



**OUTRIDE**

# Riding for Fun, Friends, and Fitness:

Advancing Youth Health and Well-Being  
through Outride's Riding for Focus Program

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We’d like to thank all of our dedicated Riding for Focus Champions for the incredible work they do to bring this program to life across the country!

*Cover Photographer: Eric Arce*



Photographer: Eric Arce

## About Outride

Outride is a 501c3 non-profit and anti-racist organization dedicated to improving the lives of youth through cycling. Outride collaborates with schools, community partners, coaches, teams, and cyclists to advance equitable, inclusive, and healthy futures for youth.

Outride was founded on the belief that cycling and well-being are connected. Back in 2012, we asked the question: “Can cycling impact learning, health, and well-being for kids with ADHD?” We partnered with a small team of neuroscientists and found that “YES!” students who participated in a regular biking program had improvements in attention and mood, as well as in cognitive performance, social relationships, and general emotional and physical health. This study led to the development of Riding for Focus in 2014—and the rest is history.

The belief in the transformative powers of cycling—and the commitment to learning more—remain at the heart of our work. We've expanded our research to understand how bicycling empowers youth and improves their mental and physical well-being, and continue to support the important work on the impact of cycling on youth with ADHD with our academic research partners.

We recognized a greater role for Outride to play in addressing the inequities in health, opportunity, and access due to the legacy of systemic racism. **We believe bicycles have the power to make lives better — they bring people and communities together, motivate us to become better humans, and help us take advantage of what the world has to offer.**

Bicycles also bring opportunity, agency, freedom, and joy through the power of two wheels. Outride is committed to breaking down barriers so that all kids have access to bikes and safe places to ride.

## Executive Summary

Youth are facing record levels of physical inactivity and mental health issues, exacerbated by COVID-19. Young girls and marginalized populations, including youth of color and youth from low-income communities, disproportionately shoulder the burden of these crises. Cycling provides a means to mitigate many of these negative trends. However, our findings suggest that not all youth have access to bikes or know how to ride, let alone access to safe routes. School-based cycling programs offer one path to get more youth active and pedaling for social, emotional, and cognitive health. Here, we summarize Spring 2021 data from Outride's Riding for Focus (R4F) middle-school cycling program that demonstrates the power of bicycling to engage students, build new skills, and spark interest in continuing to ride beyond the classroom, all while supporting youth physical and mental health. In the report, we share how students are faring, provide benchmarks of student bicycling knowledge and access, how students and teachers respond to the R4F program, and opportunities and recommendations for continuing to engage young people through bicycling.

## What We Did

Outride regularly collects data from students and teachers at R4F schools in order to continually improve its programs and to better understand the impact the program has on students. The data included in this report were collected during the 2021 Winter/Spring semester (January - May 2021), when many schools were starting to return to in-person instruction, while other schools remained in hybrid or remote settings. Middle school students (6th-8th graders) taking part in the R4F program at their school were invited to participate in voluntary pre- and post-program surveys. Teachers were also invited to complete a survey summarizing their experience implementing the program, as well as any successes and challenges they experienced.



*Photography Credit: Outride*

While this information is typically presented at Outride's annual research summit, the need for a written report documenting the impact of youth access to, knowledge about, and perceptions around cycling has become more apparent. Combining elements of standard scientific reports and writing for a general audience, the hybrid format of this report allows us to share our findings in a way that is accessible for all.

**We hope that this report serves as a catalyst to help connect those with an interest in improving the lives of youth and their communities through cycling. Our goal is to build a community of practitioners committed to sharing their learnings, experiences, and expanding cycling opportunities for youth.**

## Key Findings

Not all youth have access to bikes or know how to ride, highlighting **the need for standardized cycling education programming** at a place where all students can access it: school. Whether students did not have access to a bicycle to ride at home was variable across schools, ranging from 9% to 64% of students without access to a bike, with an average of 16.5%.



**Bicycling offers a bright spot** at a time when youth mental and physical health continues to worsen: at baseline, youth who report riding more regularly also report higher levels of mental well-being.



**Students reported higher levels of well-being after participating** in R4F than before participating, with females seeing a 9% boost in well-being scores.



**Students were more likely to report spending fewer hours in front of screens after participating** in R4F compared to before participating. This difference was most dramatic for female students: 81% of females spent more than 2 hours a day on screen time before R4F, this dropped to 73% after R4F.

R4F is highly effective at increasing student excitement and interest in bicycling, and **students across all backgrounds had fun participating** in the middle school cycling education program. 85% of students had fun in the program, with 91% of students showing some level of interest in continuing riding outside of school.



81.5% of students reported being interested in riding with friends. The social component of **bicycling offers a way to connect with others** in real life and to take a break from scrolling on their mobile devices.



Students who had previously participated in R4F report having more bike-riding knowledge and confidence at baseline than students who have not yet participated, suggesting **a retention of knowledge and skills even in the absence of consistent practice and access to school bikes**. 31% of previous R4F participants reported meeting daily physical activity requirements compared to 21% of new R4F students at baseline.



## Introduction

Before the COVID-19 pandemic, high levels of physical inactivity, sedentary behavior, and mental health concerns among young people were already a problem. Only 23% of adolescents in the United States were physically active for the recommended amount of at least 60 minutes each day of the week <sup>(1)</sup>. One in 6 school-aged children was diagnosed with a mental health disorder <sup>(2)</sup>. There also existed stark disparities in the levels of physical activity attained by adolescents from low-income communities and communities of color as well as by female youth compared to males <sup>(3)</sup>. Youth from low socioeconomic status backgrounds were also at a higher risk of developing mental health issues <sup>(4)</sup>. These gaps worsened during the COVID-19 pandemic.

The COVID-19 pandemic led to dramatic changes in the day-to-day lives of individuals across the globe and highlighted existing inequities and disparities across almost every domain. For young people, interruptions to regular school schedules and limited opportunities for in-person social interaction were accompanied by decreases in physical activity and increases in sedentary behavior and screen time <sup>(5, 6, 7, 8)</sup>. The rate of youth experiencing mental health issues has grown so concerning that the U.S. Surgeon General has issued a new advisory to shed light on the growing youth mental health crisis <sup>(9)</sup>. While encouraging families and communities to get outside and engage in physical activity was often promoted as a strategy to boost mental and physical well-being, not everyone had the privilege to follow such guidance. Instead, disparities in opportunities and access to safe environments conducive to physical activity, compounded by additional stressors exacerbated by the pandemic, contributed to widening mental and physical health gaps among youth.

In an effort to reduce these gaps, researchers and practitioners have highlighted the need for increasing equitable access to physical activities and programs that help youth develop the skills and knowledge to engage in physical activity well into adulthood <sup>(10)</sup>. Increasing access to and promoting participation in such programs is particularly important among youth from low socioeconomic status backgrounds, youth of color, and females, as these groups are already less likely to meet physical activity recommendations.

**While physical activity alone cannot solve the mental health crisis, the benefits of engaging in regular physical activity for youth are clear: Improved cognitive function, cardiorespiratory and muscular fitness, and fewer symptoms of depression are just a few <sup>(11)</sup>.**

Furthermore, physical activity habits developed at a young age influence physical activity behavior later in life <sup>(12)</sup>, reducing the risk of negative physical and mental health outcomes over time.

However, increasing access to activities alone is unlikely to lead to meaningful changes in youth physical activity. Youth attitudes around physical activity also play a key role in whether they participate in physical activity later on in life <sup>(13)</sup> – young people have to want to participate in a given activity and enjoy it if we want to see them adopt it long term. Understanding what type of programming leads to the highest levels of youth engagement across all backgrounds is essential to increase participation levels. Programs need to be fun, engaging, and relevant for youth <sup>(14)</sup>. Indeed, “having fun” is one of the top reasons youth participate in organized sports and physical activity, while “not having fun” contributes to lack of participation <sup>(15)</sup>. Concentrating on fun rather than competition may elevate engagement levels from all students.

In addition to focusing on fun, a growing body of work points to the benefits of outdoor and green space activities. Youth tend to engage in more physical activity when outdoors compared to indoors <sup>(16)</sup> and increases in outdoor activity have been associated with decreases in screen time <sup>(17)</sup>. Furthermore, nature-based engagement is associated with positive mental well-being and therapeutic benefits, particularly for those with chronic stress or emotional difficulties <sup>(18)</sup>.

One activity that provides fun, participatory-based exposure to nature and green space is bicycling. Bicycling provides youth with freedom and mobility: allowing them to transport themselves, experience natural or urban settings, and be active. Promoting bicycling and walking to school has also been shown to be effective in increasing physical activity rates among youth <sup>(19)</sup>, and bicycling to school also improves cardiorespiratory fitness <sup>(20)</sup>. Furthermore, youth participation in cycling to school can later affect comfort with cycling as an adult <sup>(21)</sup>, setting youth up to reap health benefits later in life. However, not all

youth have access to bicycles, safe places to ride, or the opportunity to learn how to ride. Indeed, there are large disparities in built environment attributes (e.g., bike lanes, traffic volume and speed) as well as disparities in perceived safety for low-income and communities of color <sup>(22,23,24)</sup>.

Schools can play a unique role in increasing access to bicycles and building up students' safe riding knowledge. Access to safe equipment and a trained instructor is provided by the school, and thus not dependent on the students' socioeconomic means or familial interests. Youth are also provided with a consistent foundation for skill development and safe and confident riding behavior in a controlled setting. Outride's Riding for Focus program is one such program that helps youth get riding during the school day, providing them with an opportunity to go outside, build social connections, take a break from their screens, and engage in regular physical activity they find fun.





## Outride's Riding for Focus Program

Riding for Focus (R4F) is Outride's middle-school-based cycling education program. It is designed to be implemented 3 days a week over 6-8 weeks during Physical Education (PE) class. The curriculum was designed to meet Society of Health and Physical Educators America (SHAPE) standards and was motivated based on learning and skill performance theories commonly used in the domain of Physical Education. The program promotes cycling as a lifelong activity that can act as an outlet for students to improve their cognitive, physical, and socio-emotional well-being. At the end of the program, students become certified as "Road Ready," indicating they have gained the knowledge and learned the skills to cycle safely. The program also has an evaluation component built in, allowing schools to better understand student experience with the program, what aspects of the program are working, and how they can adapt to better meet the needs of their students.

### Did you know...?

Middle schools can apply for a Riding for Focus grant, which includes a fleet of high-quality bicycles, helmets, access to the curriculum, comprehensive teacher training and support, and program evaluation. Grants are prioritized to schools serving marginalized youth (across gender, socioeconomic status and race and ethnicity).



*John Glodek R4F Champion + students at Dr. Martin Luther King, Jr. Middle School*

## Survey Methodology

The data presented here were collected from 20 middle schools (6th-8th grades) participating in the R4F program during the 2021 Winter/Spring semester (January - May 2021). The goals of the R4F surveys were threefold:

1. Understand baseline self-reported student well-being (WHO-5), movement behaviors (physical activity, sleep, screen time), and the associations between them at R4F schools a year into the COVID-19 pandemic, and whether these patterns changed after participating in the R4F program.
2. Report the state of access to bicycles and bicycling knowledge in youth in R4F schools and the different factors associated with access. This data can help identify key areas where more support may be needed.
3. Capture student and teacher perceptions of the R4F program to identify areas for program improvement and to highlight opportunities for continued student engagement in cycling.

