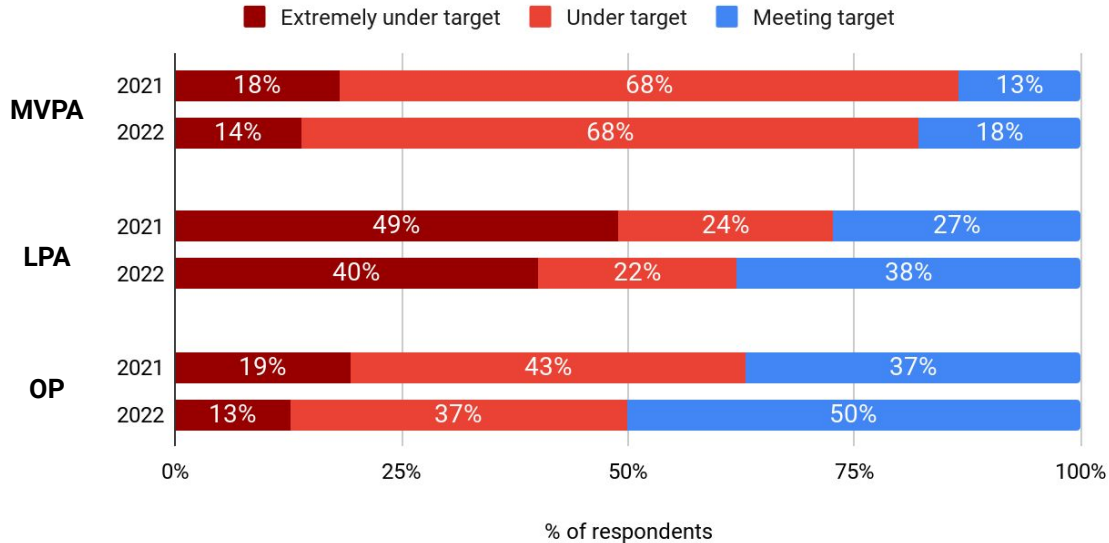
The **majority** of respondents **did not meet targets** for MVPA, LPA, or OP.

Only **1 in 6** respondents **met the MVPA target**.

More than **1 in 3** respondents were **extremely under target for LPA**, getting an hour or less per day.

## Comparison with OPS2 Results (2021 vs 2022)

### Physical Activity & Outdoor Play by Year



In 2022, **more respondents** were **meeting the targets** for all **measures**<sup>1</sup> of physical activity and outdoor play compared to 2021, and fewer were **extremely under target**.<sup>2</sup>

Statistical Significance:

1.  $p < 2.08e-08$

$p < 2.812e-13$

$p < 2.2e-16$

2.  $p < 7.791e-07$

$p < 1.055e-15$

$p < 945e-07$

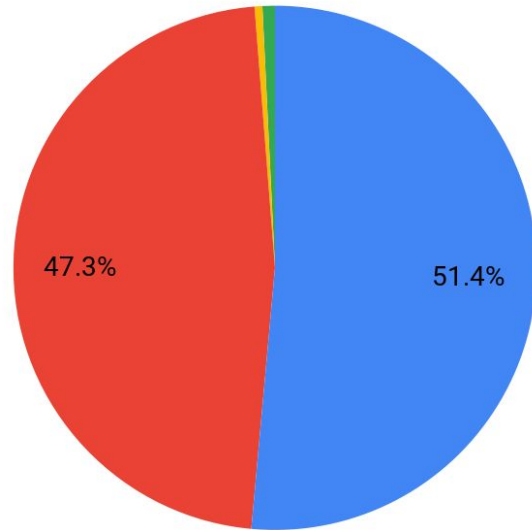


# 1. Gender

## Breakdown by Gender

Gender of Respondents (n=2,078)

Male Female Transgender Other

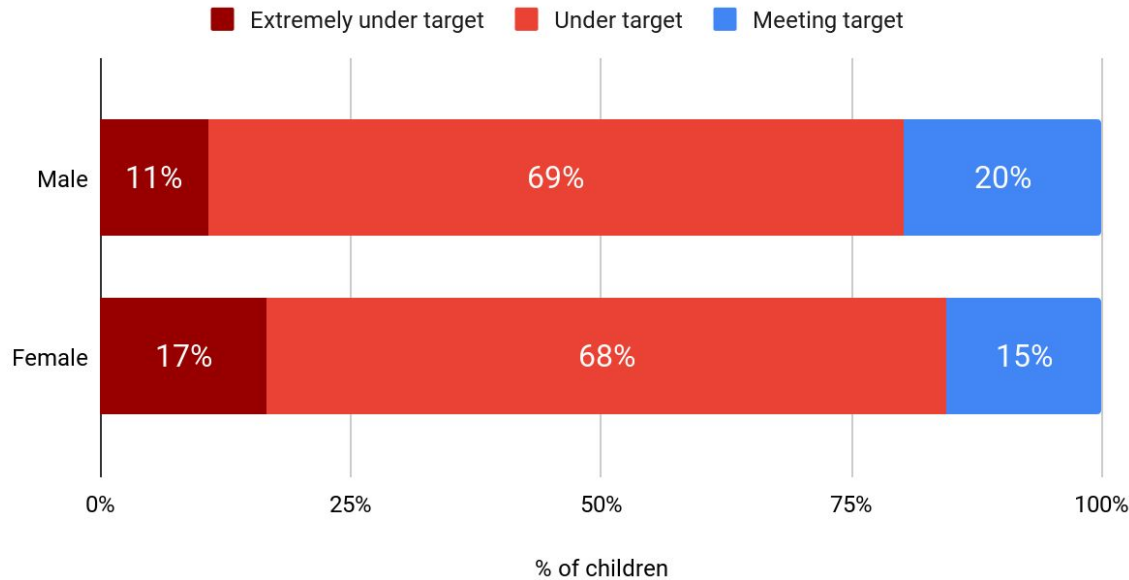


The sample was split approximately **evenly between male and female**.

Additionally, 17 respondents (0.8%) identified as “other” (e.g. non-binary, agender), and 10 (0.5%) identified as transgender.

## Gender and Moderate to Vigorous Activity (MVPA)

### Gender & MVPA



There was a **slight but consistent difference** (1-5%) by gender for all measures.

**Males** were significantly more likely to **meet MVPA targets**.<sup>1</sup>

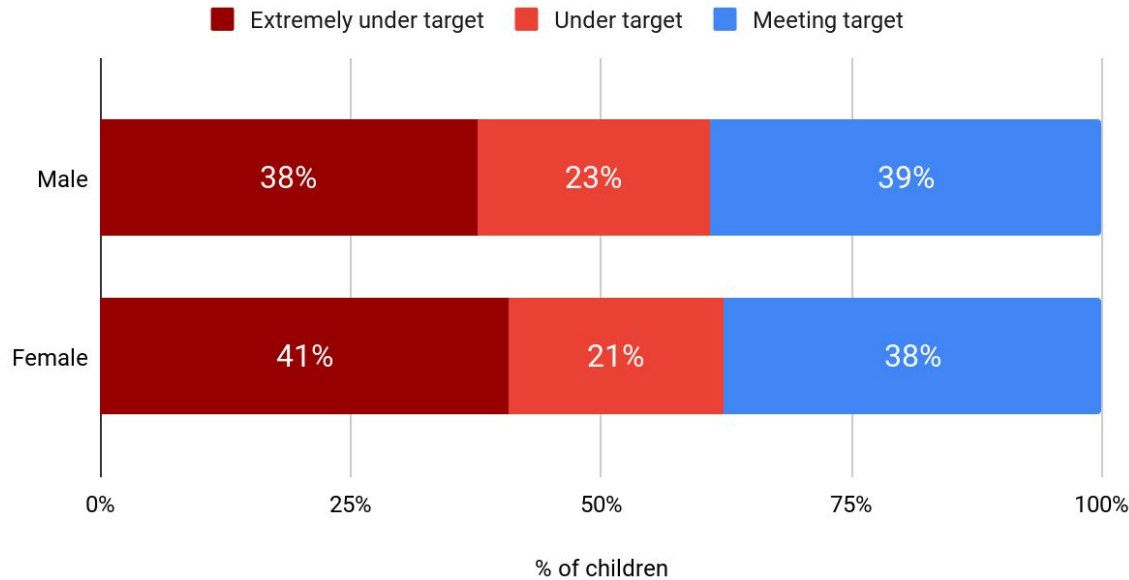
Conversely, **females** were significantly more likely to be **extremely under MVPA targets**.<sup>2</sup>

These results replicate OPS2 findings.

Statistical Significance:  
1.  $p < 0.0005525$   
2.  $p < 0.03429$

## Gender and Light Physical Activity (LPA)

Gender & LPA



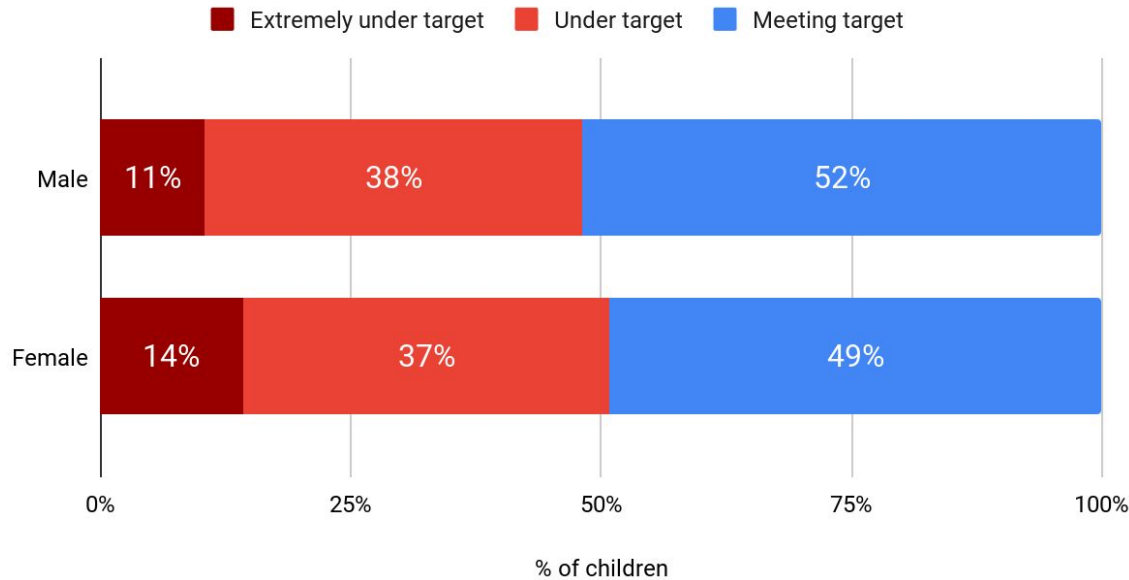
There was a **slight but consistent difference** (2-4%) by gender for all measures.

Unlike our findings from OPS2, however, there was no statistically significant difference between the genders for either being more likely to **meet MVPA targets**<sup>1</sup> or for being more likely to be **extremely under MVPA targets**.<sup>2</sup>

Statistically not significant:  
 1.  $p < 0.104$   
 2.  $p < 0.3944$

## Gender and Moderate to Vigorous Activity (MVPA)

### Gender & OP



There was a **slight but consistent difference** (1-5%) by gender for all measures.

There was no statistically significant difference between the genders to **meet MVPA targets**.<sup>1</sup>

However **females** were significantly more likely to be **extremely under MVPA targets**.<sup>2</sup>

These results partially replicate OPS2 findings.