The pre- and post-program surveys were a mix of quantitative and qualitative questions that asked about student experience with and interest in cycling, perceptions of school and Physical Education (PE), movement behaviors (sleep, screen time, physical activity), and feelings of positive mental well-being (WHO-5). The post-survey also asked about students' experiences in the R4F program.

Due to the COVID-19 pandemic, there was wide variability in interruptions in school schedules (e.g., moving back to remote learning, then re-opening, then back to remote). As a result, the same sets of students at some schools were not able to complete both pre- and post-R4F surveys. To ensure as many student voices as possible were included in the analysis, we reported the majority of the results from the pre- (baseline data) and post- (student-reported

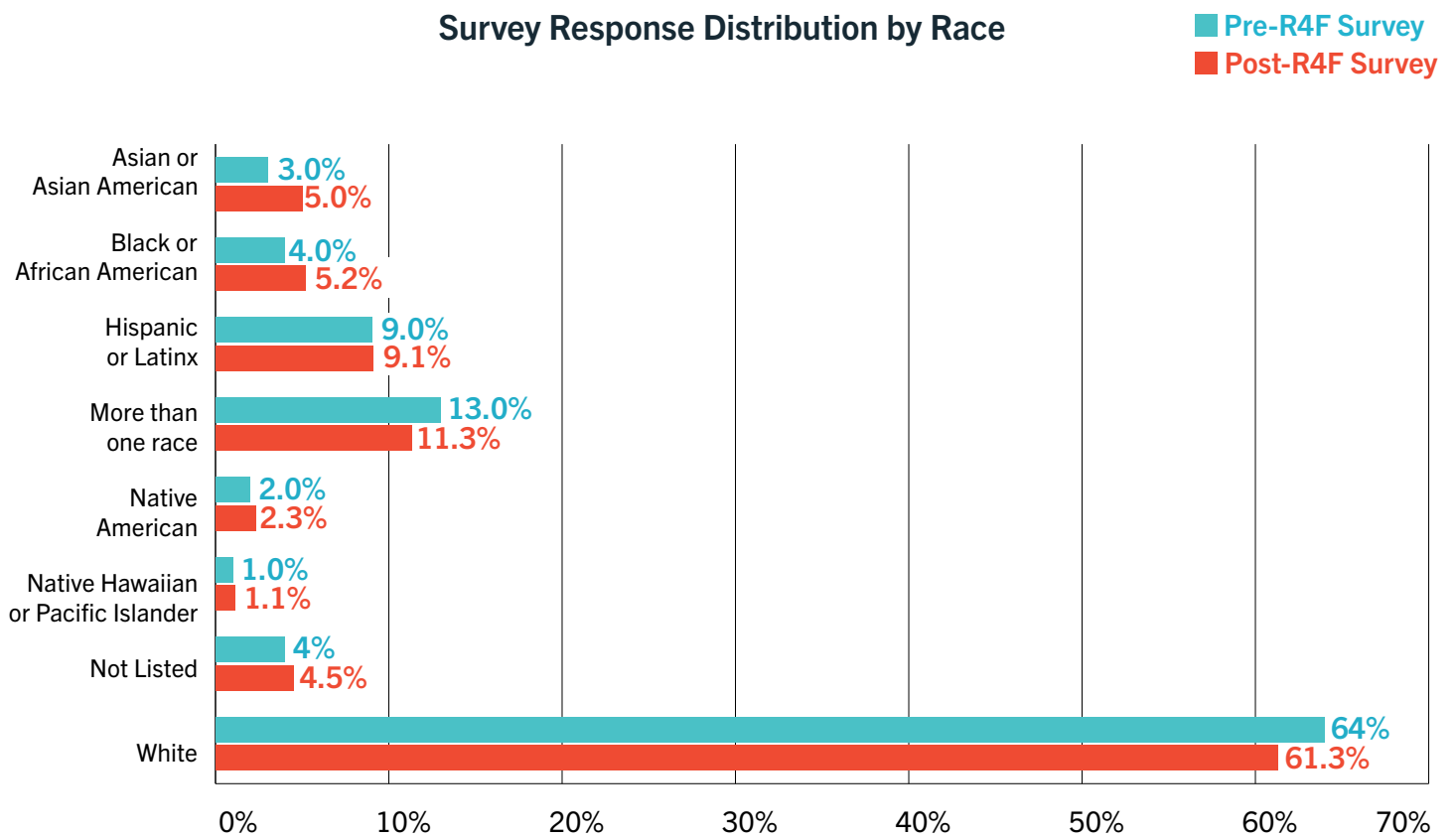
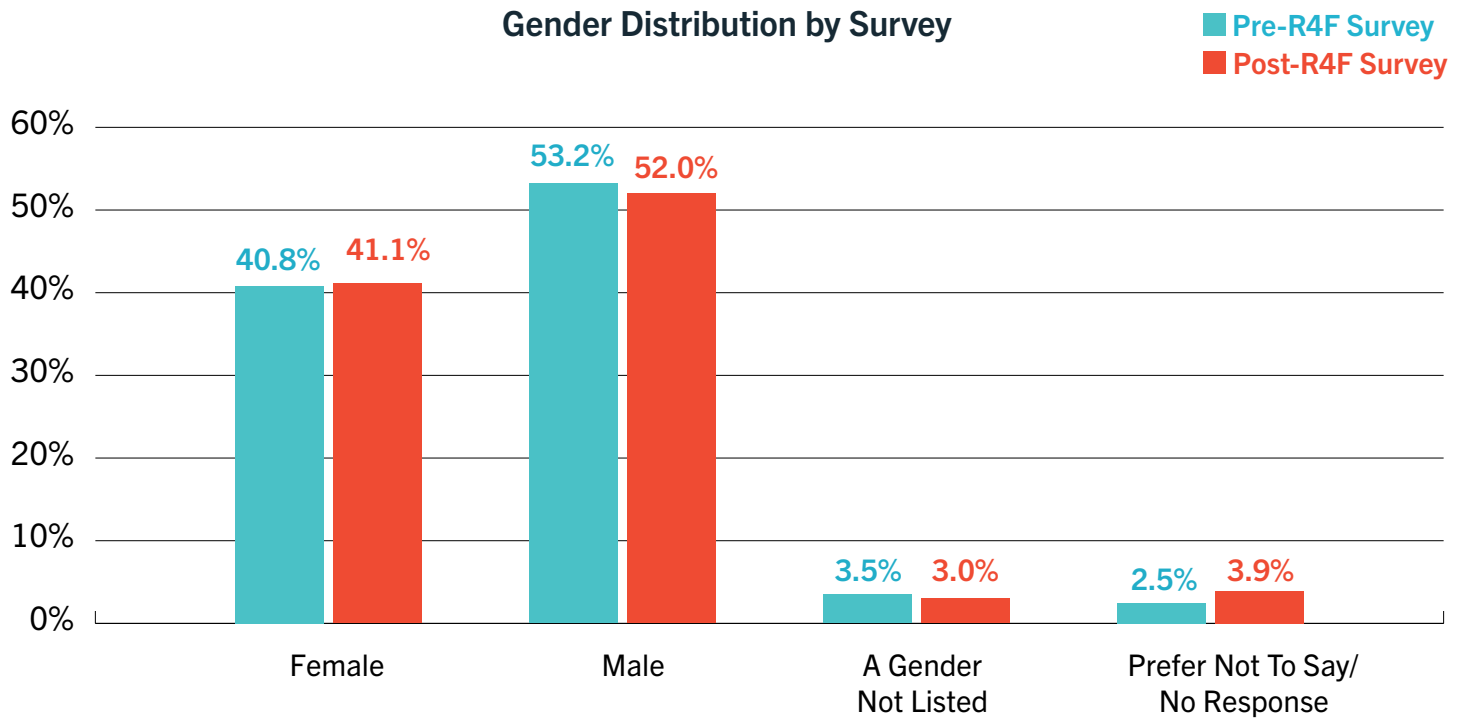
experience with the program) surveys separately, and did not draw comparisons between the two. However, where possible, we did report pre-post comparisons from students at the subset of schools who were able to complete both surveys.

### Survey Sample

In total, there were 1,268 respondents for the pre-survey and 910 for the post-survey across 20 schools. For any direct comparisons that are reported between pre- and post-surveys, only the 12 schools that were able to have the same students complete both sets of surveys were included (pre = 820 students, post = 812 students). A detailed summary of survey respondents, including the distribution of self-reported gender and race, can be found in the appendix.

Analyses in this report included students who self-reported as Asian or Asian American, Black or African American, Hispanic or Latinx, White, and students who selected more than one race or ethnicity. Students who self-reported their race or ethnicity as Native American, Native Hawaiian or Pacific Islander, or a race or ethnicity not listed were not included in statistical analyses due to small sample sizes. For the same reason, analyses including gender will only include comparisons between male and female students. Any differences reported across groups are statistically significant, unless otherwise specified.

Schools participating in the survey were located all across the United States and captured a wide range of communities. Schools were categorized based on their zip codes both by rurality (rural and not rural, based on Federal Office of Rural Health Policy data) as well as by child poverty rate (high: 16.1% or greater child poverty rate, low: less than 16.1% child poverty rate, based on the national average). (See appendix for additional details).





**SECTION I:**  
**Student Well-Being and  
Movement Behaviors**

- Baseline Movement Behaviors and Well-Being
  - Physical Activity
  - Screen Time
  - Sleep
  - Well-Being
- Changes in Well-Being and Movement Behaviors after Participation in R4F

## Baseline Movement Behaviors and Well-Being

Our baseline pre-surveys suggest that higher rates of physical activity, lower levels of screen time, and getting a sufficient amount of sleep are associated with better student well-being, even after taking gender, rurality, child poverty rate, race and ethnicity, and school into account. This is consistent with a large body of research demonstrating the impact of these

behaviors on overall well-being and quality of life<sup>(25)</sup>. However, while these three movement behaviors consistently predict student well-being, there are large disparities in terms of who is meeting the recommended levels of physical activity, sleep, and screen time.