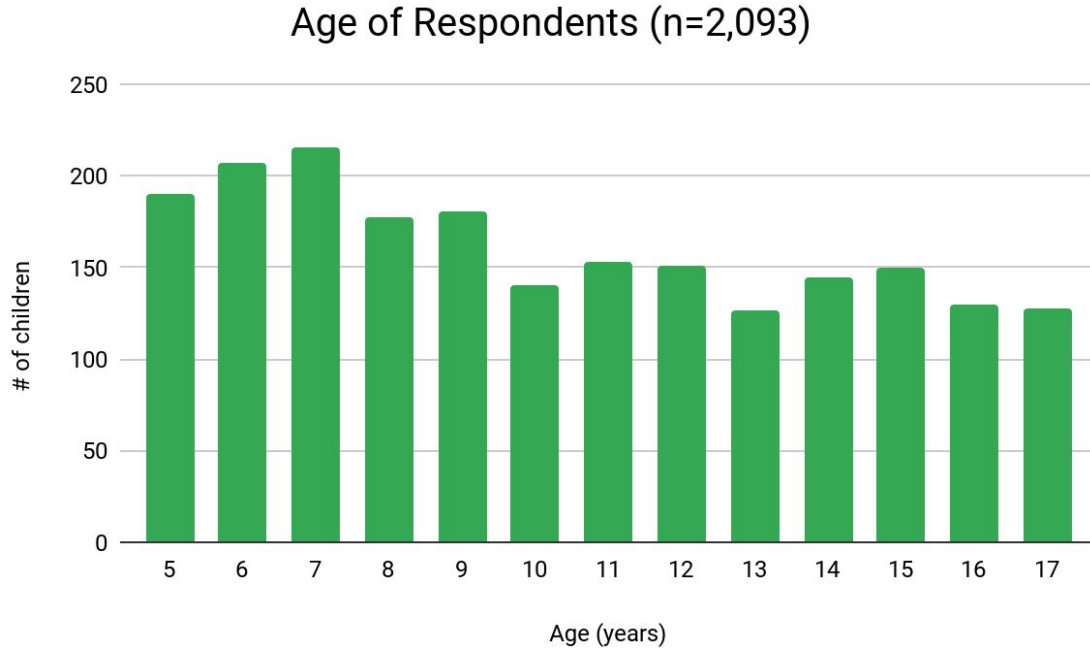
Statistically significant:  
1.  $p < 0.208$   
2.  $p < 0.0115$





2. Age

## Breakdown by Age



There was an almost uniform, but slightly right-skewed **distribution of ages** among respondents, with younger **children** (ages 5-11) making up the **majority** (61%) of the sample compared to **youth** (ages 12-17) making up only 39%.

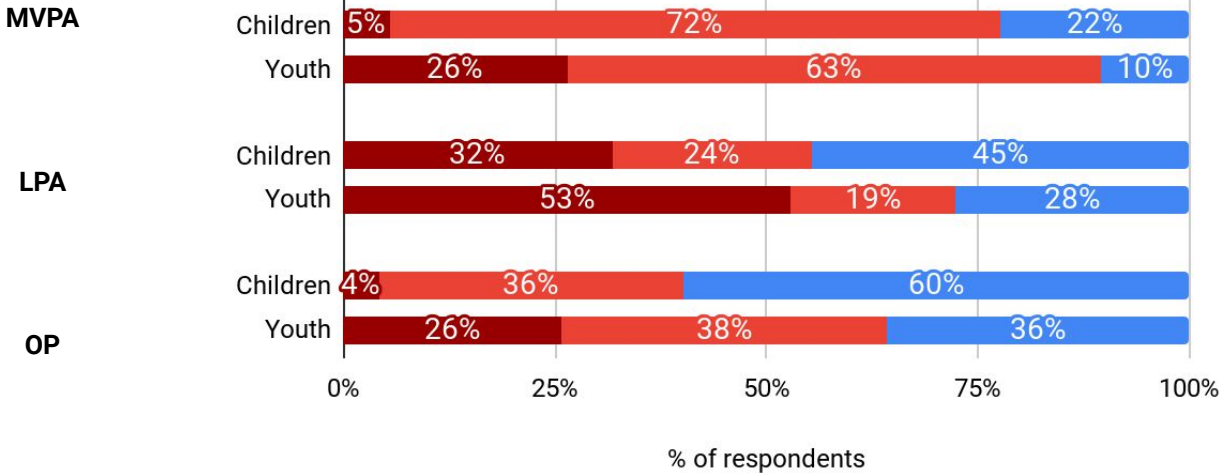
## Comparing Age Groups

Ages 5-11 (children)

Ages 12-17 (youth)

### Physical Activity & Outdoor Play by Age Group

Extremely under target Under target Meeting target



Overall, **youth** (ages 12-17) engaged in **significantly less<sup>1</sup>** physical activity & outdoor play than children (ages 5-11), for **all measures**.

For example, only **1 in 20** children were **extremely under target** for MVPA and OP, compared to **1 in 4** youth.

Statistical Significance  
1.  $p < 2.2e-16$



### 3. Parental factors

## Parental factors

Based on Maximum City's previous research, we picked 6 characteristics to investigate:



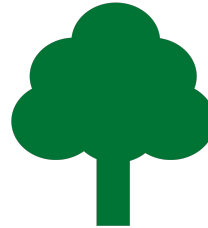
**Depression**



**Anxiety**



**Change in  
physical  
activity**



**Change in  
time spent  
outdoors**



**Concern  
about  
managing  
screen time  
at home**



**Concern  
about  
COVID-19's  
impact on  
education**



# Parental depression

Parents filled out the CESD-10 questionnaire, which measures depressive symptoms.

If they scored above a certain threshold, they met the diagnostic criteria for depression.

## CESD-10 questionnaire

(Center for the Epidemiological Studies of Depression, 10-item scale)

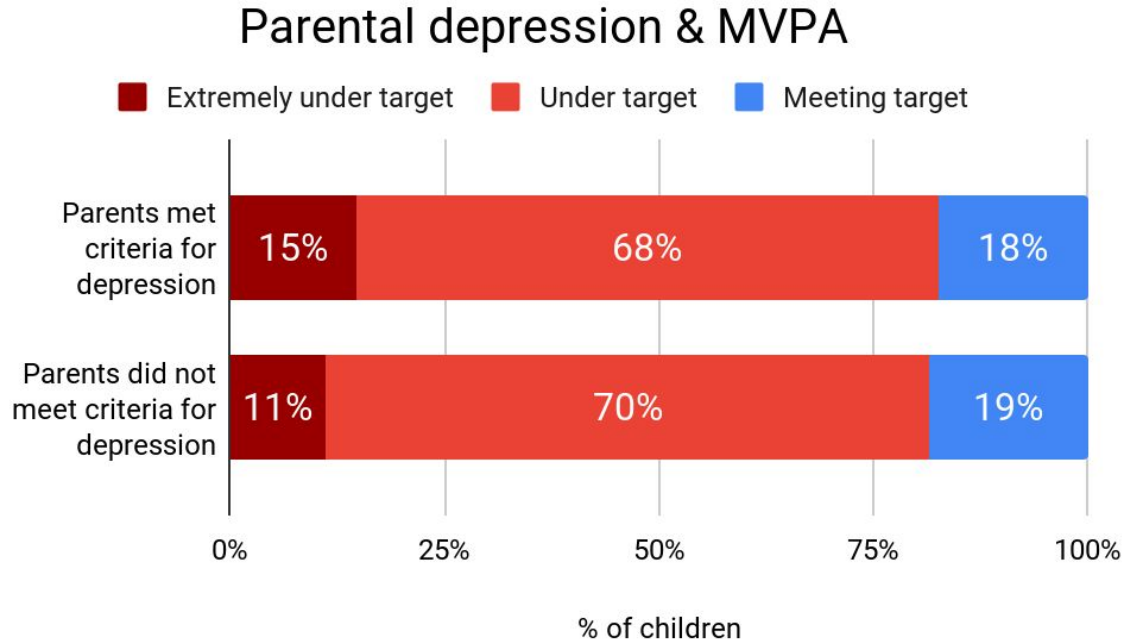
Example questions:

- How often did you feel hopeful about the future?
- How often did you feel that you could not “get going”?

See Appendix B for more information about the CESD-10 depression scale.



## Parental depression and Moderate to Vigorous Physical Activity (MVPA)



Similar to gender, there was a **slight but consistent difference** (2-4%) by parental depression for all measures.



Children whose parents **met the diagnostic criteria for depression** were more likely to be **extremely under MVPA targets**.<sup>1</sup>

However, unlike our findings from OPS2, they did not significantly differ in their likelihood to **meet MVPA targets**.<sup>2</sup>

Statistical Significance:

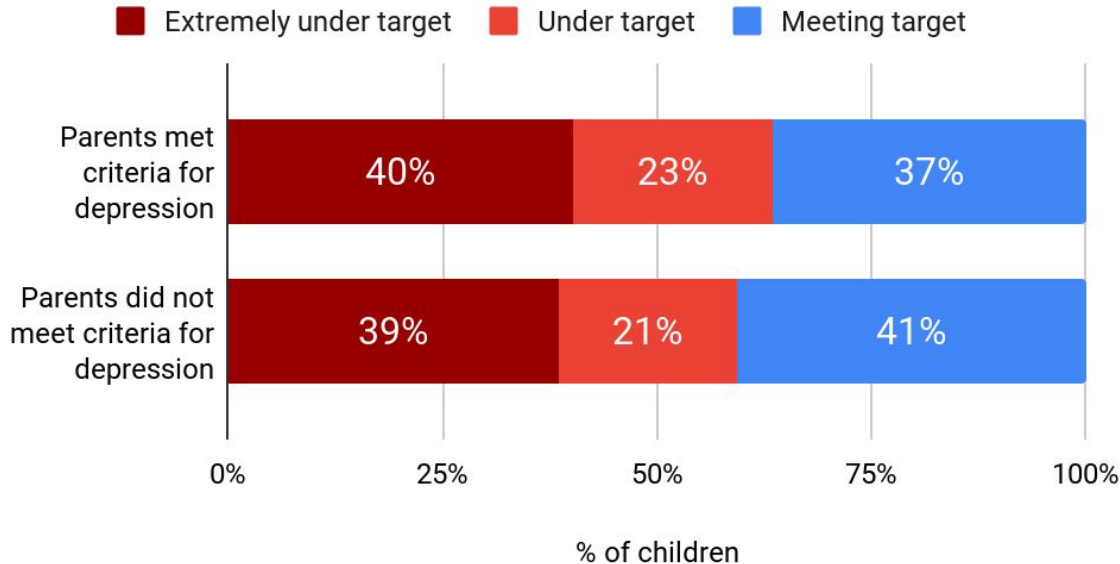
1.  $p < 0.02298$

2.  $p < 0.5692$

## Parental depression and Light Physical Activity (LPA)



### Parental depression & LPA



The trend continued for LPA.

However, unlike in our findings from OPS2, children whose parents **met the diagnostic criteria for depression** did not significantly differ in their likelihood to be **extremely under MVPA targets**<sup>1</sup> or to **meet MVPA targets**.<sup>2</sup>

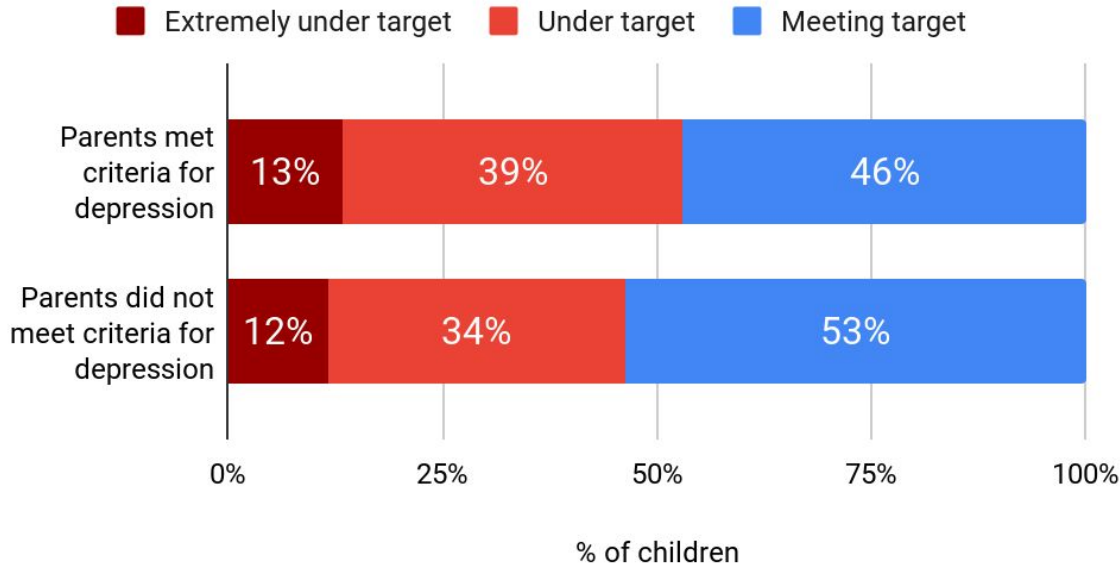
Statistical Significance:  
1.  $p < 0.4717$   
2.  $p < 0.06656$



## Parental depression and Outdoor Play (OP)



### Parental depression & OP



The trend continued for OP and replicated our findings from OPS2.

Children whose parents **met the diagnostic criteria for depression** were not significantly more likely to be **extremely under MVPA targets**<sup>1</sup> but significantly less likely to **meet MVPA targets**.<sup>2</sup>

Statistical Significance:  
1.  $p < 0.204$   
2.  $p < 0.0027$



# Parental anxiety

Parents filled out the GAD-7 questionnaire, which measures anxiety symptoms.

Based on the cumulative score, respondents were then categorized into different severity levels of anxiety.