	Definition	Recommendation for Teens
Physical Activity	Any movement of the body that requires expending energy. This is not limited to structured exercise and could include recreation, transportation, or housework.	A total of at least 60 minutes of physical activity each day of the week. (It doesn't have to be all at once!) <a href="#">(CDC)</a>
Screen Time	Any activities done in front of a screen (e.g. watching TV, scrolling on social media). It is considered a sedentary behavior, requiring very little energy use.	An average of 2 hours or less per day of recreational screen time. <a href="#">(CSEP)</a>
Sleep	Sleep is essential for good mental and physical health and is critical in supporting healthy brain function.	At least 8 hours of sleep each night for teens <a href="#">(CDC)</a>
Well-Being	Well-being captures one's overall satisfaction with life and is often associated with positive emotions like happiness and joy and feeling good about life <sup>(26)</sup> .	Many factors contribute to well-being. Getting enough sleep and physical activity each day, while reducing screen time and sedentary behavior are all positively associated with mental well-being. <sup>(27)</sup>



**60 minutes  
of physical activity  
each day of the week**



**Less than 2 hours  
of screen time  
per day**

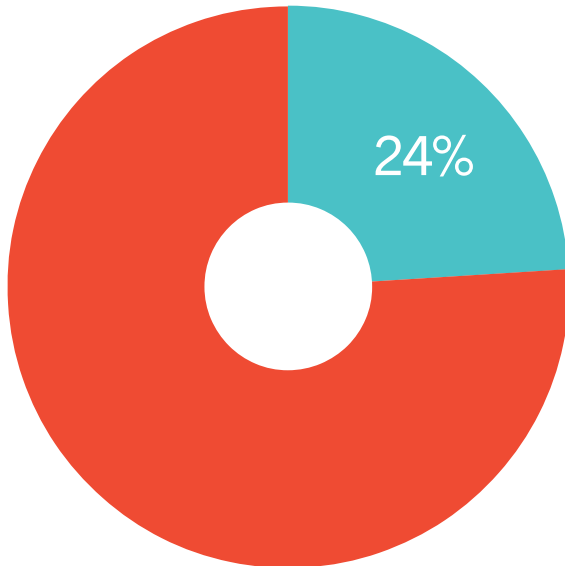


**Minimum of  
8 hours of sleep  
each night for teens**

## Physical Activity

In line with the adolescent national average of 23.2% (1), 24% of surveyed Riding for Focus students reported getting at least 60 minutes of physical activity (PA) each day at baseline. Female students (17.4%) were less likely to meet the physical activity recommendations than male students (29.8%). Asian (12.1%), Black (16%), and Hispanic or Latinx (19%) students were also less likely to meet physical activity recommendations than White students (25.5%) and students reporting more than one race (26.2%).

Given the importance of regular physical activity in preventing chronic disease and boosting mental health, it is essential to increase physical activity levels among youth, particularly for females and for youth of color, who continue to fall behind the national average.



Only **24%** of surveyed Riding for Focus students reported getting **at least 60 minutes of physical activity (PA) each day** at baseline

*The adolescent national average is 23.2% (Healthy People 2030)*

Did you know...?

**17.4%**  
of female  
students

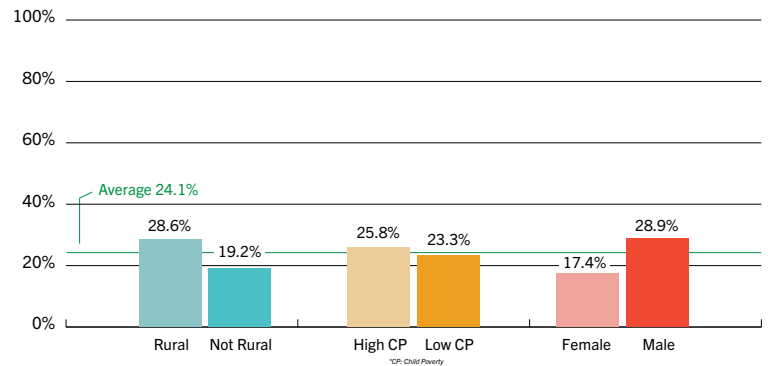
met the physical activity  
recommendations

**29.8%**  
of male  
students

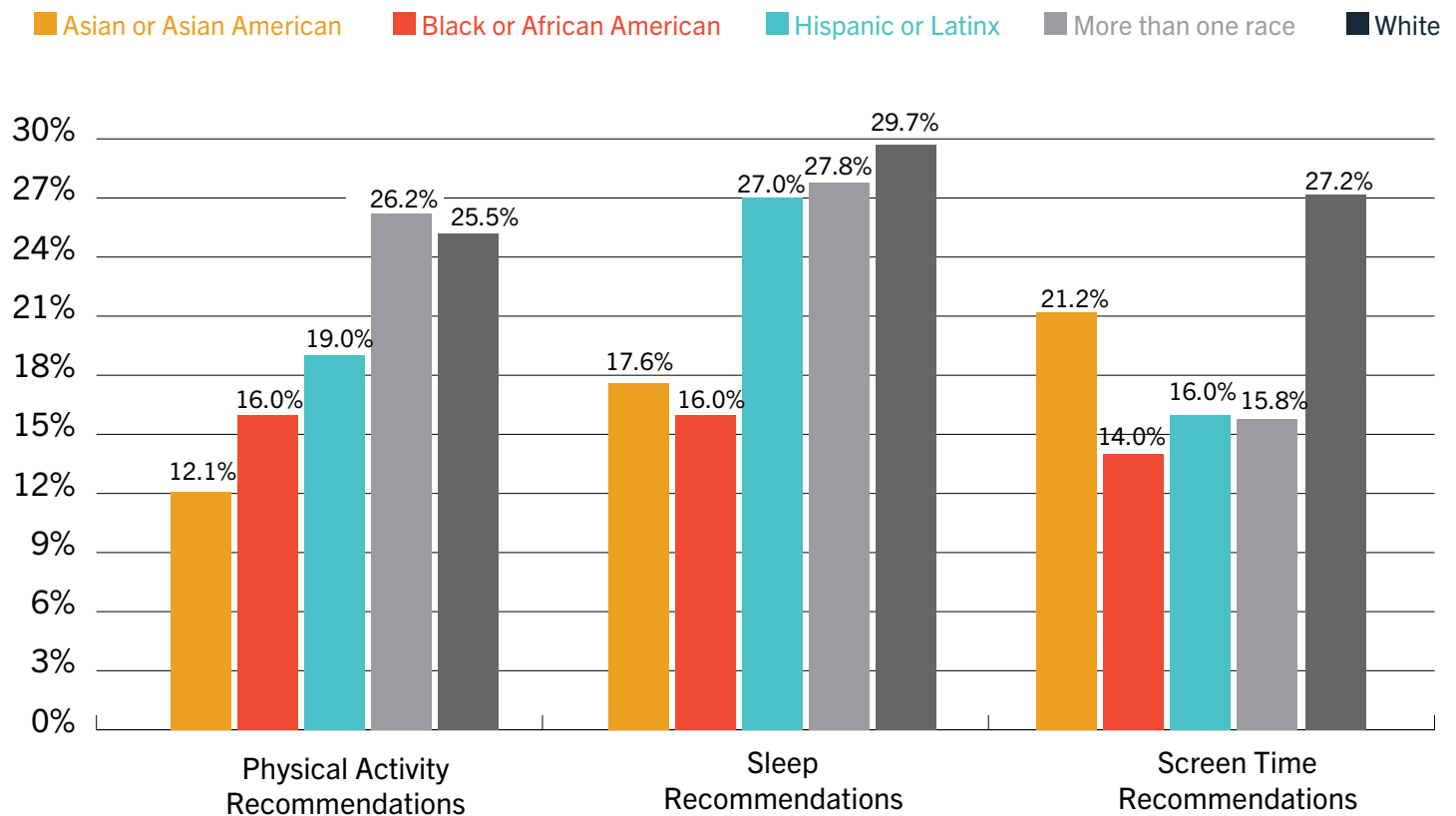
met the physical activity  
recommendations

Students at schools in rural communities were more likely to meet the physical activity recommendations (28.6%) than those in non-rural communities (19.2%). While adults living in rural areas are typically less active than adults living in non-rural areas <sup>(28)</sup>, previous research is mixed with regards to whether rural youth are typically more or less likely to engage in physical activity than their non-rural peers. It is possible that during the pandemic, rural youth had more opportunities to spend time outside while still following social distancing recommendations. A deeper understanding of the rural schools participating in this survey is needed, as the environmental and social factors that influence physical activity rates are complex <sup>(29)</sup>.

Proportions of Students Meeting Daily Physical Activity Recommendations



Proportions of Students Meeting Daily Movement Behavior Recommendations

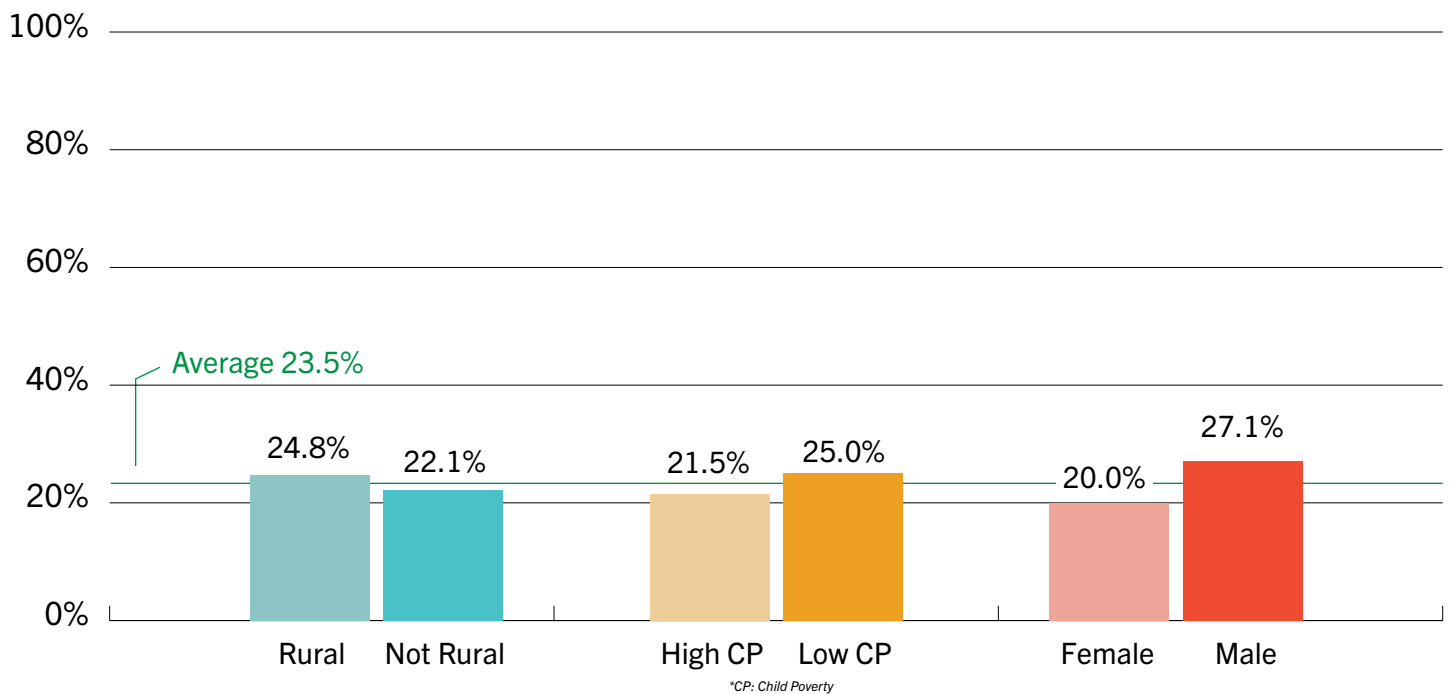


## Screen Time

Only 25% of Riding for Focus students spent 2 hours or less in front of a screen for non-school purposes at baseline, consistent with national data from Canadian youth during the pandemic (25.6%)<sup>(30)</sup>. Screen time was highest among female students and Black and Hispanic or Latinx students. Female students (20%) were less likely to spend only 2 hours or less a day in front of a screen than male students (27.1%), as were Black students (14%), Hispanic or Latinx students (16%), and students self-reporting more than one race (15.8%) compared to White students (27.2%).

As moderate to high usage of screen media among youth (i.e. 4-7+ hours/day) is associated with poor emotional regulation, difficulty making friends, and increased diagnoses of anxiety and depression<sup>(31)</sup>, it is more important than ever to find meaningful activities for youth to engage in that encourage them to take a break from their screens and find social connection in real life.

Proportions of Students with 2 Hours or Less of Screen Time/Day





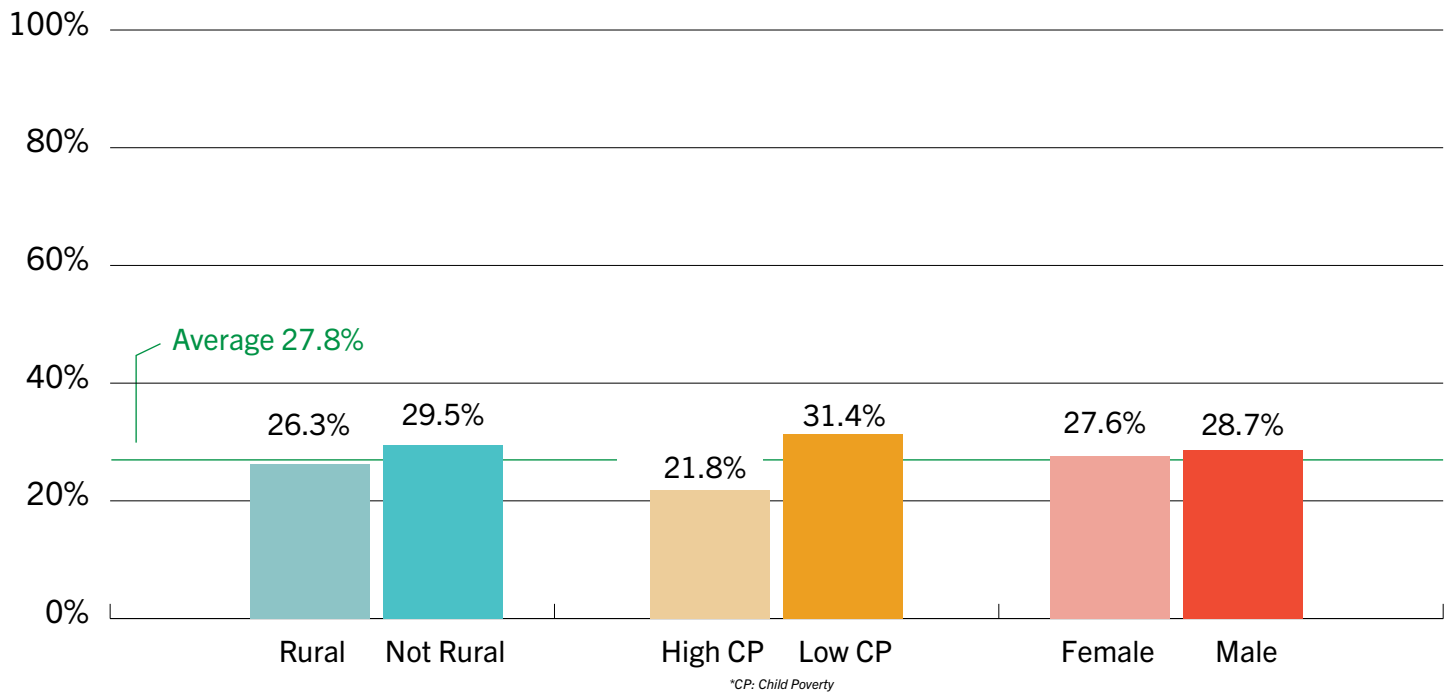
## Sleep

At baseline, only 27.8% of R4F students reported sleeping at least 8 hours each night, consistent with national data that suggests that only 3 to 4 out of 10 teenagers get enough sleep each night <sup>(32)</sup>. Students in areas with high rates of child poverty were less likely to meet the recommended 8 hours of sleep (21.8%) than students in areas with lower rates of child poverty (31.4%). Additionally, Black (16%) and Asian students (17.6%) were less likely than White students (29.7%) to get at least 8 hours of sleep a night.

to an increased risk of accidents, depressed mood, obesity, and diabetes <sup>(33)</sup>. Yet, disparities in sleep duration persist among youth from low socioeconomic status backgrounds, as well as among youth of color <sup>(34)</sup>, potentially contributing to widening gaps in health, as well as academic, outcomes. Increasing youth physical activity has been suggested as one way to reduce the sleep gap <sup>(35)</sup>, underlining the importance of increasing access to physical activity programs among vulnerable populations.

Sleep is essential for both physical and mental health. Consistent poor sleep is associated with problems with attention, behavior, and learning, in addition

Proportions of Students Sleeping at Least 8 Hours/Night



## Well-Being

Well-being is complex and multi-faceted and can span many different domains, from physical to emotional to economic. While there are many ways to gauge someone’s well-being, scientifically validated self-report questionnaires are often used to obtain a standardized measure. In our baseline pre-survey, we measured well-being using the World Health Organization-Five (WHO-5) Well-Being Index <sup>(36)</sup>. The WHO-5 is a short self-report questionnaire that assesses positive well-being <sup>(37,38)</sup>. The WHO-5 index runs from 0 (poor well-being) to 100 (good well-being), and scores below 50 are associated with depressive symptoms.

At baseline, the average WHO-5 score across R4F students was 62.9, consistent with the 62.1 average of WHO-5 scores across 34 countries <sup>(39)</sup>. Female students (57.5) reported significantly lower levels of well-being than male students (68.6). While there were numerical differences across race, socioeconomic-

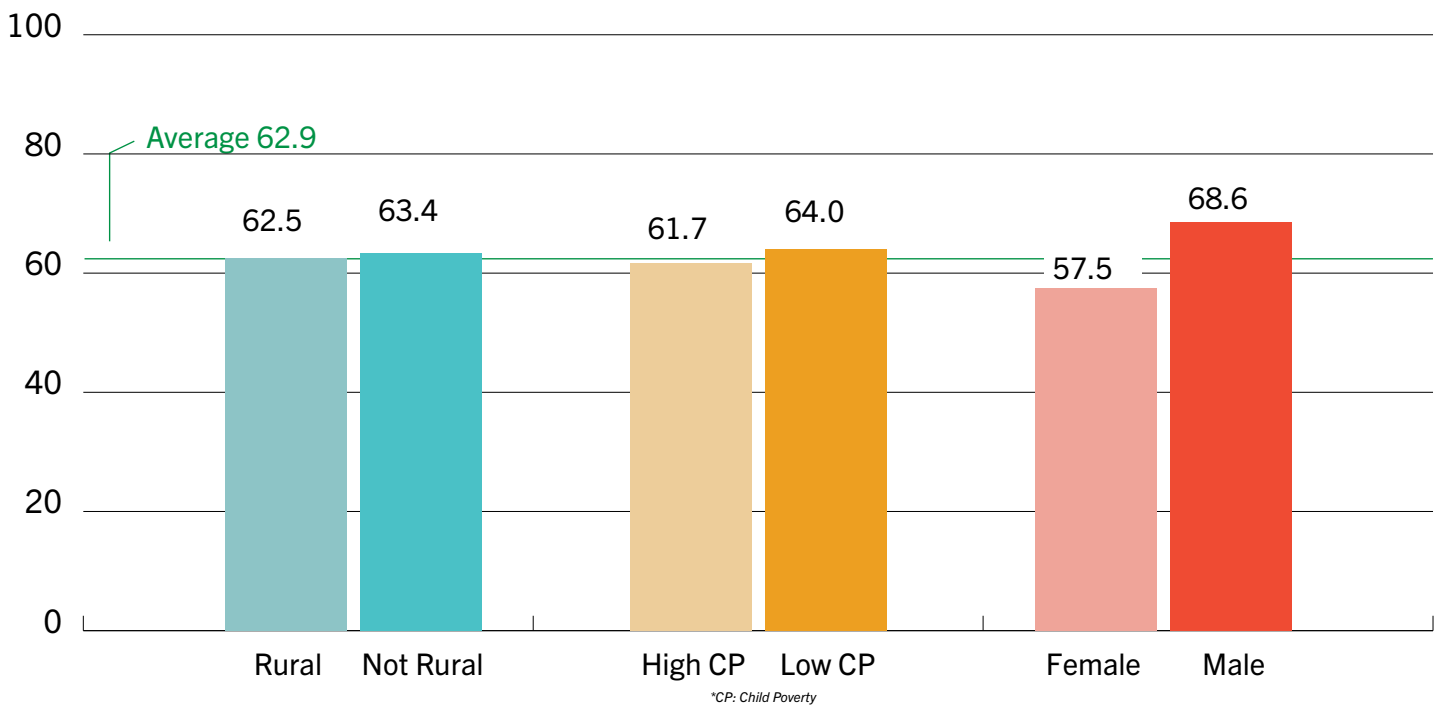
status, and rurality, these differences were not statistically significant in this sample.

Students who either met recommendations for sleep (at least 8 hours a night), physical activity (60 minutes a day), or recreational screen time (2 hours or less a day) all reported higher levels of well-being than those who did not, even when accounting for gender, rurality, child poverty rate, race and ethnicity, or school.