## GAD-7 questionnaire

(General Anxiety Disorder, 7-item scale)

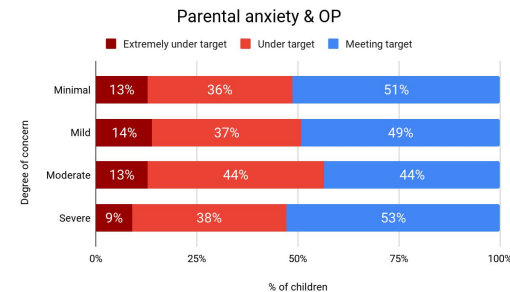
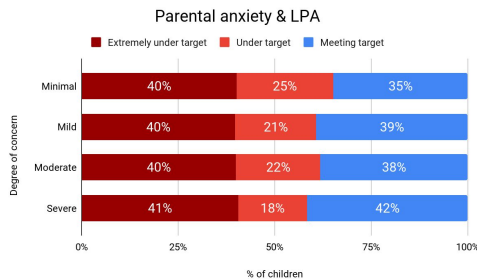
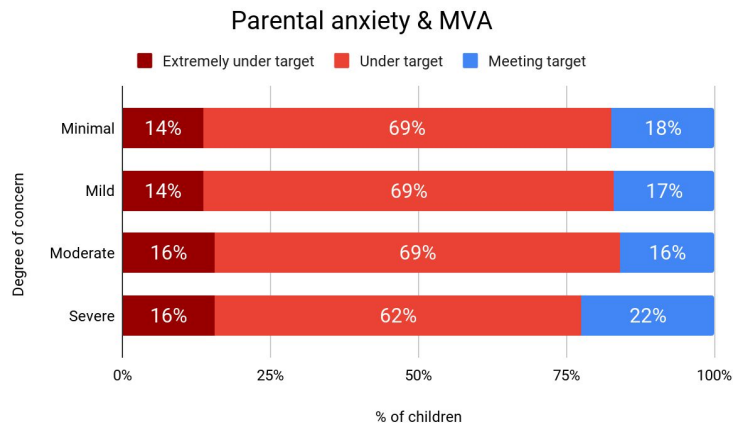
Example questions:

- Over the last 2 weeks, how often have you been bothered by the following problems?
  - Feeling nervous, anxious or on edge
  - Not being able to stop or control worrying

See Appendix C for more information about the GAD-7 anxiety scale.



## Parental anxiety and Physical Activity



There was **no statistically significant trend** between parental anxiety scores and physical activity levels.<sup>1</sup> This replicates findings from OPS2.



# Parental increase in physical activity

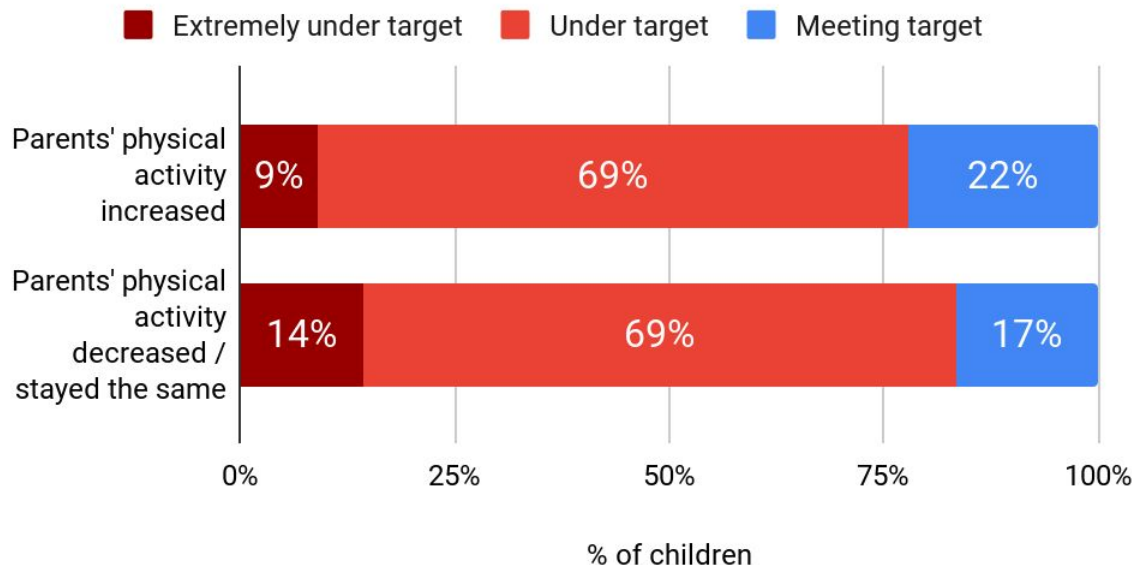
Survey question:

Since the beginning of the COVID-19 pandemic, have you experienced: **increase in exercise or physical activity?**

## Parental physical activity and Moderate to Vigorous Activity (MVPA)



### Parental physical activity & MVPA



This factor was consistently associated with **moderate differences** (5%) in children's MVPA levels.

Children whose parents' **physical activity increased** during COVID-19 were more likely to **meet MVPA targets**,<sup>1</sup> and less likely to be **extremely under target**.<sup>2</sup> This replicates OPS2 findings.

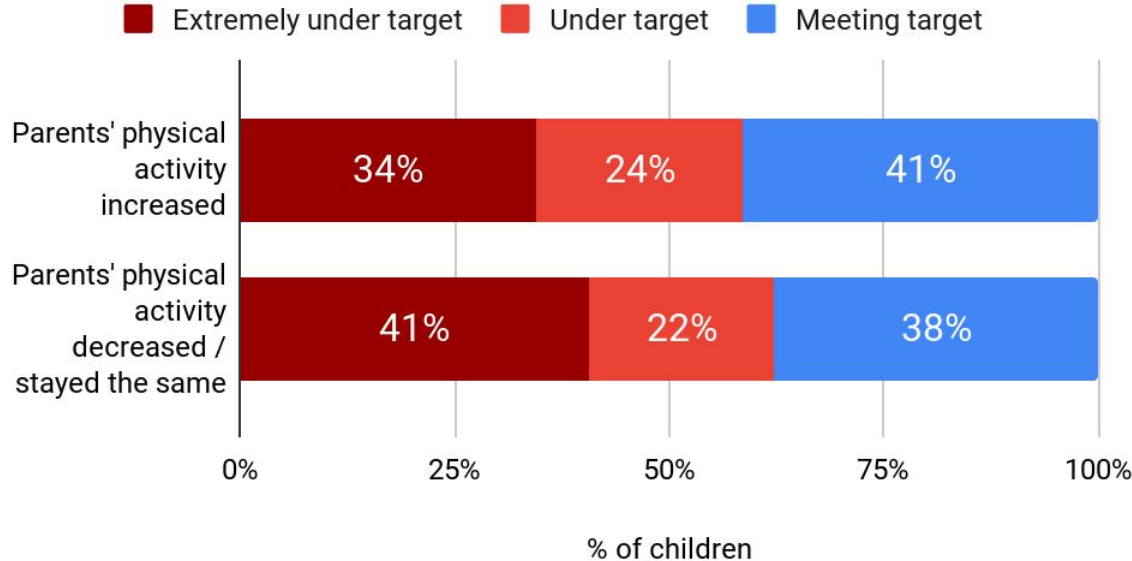
Statistically significant:

1.  $p < 0.002345$

2.  $p < 0.004028$

## Parental physical activity and Light Physical Activity (LPA)

### Parental physical activity & LPA



This factor was consistently associated with **large differences** (7-14%) in children's MVPA levels.

Children whose parents' **physical activity increased** during COVID-19 were less likely to be **extremely under target**.<sup>1</sup> They were also more likely to **meet LPA targets**, however this result was not statistically significant.<sup>2</sup>

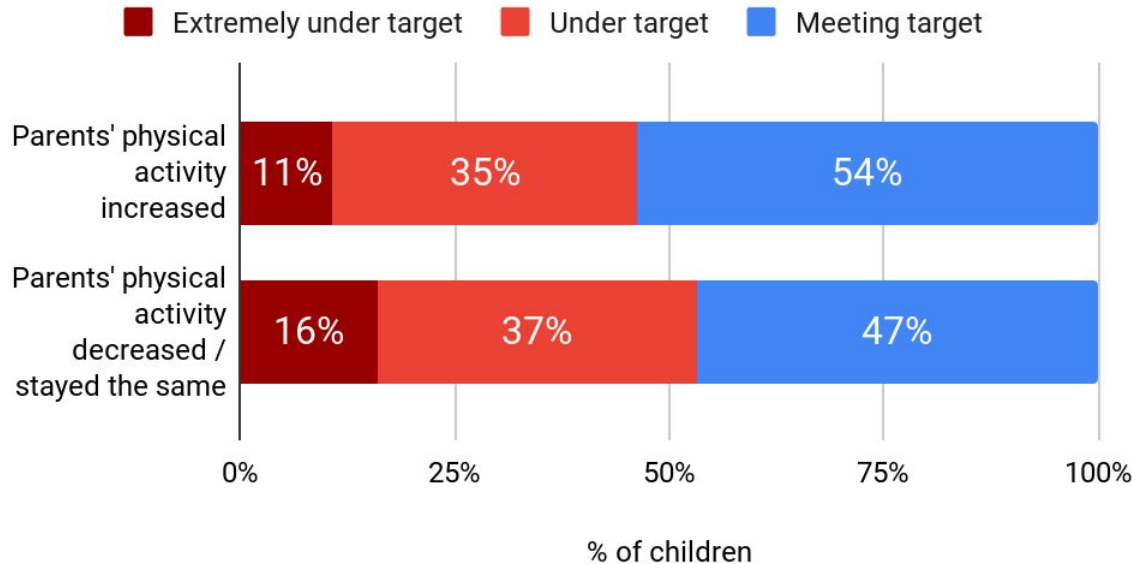
These results only partially replicate OPS2 findings.

Statistical Significance:  
 1.  $p < 0.01032$   
 2.  $p < 0.135$

## Parental physical activity and Outdoor Play (OP)



### Parental physical activity & OP



Children whose parents' **physical activity increased** during COVID-19 were significantly more likely to **meet OP targets**,<sup>1</sup> and less likely to be **extremely under target**.<sup>2</sup>

This replicates OPS2 findings.

Statistically significant:  
1.  $p < 0.005877$   
2.  $p < 0.003717$



# Parental increase in outdoor time

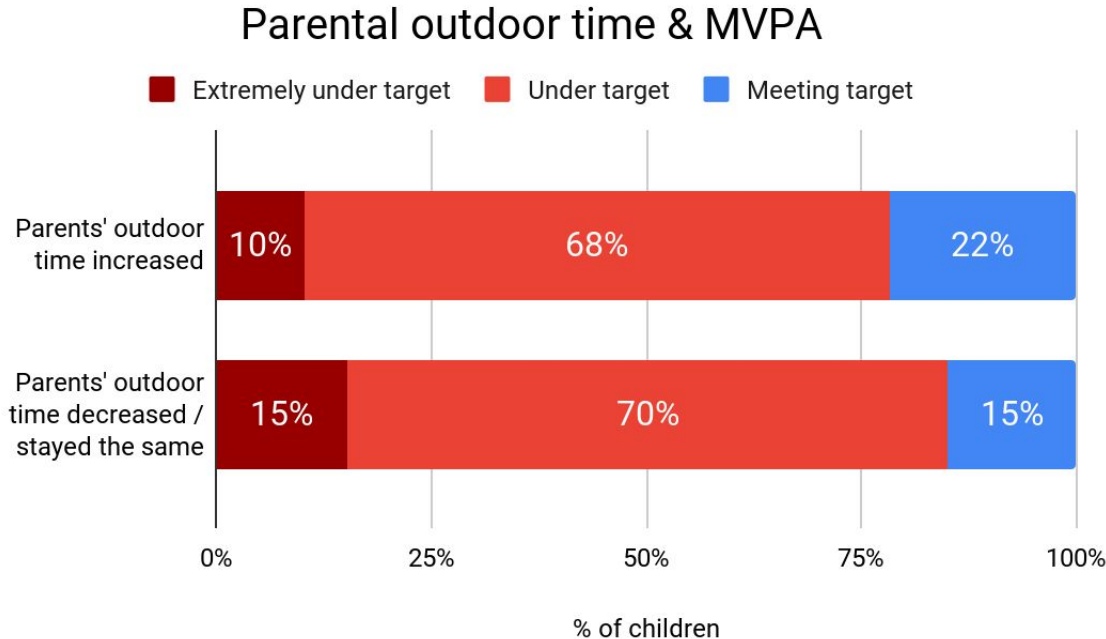
## Survey question:

Since the beginning of the COVID-19 pandemic, have you experienced: **more time in nature/being outdoors?**





## Parental time spent outdoors and Moderate to Vigorous Activity (MVPA)



This factor was consistently associated with **moderate differences** (5-7%) in children's MVPA levels.

Children whose parents' **outdoor time increased** during COVID-19 were more likely to **meet MVPA targets**,<sup>1</sup> and less likely (10%) to be **extremely under target**.<sup>2</sup> While this replicates OPS2 findings, the magnitude of difference is not as large in OPS3.

Statistically significant:

1.  $p < 4.565e-05$

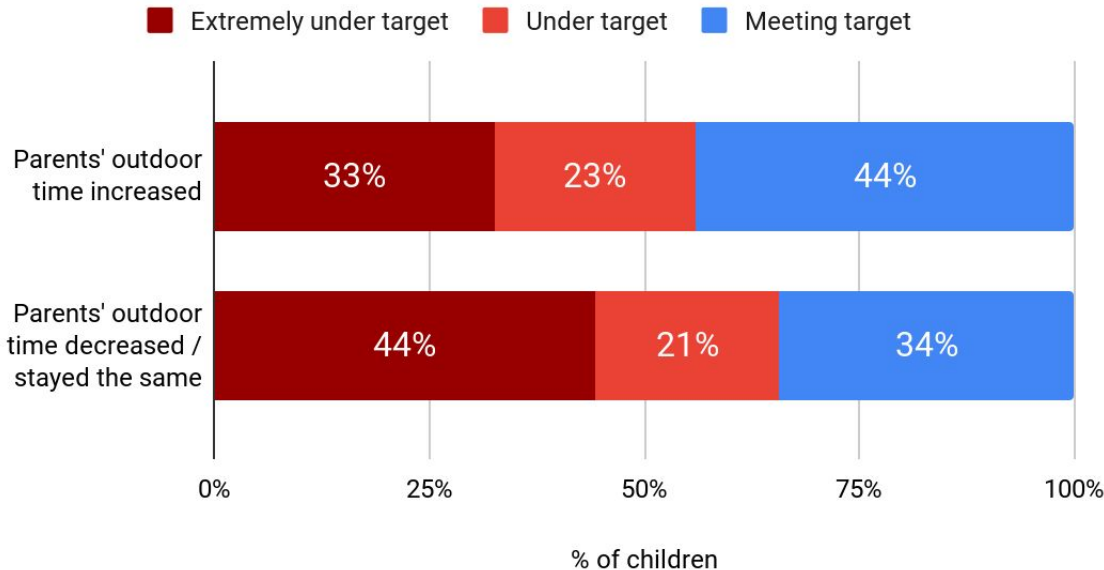
2.  $p < 0.0005507$



## Parental time spent outdoors and Light Physical Activity (LPA)



### Parental outdoor time & LPA



Children whose parents' **outdoor time increased** during COVID-19 were *much* more likely (10%) to **meet LPA targets**.<sup>1</sup>

They were also *much* less likely (11%) to be **extremely under LPA targets**.<sup>2</sup>

This replicates OPS2 findings.

Statistically significant:

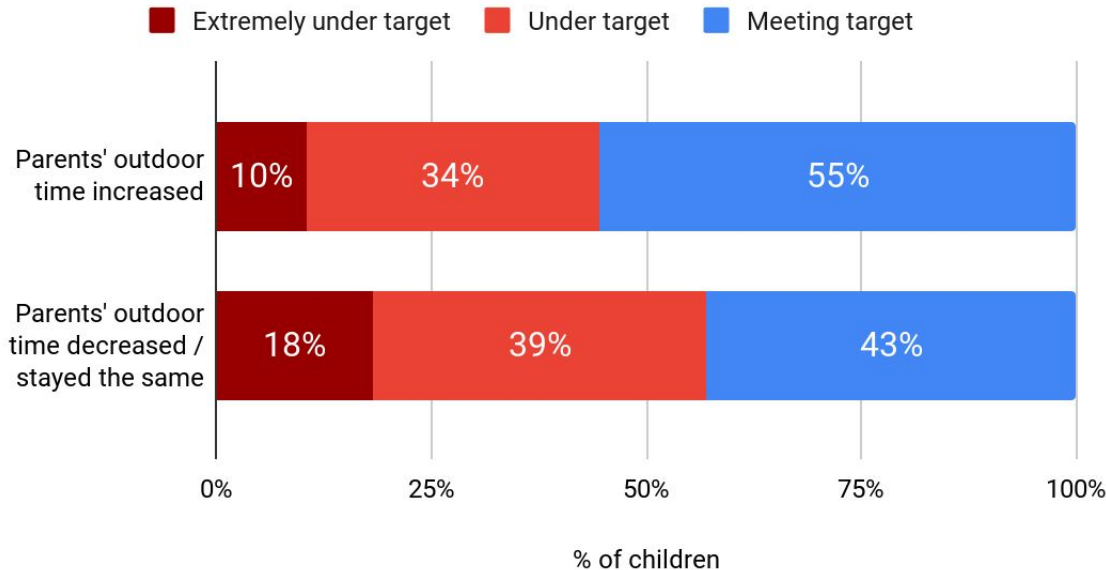
1.  $p < 5.581e-06$

2.  $p < 4.691e-08$

## Parental time spent outdoors and Outdoor Play (OP)



### Parental outdoor time & OP



Children whose parents' **outdoor time increased** during COVID-19 were *much* less likely (8%) to be **extremely under OP targets**.<sup>1</sup>

They were also *much* more likely (12%) to **meet OP targets**.<sup>2</sup> Apart from age, this is the **largest difference** among all outcomes.

Statistically significant:

1.  $p < 1.084e-06$

2.  $p < 1.379e-08$



# Parental concern about COVID-19's impact on education

Survey question:

How much does this statement apply to you?

"I am concerned about the **impact of COVID-19 on my child(ren)'s learning/education.**"

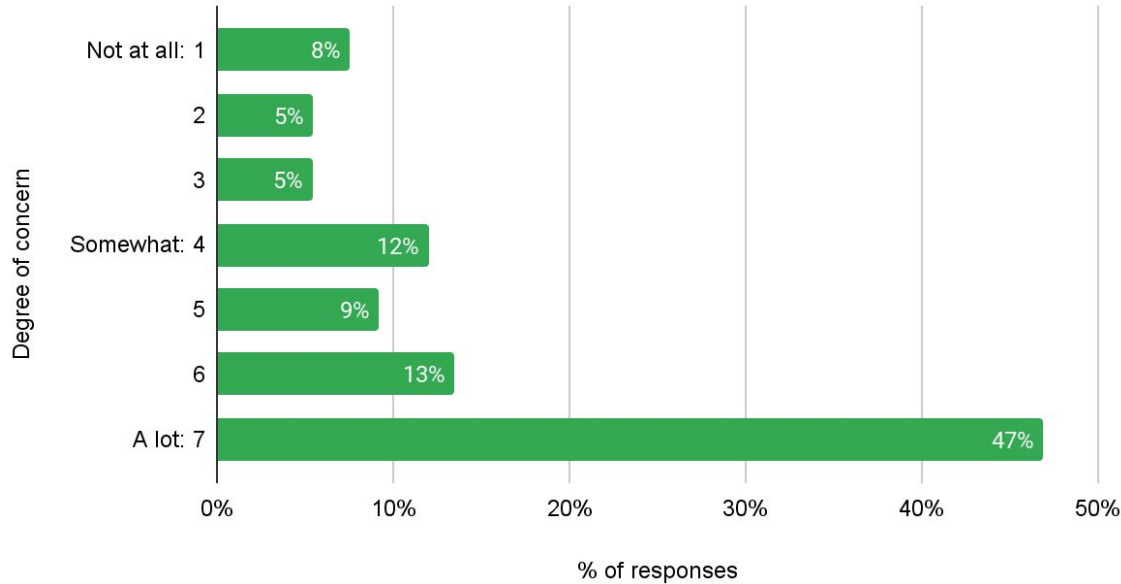
- 1 - "Not at all"
- 4 - "Somewhat"
- 7 - "A lot"



## Parental concern about COVID-19's impact on education - responses



### Parental concern about COVID-19's impact on education

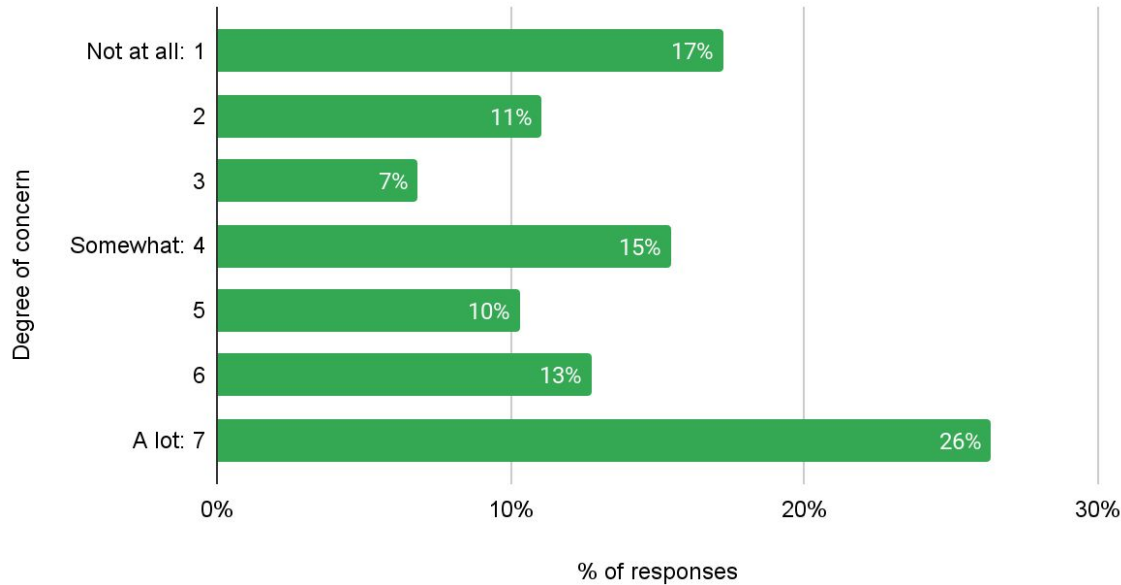


In 2021 (OPS2), most parents (47%) were **concerned “a lot”** about COVID-19's impact on their child(ren)'s education.

## Parental concern about COVID-19's impact on education - responses



### Parental concern about COVID-19's impact on education



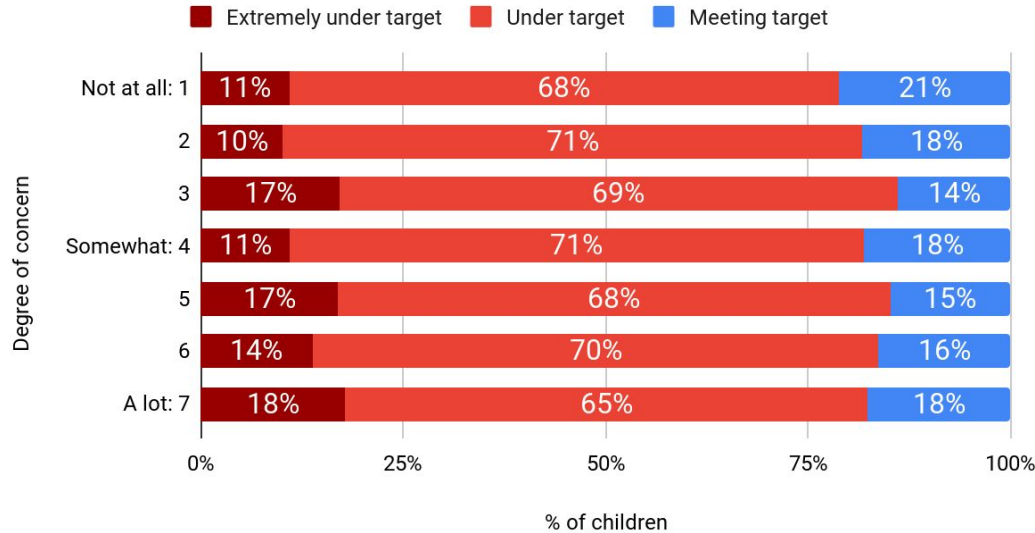
In 2022 (OPS3), only 26% of parents were **concerned "a lot"** about COVID-19's impact on their child(ren)'s education, and this decrease of 21% is statistically significant<sup>1</sup>, indicating a shift in attitude in the later stages of the pandemic.