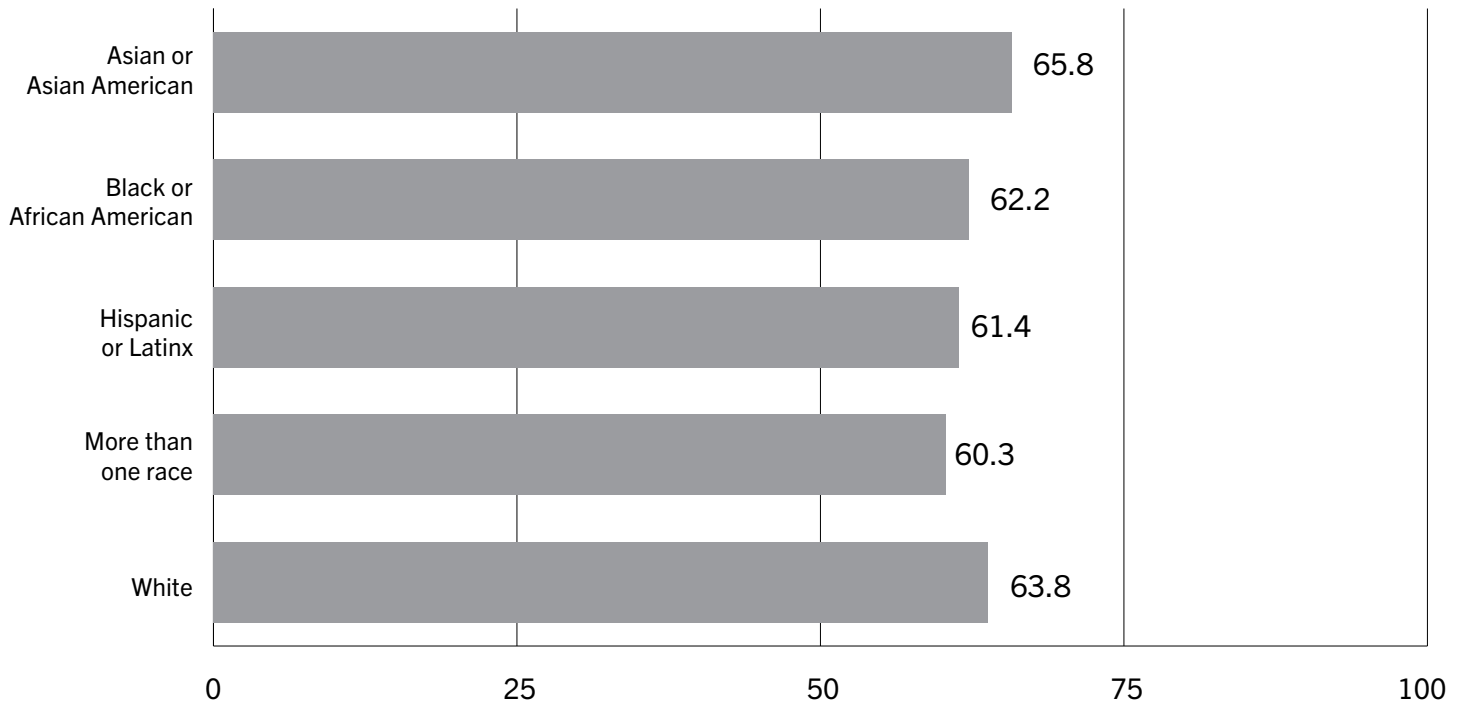
While meeting daily physical activity recommendations was associated with better student well-being, the benefits are not all or nothing. This is consistent with the scientific literature and the World Health Organization’s 2020 guidelines on physical activity <sup>(40)</sup>.

**Just being active for one day a week is better than nothing at all, and each additional day of activity is beneficial.**

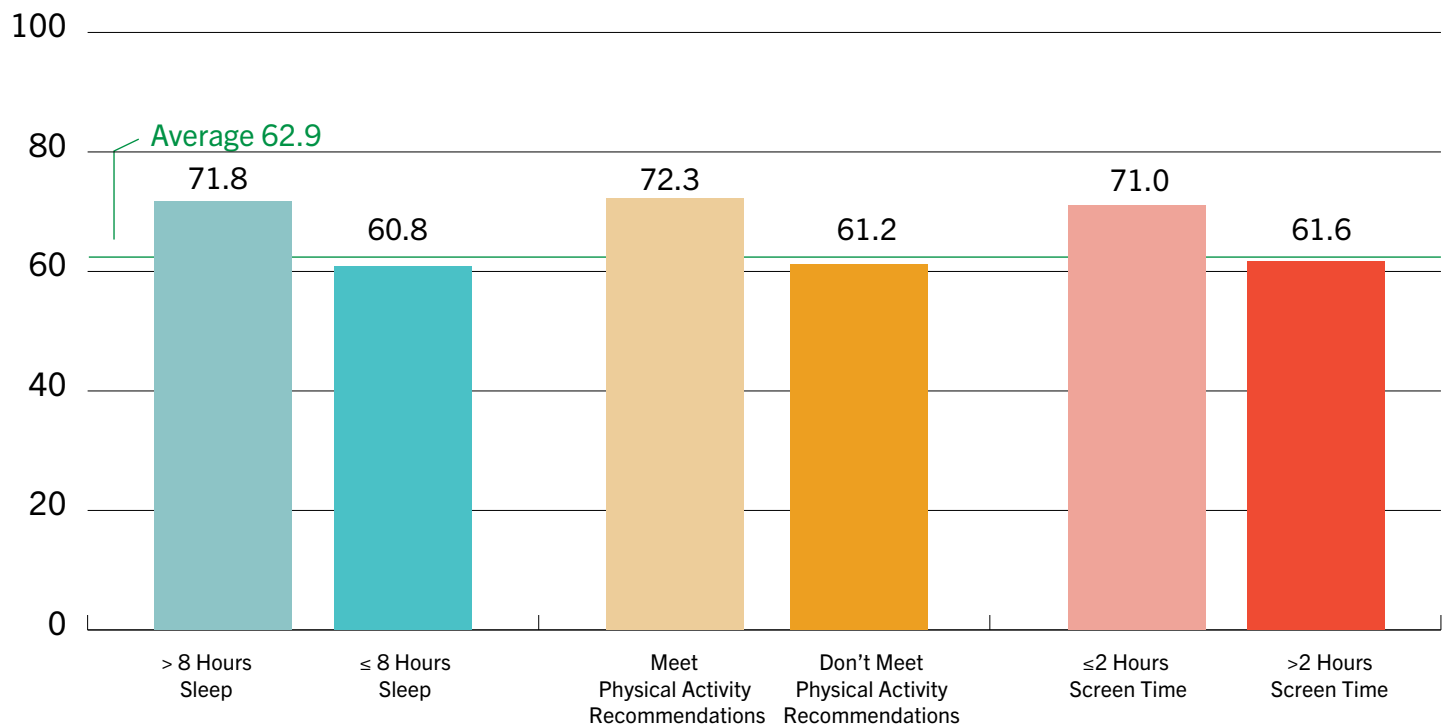
Average WHO-5 Well-Being



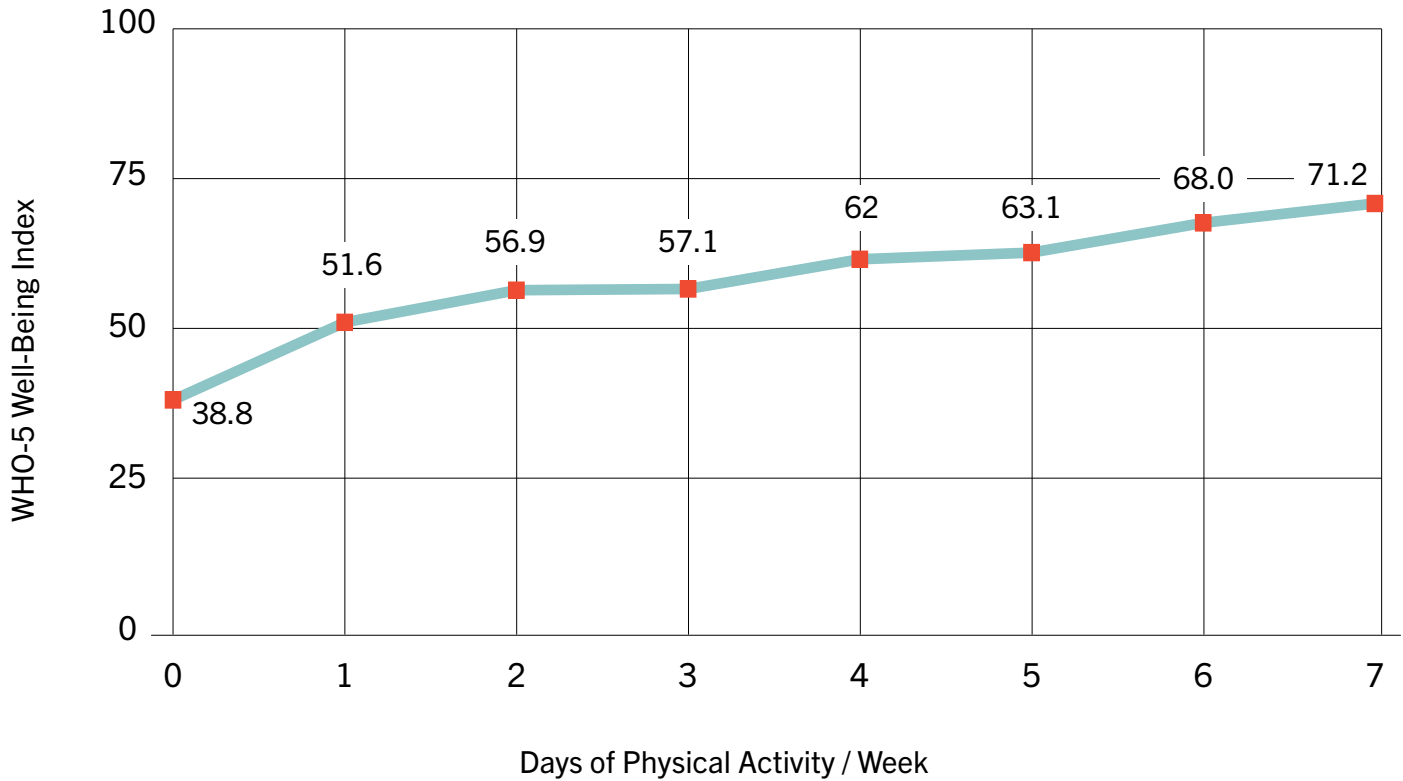
Baseline WHO-5 Well-Being by Race or Ethnicity



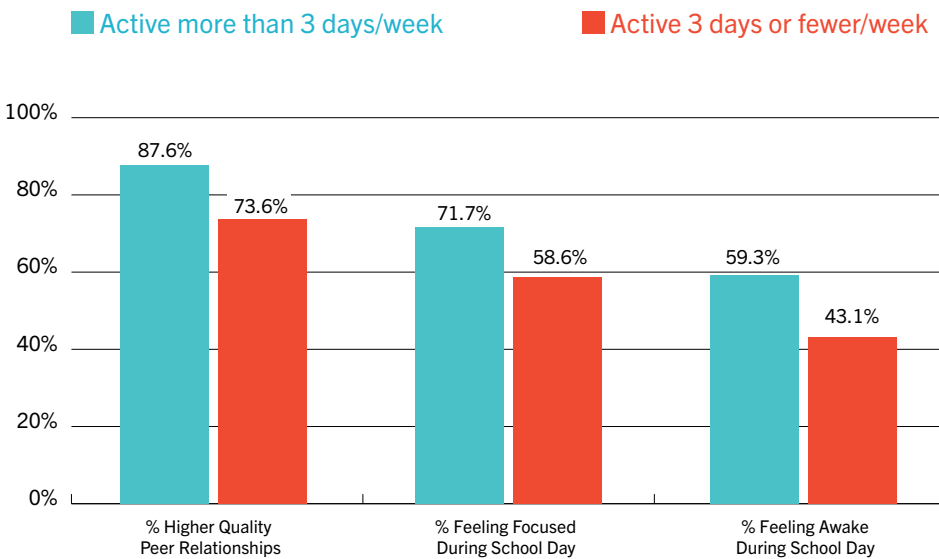
Average WHO-5 Well-Being by Meeting Movement Behavior Recommendations