Statistically significant:  
1.  $p < 0.005$

## Parental concern about COVID-19's impact on education and Moderate to Vigorous Activity (MVPA)



### Parental concern about education & MVPA



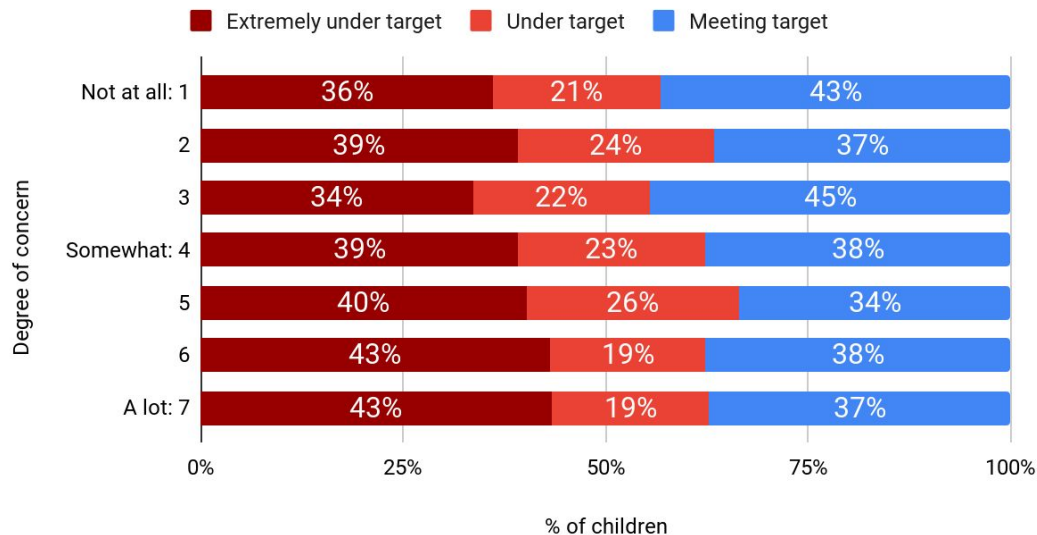
While statistically there is a significant trend<sup>1</sup>, practically we can only observe a minimal difference in parental concern across the target categories.

Statistically significant:  
1.  $p < 0.007356$

## Parental concern about COVID-19's impact on education and Light Physical Activity (LPA)



### Parental concern about education & LPA

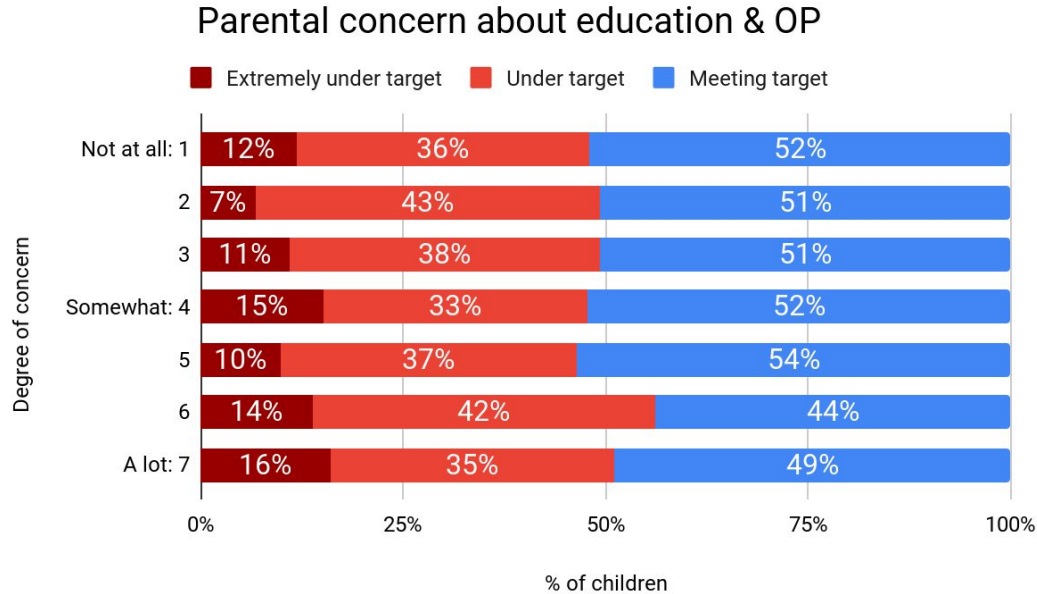


Again, children whose parents were **more concerned** about COVID-19's impact on education were less likely to **meet LPA targets** and more likely to be **extremely under target**<sup>1</sup>, but this trend only appears minimal and is not straightforward.

Statistically significant:  
1.  $p < 0.02334$



## Parental concern about COVID-19's impact on education and Outdoor Play (OP)



For OP, there seems to be no statistically significant trend of parental concern across the three categories.<sup>1</sup>

Statistical significance:  
1.  $p < 0.06$



# Parental concern about managing screen time

Survey question:

How much does this statement apply to you?

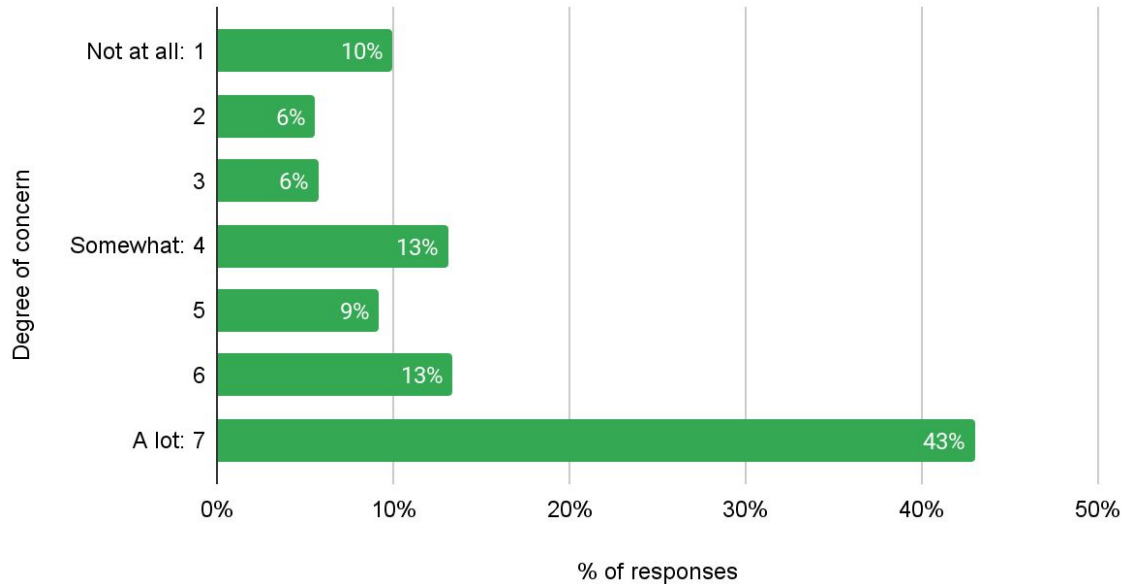
“I am concerned about **managing screen time at home.**”

- 1 - “Not at all”
- 4 - “Somewhat”
- 7 - “A lot”

## Parental concern about managing screen time at home



### Parental concern about managing screen time at home



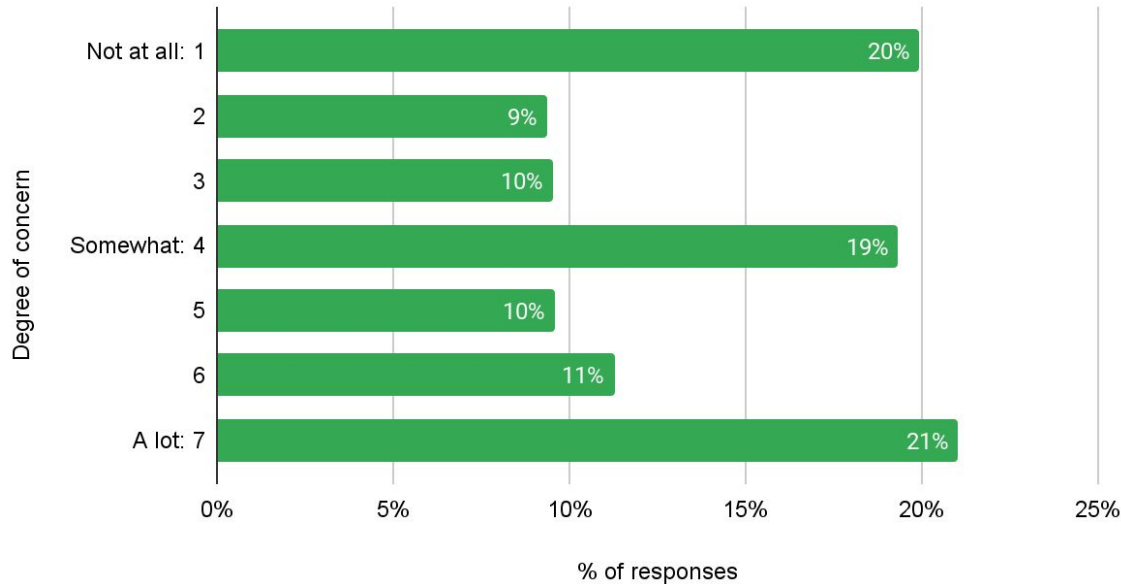
In OPS2 (2021), most parents (43%) were **concerned “a lot”** about managing screen time at home.

The distribution of answers was nearly identical to the answers for “concern about COVID-19’s impact on education”.

## Parental concern about managing screen time at home



### Parental concern about managing screen time at home

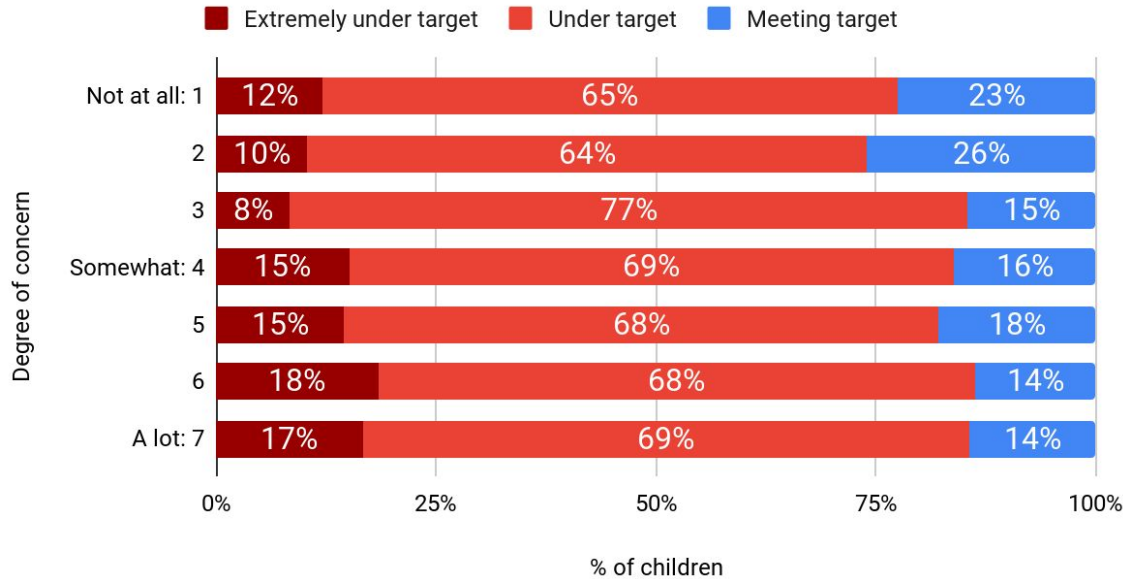


One year later, in OPS3, the responses were significantly more balanced<sup>1</sup>, with only 21% of parents being **concerned "a lot"**.