### More Days of Physical Activity Associated With Higher Well-Being



### More Active Students Report Better Relationships, Focus, And Alertness During The School Day

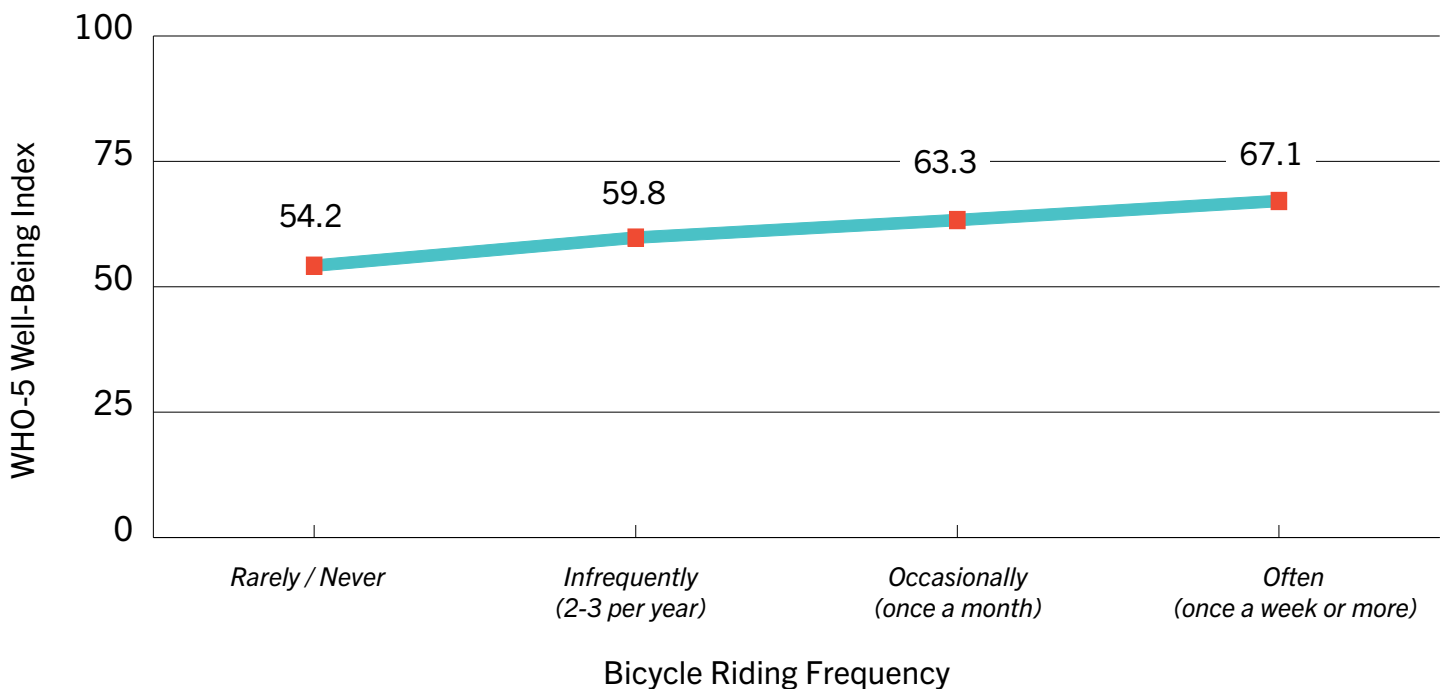


Beyond reporting higher levels of well-being, students who were active more than 3 days of the week also reported better peer relationships, feeling more focused during the school day, and feeling more awake during the school day than those who were active 3 or fewer days a week. Together, this supports the wide variety of research suggesting that **physical activity can boost quality of life across many domains.**

We also saw that students who reported riding their bicycle more often also reported higher levels of well-being, even after accounting for gender, rurality, child poverty rate, race and ethnicity, and physical activity levels. Specifically, bicycling at least once a week was associated with better mental well-being (67.1) compared to those who did not ride as regularly (Once a month: 63.3,

2-3x/year: 59.9, Rarely/Never: 54.2). Additional research is needed to better understand why, but bicycling often brings about feelings of joy across all ages <sup>(41)</sup> and provides youth with a sense of freedom they may not otherwise enjoy <sup>(42)</sup>, both of which can contribute to one’s well-being.

More Regular Bicycle Riding Associated With Higher Well-Being



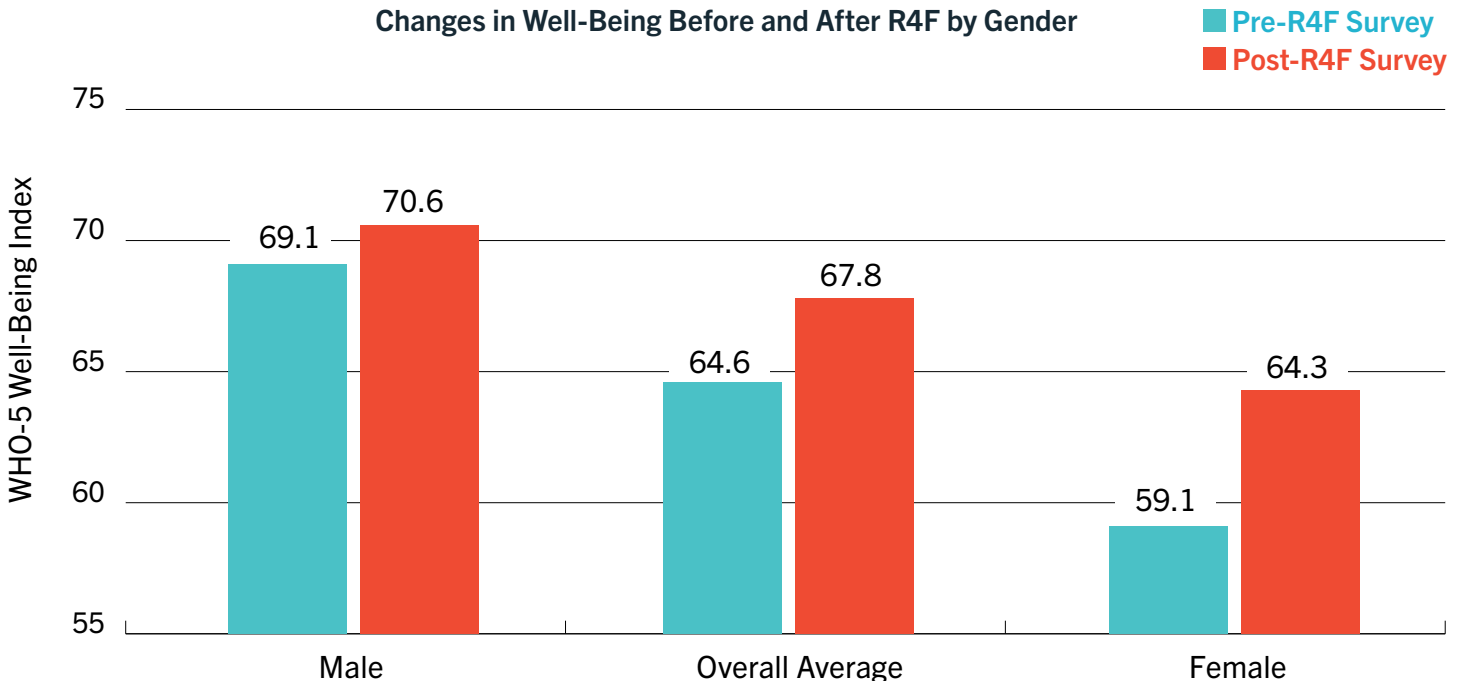
Altogether, it is clear that the majority of youth aren’t getting enough physical activity or sleep and are facing climbing levels of screen time, all of which can negatively impact mental well-being. Given the increasing levels of sedentary behavior and mental distress among youth, increasing physical activity rates is more important than ever, particularly for

youth of color, youth from low socioeconomic status backgrounds, and females. Bicycling programs offer one possible solution to build a long-term culture of youth and community health and well-being, allowing youth to build confidence, social connections, and achieve a sense of freedom and mobility, all while engaging in health-promoting physical activity.

## Changes in Well-Being and Movement Behaviors after Participation in R4F

Based on the subset of schools that were able to participate in both pre- and post-surveys despite COVID-19, well-being scores were higher on average in the post-surveys (67.8) compared to the pre-surveys (64.6). This difference was most evident in female students, who saw an almost 9% increase in their reported well-being scores after participating in R4F (64.3) compared to before participating (59.1). Though there were small differences in the magnitude of the changes across other groups, the pattern was consistent: **students reported higher levels of well-being after participating in R4F than before they started.**

Changes in Well-Being Before and After R4F by Gender



There were also promising positive trends in increases in daily physical activity levels and weekly bicycling frequency from pre to post R4F, particularly at schools serving a majority Black and Hispanic / Latinx student population, though these differences were not statistically significant. We did not observe any

differences in sleep outcomes. Additional data, along with appropriate comparison groups, are needed in order to better understand these trends, and we look forward to sharing the outcomes of that work in the future.

In terms of screen time, a higher proportion of students reported meeting screen time recommendations (2 hours or less a day) after R4F (28%) than before (25%).

**This change was largely driven by female students, where only 19% of female students met the screen time recommendation before participating in R4F compared to 27% meeting the recommendation after participating,** suggesting a reduction in screen time.

Overall, these quantitative differences mirror the qualitative student experience. Many students report feeling a sense of calm once they hop on a bike.

As one student puts it:

**“[bicycling] allows me to get my mind off what is going on in my life.”**

Another R4F student reflected,

**“What I like most about bicycling is... being outside, and not just staying inside watching TikTok.”**

Cycling can provide a form of escape, far away from screens, homework assignments, and other sources of stress.



*Photographer: Eric Arce*



**SECTION II:  
Student Riding Experience,  
Access to Bikes, and Riding  
Frequency**

- Baseline Riding Experience, Access to Bikes, and Riding Frequency
  - Bicycle Riding Experience
  - Access to Bicycles at Home
  - Bicycle Riding Frequency
  - What Students Want To Learn



## Baseline Riding Experience, Access to Bikes, and Riding Frequency

While many students will have had some exposure to bicycling by the time they enter middle school, we cannot assume the same level of knowledge and experience across all students. While there is limited research on national levels of youth experience with and confidence riding a bike, in addition to student access to bikes, data from our R4F programs suggest

that these statistics vary widely across the country and across demographics. Understanding these differences is critical to ensure the level of educational programming is appropriate for students and that students with no previous experience or knowledge aren't left out.

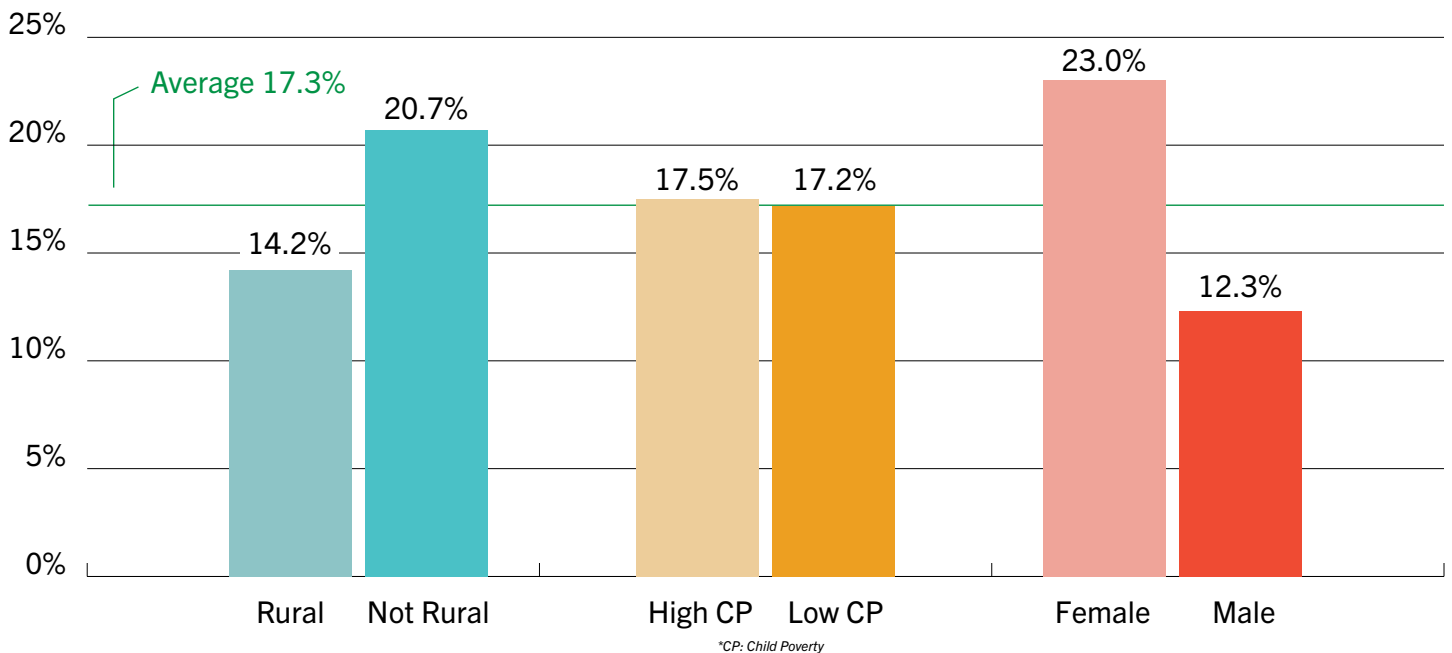
### Bicycle Riding Experience

Baseline school averages of students who either **do not know how to ride or have low levels of confidence riding a bike** range from 8.5% to 32% of students, with an average of 17.3% of students across schools. Students in non-rural settings (20.7%) and female students (23%) were more likely to report having less bike-riding knowledge and confidence than their rural and male peers (14.2%, 12.3% respectively). Furthermore, Hispanic or Latinx students were almost twice as likely to report lower levels of bike-riding

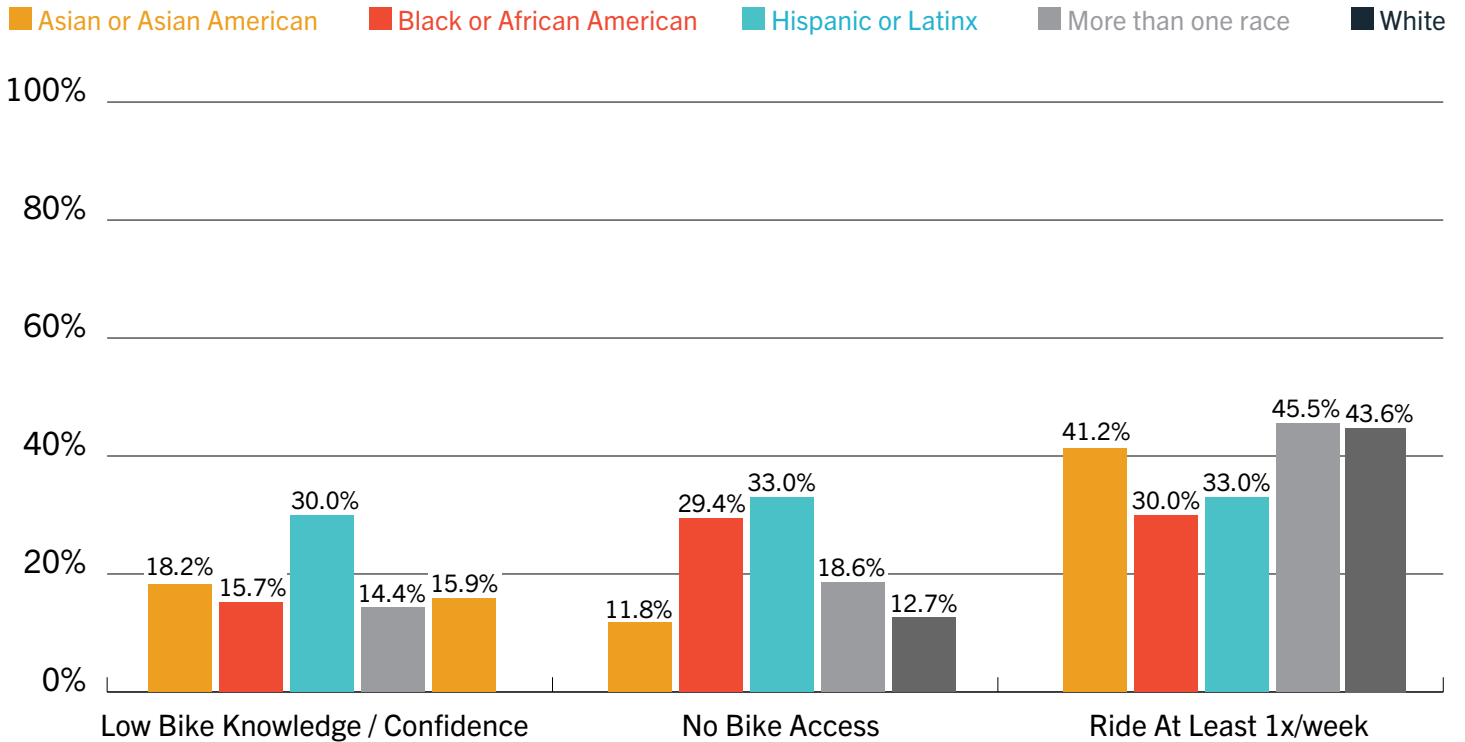
knowledge and confidence (30%) than their White peers (15.9%).

Providing students with the knowledge and experience of how to safely ride a bike is critical for later participation, as equipping students with cycling training can increase confidence levels and attitudes towards cycling while decreasing fears around cycling <sup>(43)</sup>.

Proportion of Students with Little to No Bike Riding Knowledge



Bicycling Knowledge, Access, and Riding Frequency



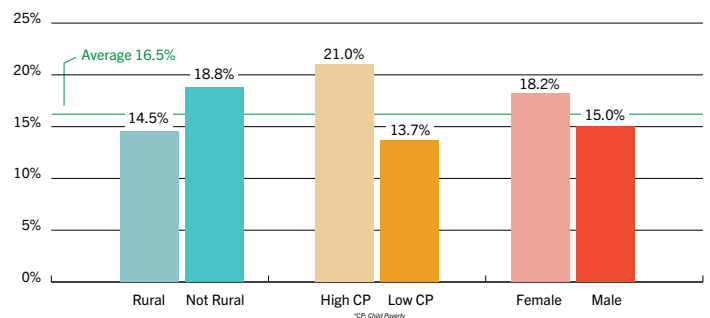
## Access to Bicycles at Home

On average, 16.5% of students reported **not having access** to a bike at home. However, this was highly variable across schools (from 9% to 64% of students), and students in areas with high rates of child poverty were more likely to not have a bike at home (21%) than those in areas with low rates of child poverty (13.7%).

**Black (29.4%) and Hispanic/Latinx students (33%) were also more likely to not have access to a bike at home compared to White students (12.7%).**

Rather than relying on youth to bring their own bicycles to participate in bicycling programming, providing access to bicycles is critical to ensure youth from low socioeconomic backgrounds and youth of color are not disproportionately left out.

### Proportion Of Students Without Access To A Bicycle At Home



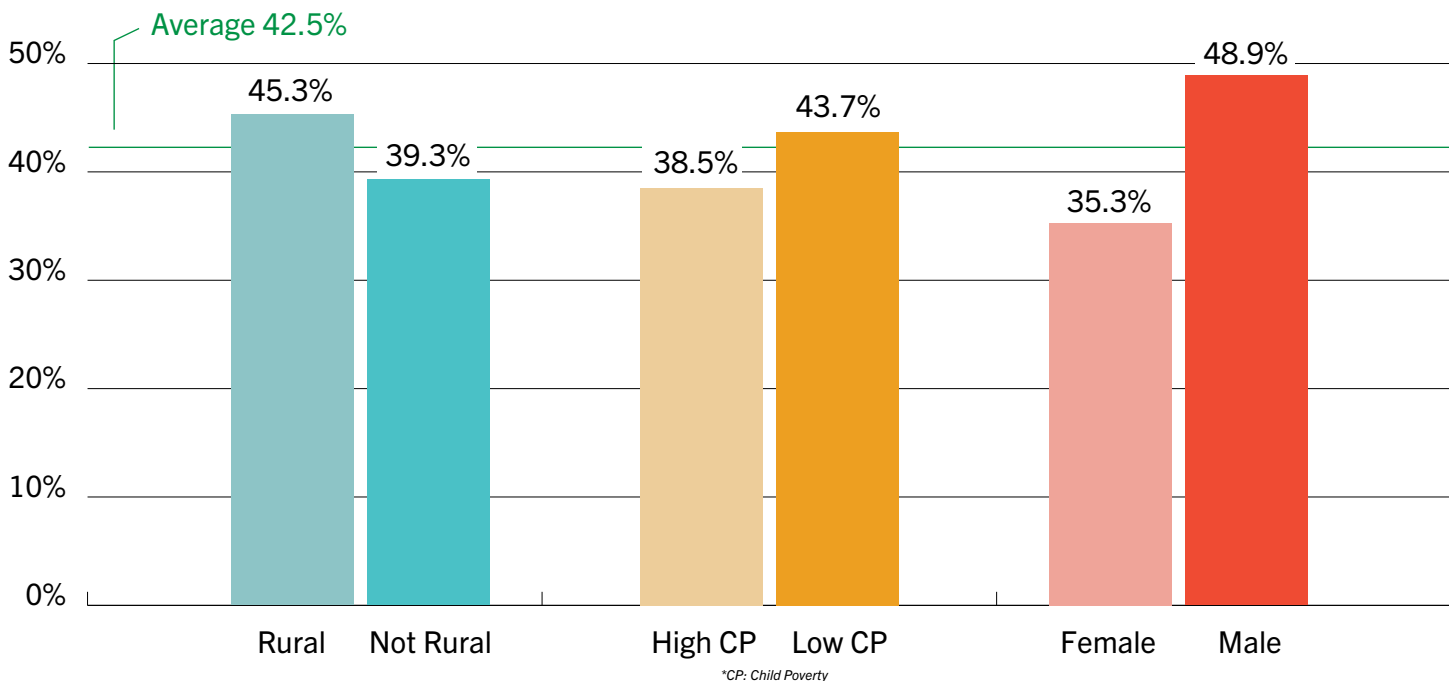
## Riding Frequency Outside of School

On average, 42.5% of students reported riding a bike outside of school at least once a week, but differences in riding knowledge and access also mirrored student riding frequency. Students at rural schools (45.3%), students at schools in areas with low rates of child poverty (43.7%), and male students (48.9%) were more likely to ride a bike at least once a week outside of school compared to their peers (non-rural: 39.3%, high child poverty: 38.5%, female students: 35.3%). Black (30%) and Hispanic or Latinx students (33%) also reported lower levels of weekly riding than their White peers (43.6%).