Statistically significant:  
1.  $p < 0.0004$

## Parental concern about managing screen time at home

### Parental concern about managing screen time & MVPA



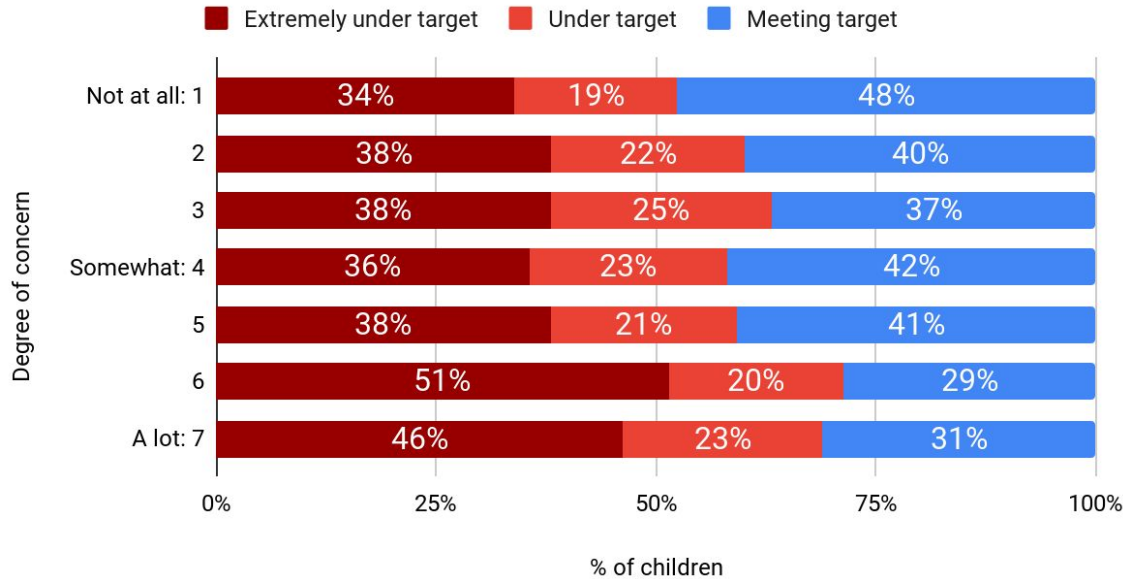
Like in OPS2, the more parents were concerned about managing screen time at home, the more likely to be **extremely under MVPA targets** and the less likely to **meet MVPA targets**.<sup>1</sup>

Statistically significant:  
1.  $p < 0.00027$

## Parental concern about managing screen time at home



### Parental concern about screen time & LPA

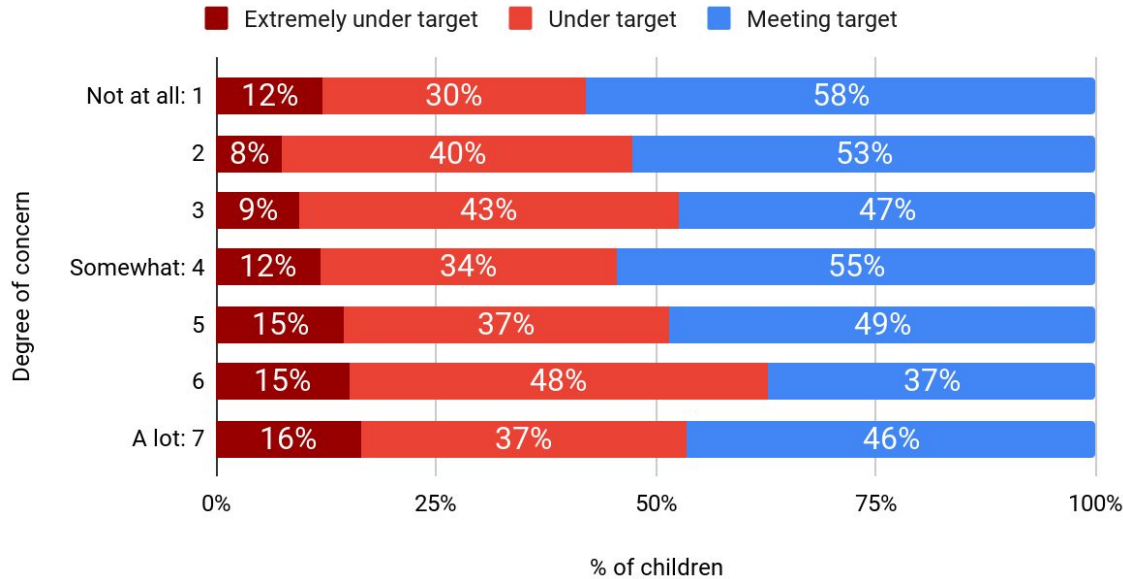


Like in OPS2, the more parents were concerned about managing screen time at home, the more likely to be **extremely under LPA targets** and the less likely to **meet LPA targets**.<sup>1</sup>

Statistically significant:  
1.  $p < 0.0000005$

## Parental concern about managing screen time at home

### Parental concern about screen time & OP



Like in OPS2, the more parents were concerned about managing screen time at home, the more likely to be **extremely under OP targets** and the less likely to **meet OP targets**.<sup>1</sup>

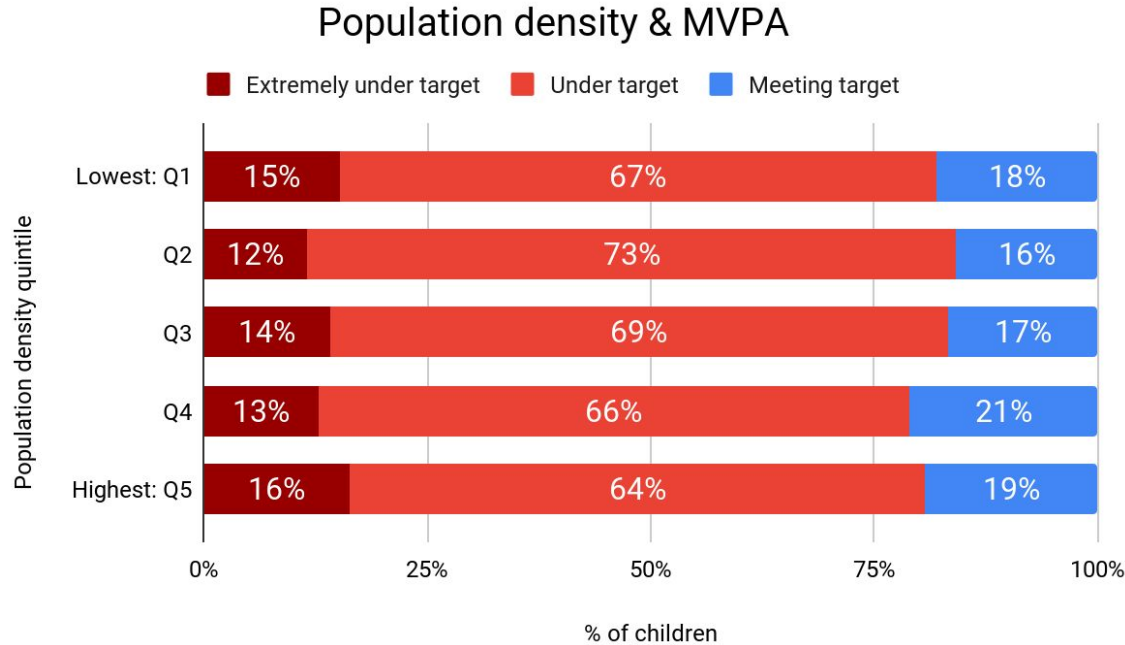
Statistically significant:  
1.  $p < 0.0000005$



## 4. Population density



## Population density and Moderate to Vigorous Activity (MVPA)

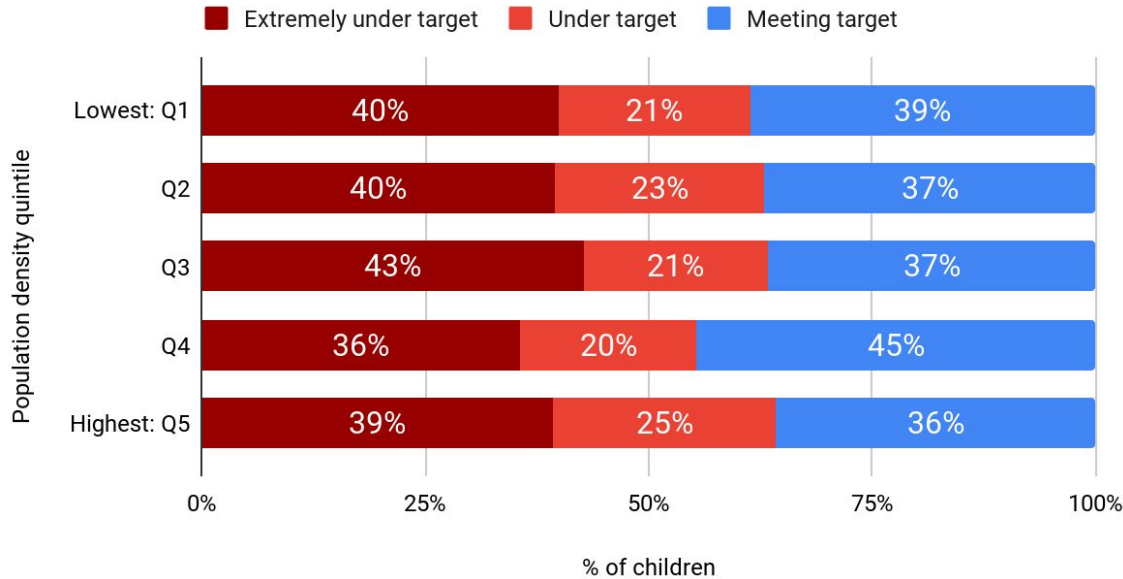


We could *not* observe a statistically significant<sup>1</sup> relationship between population density and MVPA. This contradicts OPS2 results, where there was a clear step-wise difference for this factor.

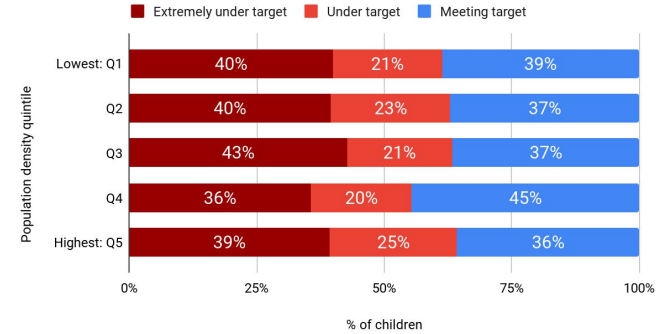
Statistical Significance:  
1.  $p < 0.5211$

## Population density and Light Physical Activity/Outdoor Play (LPA/OP)

### Population density & LPA



### Population density & OP



The same was true for LPA/OP: While in OPS2, we observed a clear trend between population density and LPA/OP, OPS3 data does not allow for the same conclusions.<sup>1</sup>

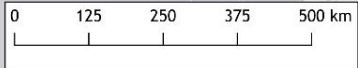
Statistical Significance:  
1.  $p < 0.6486; 0.2786$

### How to read the maps on the upcoming slides

The next few slides contain maps created using QGIS Desktop 3.22.6.

- Each FSA (Forward Sortation Area based on postal code) is coloured according to its population density (from light green to dark green)
- **Red dots** represent FSAs where the average level of physical activity or outdoor play qualifies as **extremely under target**
- **Yellow dots** represent FSAs where the average level of physical activity or outdoor play qualifies as **meeting targets**
- Note that FSAs without any dots (i.e., most of the FSAs) are **under targets** for physical activity or outdoor play. These have been left unmarked for legibility
- Each dot represents an entire FSA - so there might be anywhere from 1 to 91 respondents in that FSA

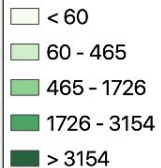
# Average MVPA levels Ontario



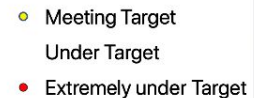
Manitoba

Quebec

## Population Density (people per sq.km)

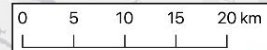


## Average MVPA level



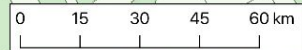
United States of America

# Ottawa Region

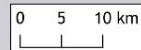


Quebec

# Golden Horseshoe



# Toronto



United States of America

# Average LPA levels Ontario

0 125 250 375 500 km



Manitoba

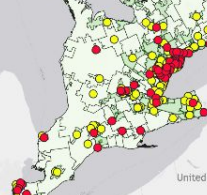
Quebec

## Population Density (people per sq.km)

- < 60
- 60 - 465
- 465 - 1726
- 1726 - 3154
- > 3154

## Average LPA level

- Meeting Target
- Under Target
- Extremely under Target



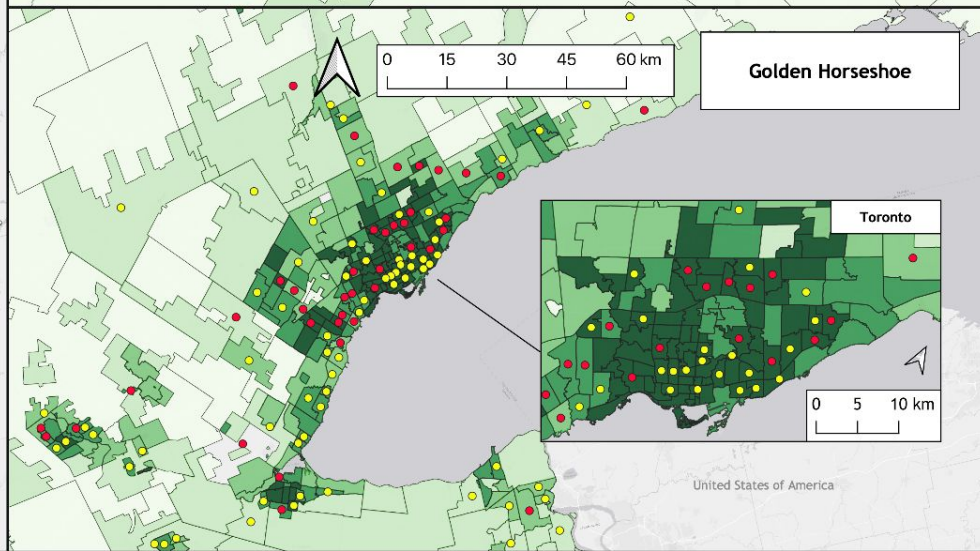
United States of America

0 5 10 15 20 km



# Ottawa Region

Quebec

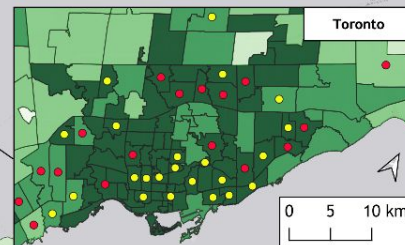


# Golden Horseshoe

0 15 30 45 60 km



# Toronto



United States of America

# Average OP levels Ontario

0 125 250 375 500 km



Manitoba

Quebec

## Population Density (people per sq.km)

- < 60
- 60 - 465
- 465 - 1726
- 1726 - 3154
- > 3154

## Average OP level

- Meeting Target
- Under Target
- Extremely under Target

United States of America

0 5 10 15 20 km

# Ottawa Region

Quebec

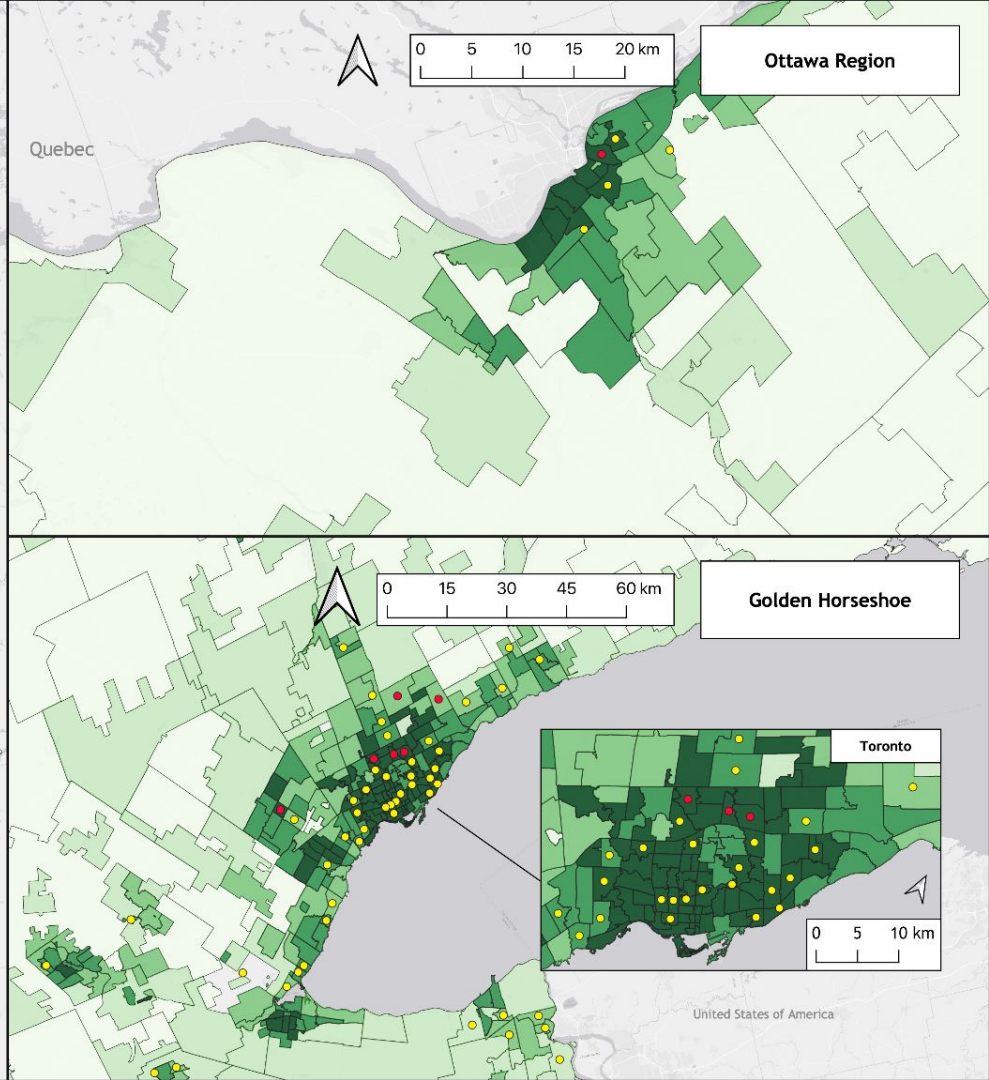
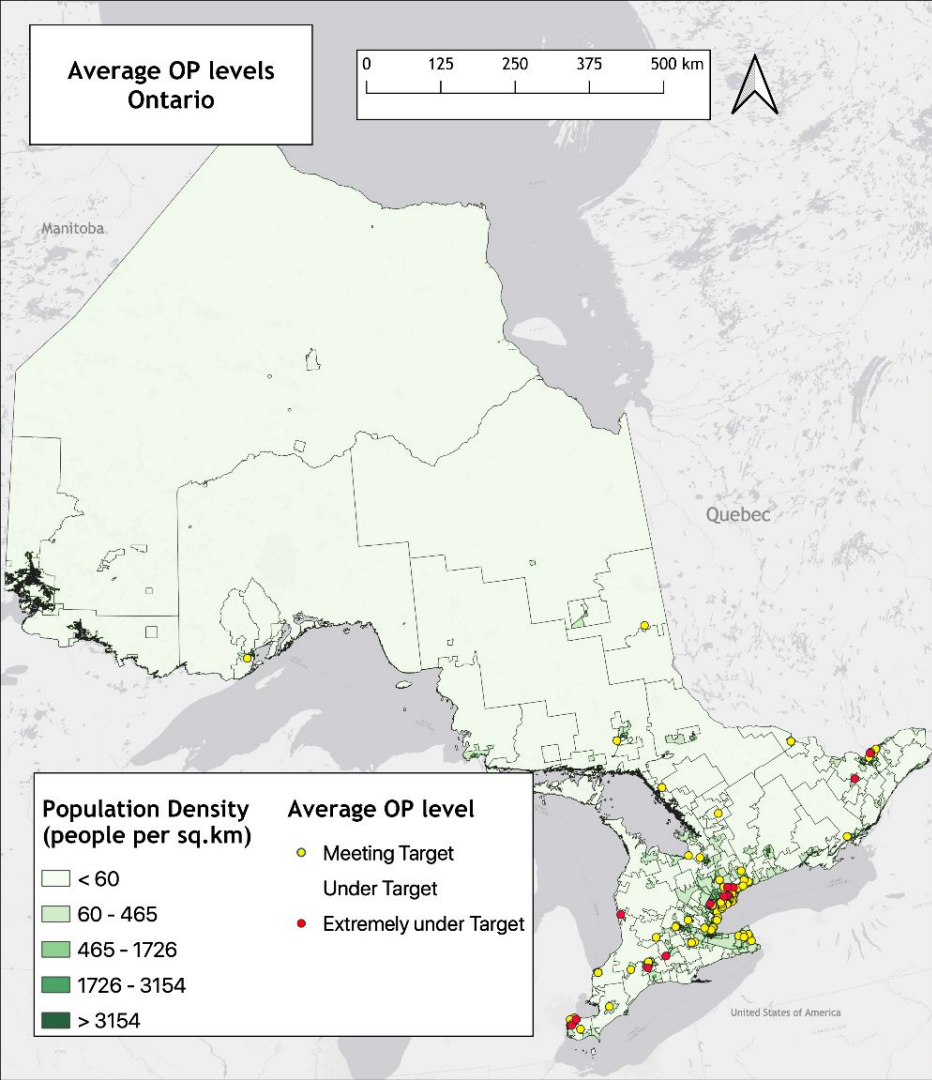
0 15 30 45 60 km

# Golden Horseshoe

Toronto

0 5 10 km

United States of America



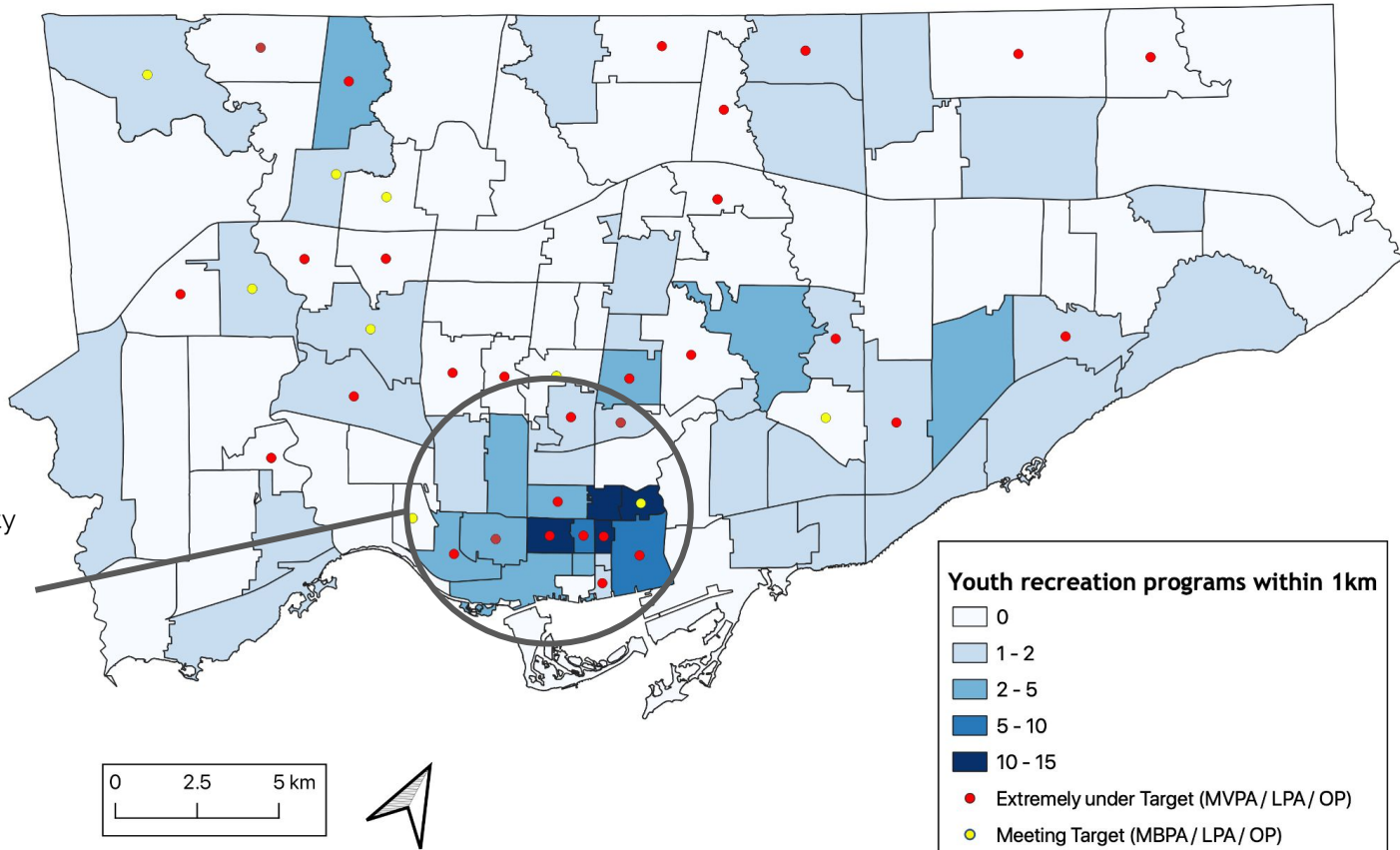
# Possible interpretations

1. At the time of OPS3, most COVID-19 restrictions on recreational and sports facilities were lifted. Consequently, the relationship between the built environment and physical activity (e.g. outdoor spaces, safety concerns etc.) might have been less decisive than in 2021.



# Toronto (2021)

Comparing access to youth recreation programs with physical activity levels

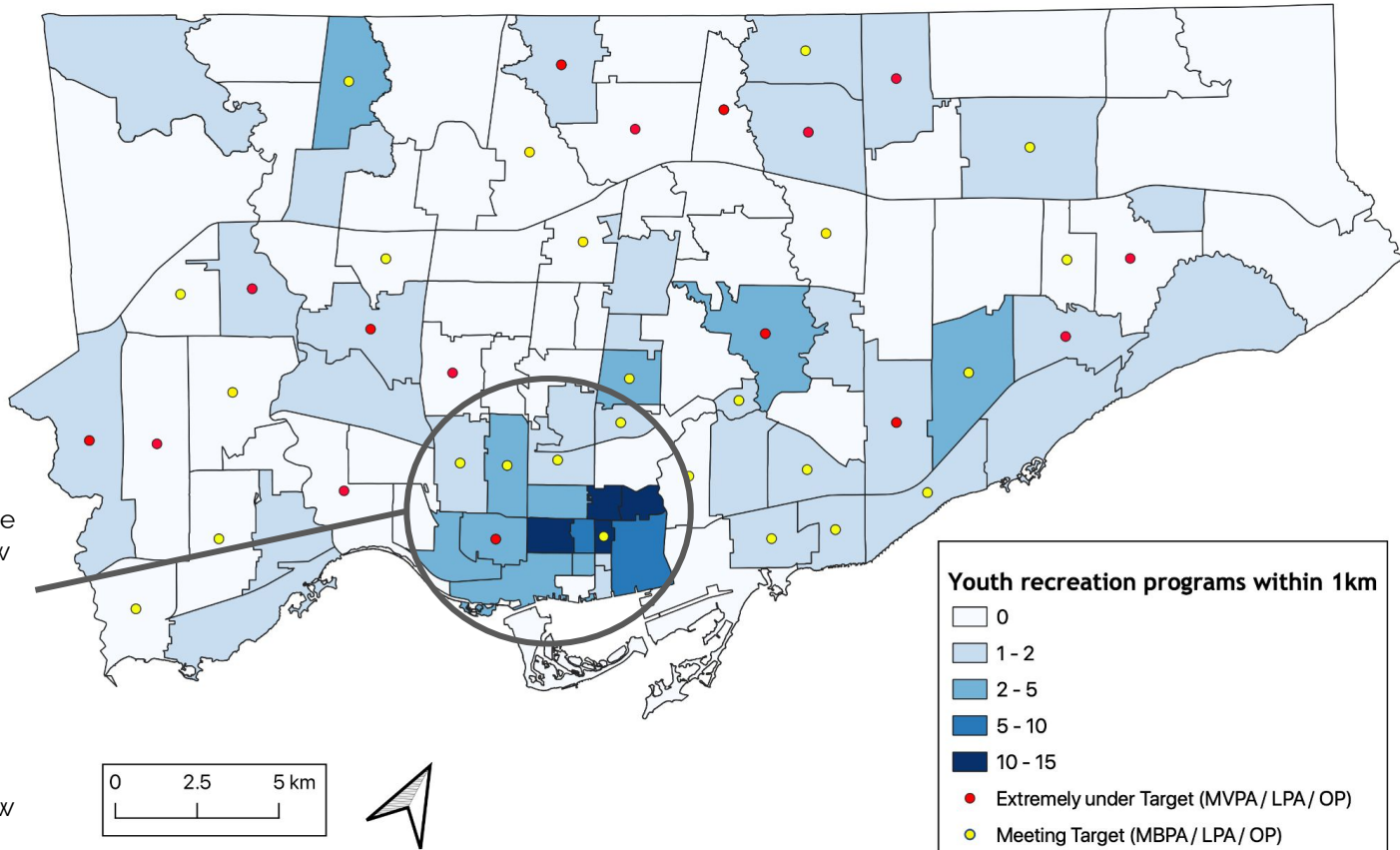


In 2021, high density FSAs in downtown Toronto had many youth recreation programs, while also being extremely under target.



# Toronto (2022)

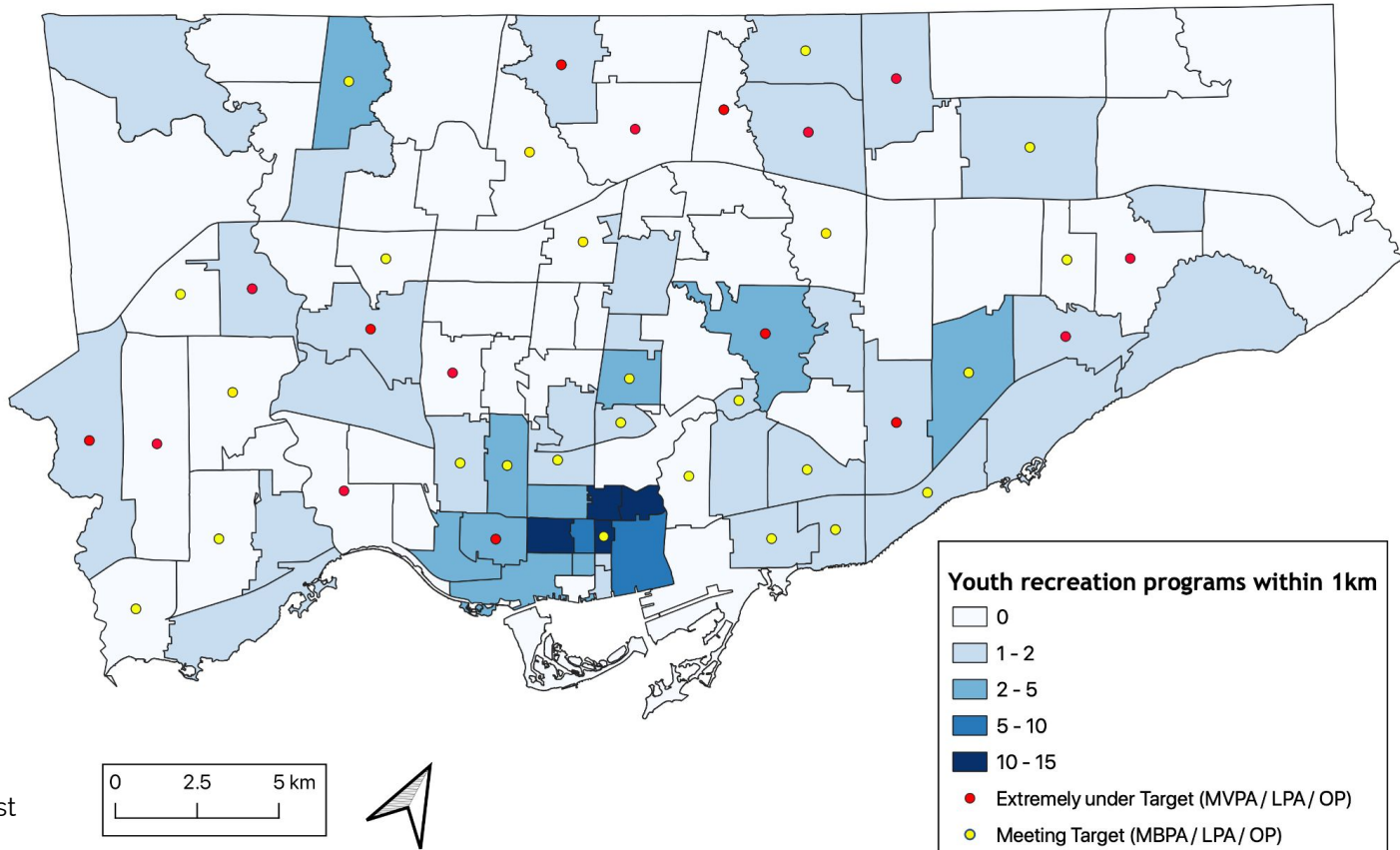
Comparing access to youth recreation programs with physical activity levels



While in 2022, these same FSAs are now either meeting targets or under target. Possibly because the restrictions on available youth recreation programs were now lifted!

# Toronto (2022)

Comparing access to youth recreation programs with physical activity levels



However, this evidence is by no means conclusive. In 2022, there are FSAs extremely under target that were meeting targets in 2021 and vice versa. Other interpretations must still be considered.

# Possible interpretations

1. At the time of OPS3, most COVID-19 restrictions on recreational and sports facilities were lifted. Consequently, the relationship between the built environment and physical activity (e.g. outdoor spaces, safety concerns etc.) might have been less decisive than in 2021.
2. The analytical sample size of OPS3 ( $n=2093$ ) was significantly smaller than that of OPS2 ( $n=7910$ ). Sampling bias and variability could have led to the discrepancy in results.



## Summary of Key Findings

The overall results from OPS3 show:

- **Low levels** of physical activity and outdoor play when measured against recommended standards
  - The **majority** of children and youth **were under target** for MVPA and LPA
  - About **half** of children and youth **were under target** for OP
- **Youth** (ages 12-17) met far fewer targets than children (ages 5-11). In fact, age is the predictor variable with the largest impact on physical activity.
- An **encouraging increase** in activity levels compared to OPS2 with more children and youth meeting targets and fewer being extremely under target



## Summary of Key Differences to OPS2

- Parental depression **is no longer a significant factor** impacting physical activity
- Parental concern about COVID-19's impact on education decreased and **is no longer a significant factor** impacting physical activity or outdoor play
- Population density appears to be **no longer a significant factor** impacting physical activity or outdoor play



## Conclusion

- **Gender, Age, and parental factors** (physical activity, outdoor time, concern about screen time) are related to physical activity and outdoor play.
- Particular attention must be paid towards youth between the ages 12-17.
- The lifting of pandemic-related restrictions in the built environment and the educational space may have improved overall physical activity and outdoor play levels.



# Appendices

- [1. Appendix A: Ontario Parent Survey - Methodology \(64\)](#)
- [2. Appendix B: Depression Scale - CESD 10 \(65\)](#)
- [3. Appendix C: Anxiety Severity Scale - GAD-7 \(66\)](#)
- [4. Appendix D: Population Density Quintiles \(67\)](#)

## Appendix A: Ontario Parent Survey - Methodology

### About the Study

This presentation summarizes findings from specific questions related to child and youth physical activity and outdoor play in the second Ontario Parent Survey (OPS), conducted during the third wave of the pandemic in Ontario. The OPS focused on issues related to the health and well-being of caregivers, their children, family functioning, and the impact of COVID-19 across a number of domains. A report on the broader study can be found [here](#).

### Sampling

A convenience sample of caregivers with children aged 0-17 years was recruited through multiple crowdsourcing techniques – advertisements online and social platforms, as well as email announcements through public health units, Ontario EarlyON Centres, participating school boards, and municipal, community and professional organizations across Ontario. Caregivers from the first OPS (conducted in the spring of 2020) and second OPS (conducted in the spring/summer of 2021) who provided their contact information were also invited to take part in this survey. The survey was available online in both English and French. It is important to note that the crowdsourcing method of data collection does not use a probability sampling design; therefore, findings cannot be generalized to the Ontario population.

From August 24th to November 9th of 2022, a total of 3,049 caregivers participated in the survey, representing over 6,000 children. This presentation analyzes **responses from parents and caregivers** representing the **2,093 children and youth between the ages of 5-17**.



## Appendix B: Depression scale - CESD-10

For the next few questions, please think about how you have felt in the past week. Choose the answer that most applies to how you have felt over the past week...

1. How often were you bothered by things that usually don't bother you?
2. How often did you have trouble keeping your mind on what you were doing?
3. How often did you feel depressed?
4. How often did you feel that everything you did was an effort?
5. How often did you feel hopeful about the future?\*
6. How often did you feel fearful or tearful?
7. How often was your sleep restless?
8. How often were you happy?\*
9. How often did you feel lonely?
10. How often did you feel that you could not "get going"?

Answer scale:

- 0 - "rarely or never (less than 1 day)"
- 1 - "some of the time (1-2 days)"
- 2 - "occasionally (3-4 days)"
- 3 - "all of the time (5-7 days)"

Total score is calculated by finding the sum of 10 items. **Any score greater than or equal to 10 is considered depressed.**

## Appendix C: Anxiety severity scale - GAD-7

Over the last 2 weeks, how often have you been bothered by the following problems?

1. Feeling nervous, anxious or on edge
2. Not being able to stop or control worrying
3. Worrying too much about different things
4. Trouble relaxing
5. Being so restless that it's hard to sit still
6. Becoming easily annoyed or irritable
7. Feeling afraid as if something awful might happen

Answer scale:

- 0 - Not at all
- 1 - Several days
- 2 - More than half the days
- 3 - Nearly everyday

Total score is calculated by finding the sum of 7 items. Anxiety severity is then classified according to the following scheme:

- 0-4 - Minimal anxiety
- 5-9 - Mild Anxiety
- 10-14 - Moderate anxiety
- >15 - Severe Anxiety

## Appendix D: Population density quintiles

	Population Density (population per sq. km)			Example FSAs
Q1	0.000000	-	61.2868	K7A: Smith Falls P9N: Kenora
Q2	61.2869	-	480.0546	N4K: Owen Sound L4K: Concord (Vaughan)
Q3	480.0547	-	1742.0232	L2J: Niagara Falls (North) P6B: Sault Ste. Marie (Central)
Q4	1742.0233	-	3165.4394	L1G: Oshawa (Central) N8X: Windsor (South)
Q5	3165.4395	-	29396.1030	K1N: Ottawa (University of Ottawa) M5A: Old Toronto



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