Together, these findings demonstrate differences across gender, socioeconomic status, race, and rurality when it comes to bicycling knowledge, access, and riding frequency among youth at R4F schools.

Concerns around personal safety, disparities in access to safe places to ride, and community, family, and peer perceptions toward bicycling are all likely to contribute to these differences. Programs that support increasing access to bicycles for youth (e.g., Earn-A-Bike Programs, Free Bikes 4 Kidz) and initiatives and policies that support equitable improvements to infrastructure (e.g. Safe Routes to School) are making progress. Bicycle education programs are also needed, as providing youth with a base level of knowledge around cycling in a supportive and safe environment can empower them to ride confidently. Importantly, we can also strive to make programming even more relevant to youth by listening to what excites them most about being able to ride.

Proportion of Students Who Report Riding At Least 1x/Week



## What Students Want to Learn

Understanding what aspects of bicycling engage students is critical to continue to encourage their participation in this activity. Before getting started with the R4F program, students were asked to share what they most want to learn when it comes to bicycling.

Themes that emerged from students' open-ended responses ranged from simply wanting to learn how to ride a bike to improving their riding skills to more aspirational goals of pushing bikes to their limits.



### Training / Improving



*"I can't ride for that long before I get tired. I'd like to learn how to build up endurance."*

*"Improve my strength going up hills."*

---

Many students focused on what they could do to improve their bike-riding ability. Whether that was building endurance, gaining the fitness and confidence to overcome a local hill, or developing the skills to ride a local trail, students recognized that with continued practice, they could build the confidence and ability to take on new challenges and goals.



### Riding Basics / Safety



*"I'd like to learn how to ride on roads properly, and know the correct signals while riding a bike on the road"*

*"I'd mostly just like to learn how to ride to be honest."*

---

Whether graduating from a balance bike to pedaling for the first time, learning when to shift gears, or learning how to safely navigate their neighborhood streets, a large group of students highlighted basic skills and safety knowledge as an area of interest.

Middle school students are often well-aware of what they want to work on when it comes to developing bicycling skills. The R4F program provides students with the opportunity to work on two of the four themes outlined above, focusing primarily on bicycling handling skills, traffic safety, and physical literacy

**However, it is clear from student responses that there are additional pathways that could be introduced to help support their engagement and interest in bicycling. From non-competitive riding clubs to bike maintenance and repair education workshops, partnering with local organizations (bike coalitions**

**and co-ops, bicycling clubs, etc.) to provide additional opportunities for students can be a great way to maintain student interest in continuing to be active and ride.**

In addition, just as bicycling can provide independence with regards to mobility and transportation, pursuit of bicycling can also open students up to a wide range of economic opportunities in the future, from bicycle maintenance, to urban planning, to coaching, and so on.



**General Bike Knowledge +  
Bike Maintenance**



*“I’d like to learn about how they are made”*

*“What makes the bike work how it does”*

---

Students were curious about a wide variety of bike trivia (e.g. when was the bike first invented?, how fast can they go?) as well as practical maintenance knowledge (e.g. fixing a flat, getting their chain back on).



**Wheelies /  
Jumps / Tricks**



*“I want to learn how to do cool tricks”*

*“How to do a wheelie!”*

---

Students were drawn to the possibility of learning how to do a wheelie, ride with no hands, or land jumps. While these activities are not included in the Riding for Focus curriculum, understanding what motivates students to participate and revealing a pathway for future skill development outside of school may help to encourage long-term riding.

**SECTION III:**  
**Student and Teacher**  
**Experience in Riding for Focus**

- Student Experience in Riding for Focus
  - Fun
  - Likes
  - Dislikes
  - Continuing Riding
  - Activities of Interest
  - Effects of Previous Participation
  
- Teacher Experience in Riding for Focus
  - Likes
  - Challenges



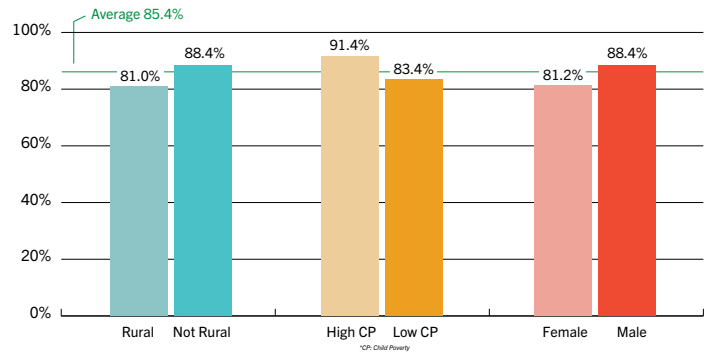
## Student Experience in Riding for Focus

The student post-survey captured each student’s experience in R4F, where they provided feedback about what they liked (and did not like) about the program, as well as what types of bicycling activities they’d be interested in pursuing.

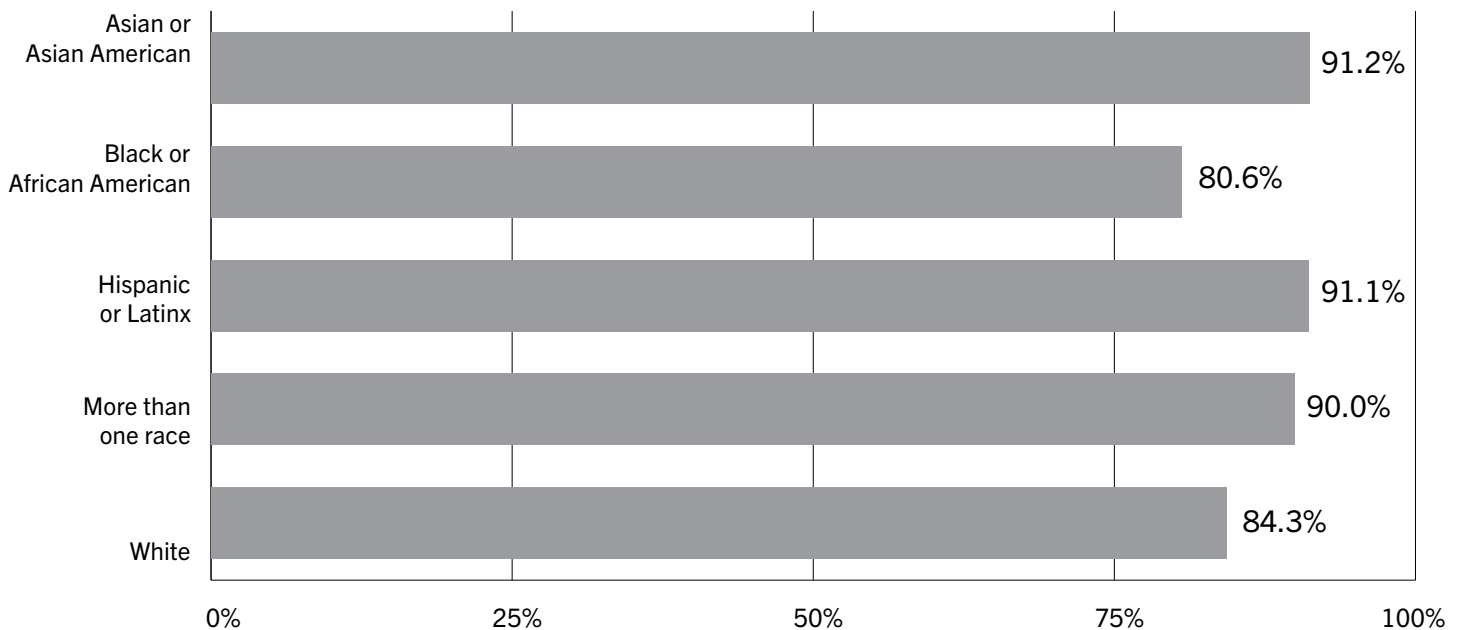
### Did students have fun in Riding for Focus?

Overall, the program was well-received by students. 85.4% of respondents said they had fun in the program the majority of the time. At least 8 out of 10 students across all groups had fun in the program, demonstrating the success of providing students with access to bikes and a safe environment to learn during the school day. This is important, as developing positive associations with bicycling and Physical Education can overturn the often negative stigma of PE class <sup>(44)</sup> and can set the tone for perceptions around physical activity for years to come <sup>(45)</sup>.

Proportion of Students Who Had Fun in R4F  
The Majority Of The Time



Proportion of Students Who Had Fun in R4F By Race or Ethnicity



## What Students liked about Riding for Focus

When asked what they liked most about their experience in the Riding for Focus program, the following themes emerged:

### Having Fun

▮ *“We got to do something that was actually fun for PE!”*

— Above all, students thought that riding was fun and enjoyable. This is important, as having fun is an essential factor in youth determining whether they want to continue a particular activity <sup>(15)</sup>.

### Just Riding

▮ *“Just getting to ride bikes for a class”*

*“I got to ride bikes, which I’ve never gotten to do in gym class before”*

— Many students reported just being able to ride as one of their favorite things about the program. Additionally, many students were excited about being able to ride during the school day, and did not associate it with a typical PE activity, or something they’d be able to typically do during school hours.

### Getting to be Outside

▮ *“It was fun to leave and see new things instead of just the gym”*

*“Being outside in the fresh air”*

*“That we don’t need to sit inside all day doing assignments”.*

— Another common theme was being able to go outside during school hours. Many students commented how nice it was to be able to get out of the confines of the gym and breathe fresh air. Not only do students enjoy being outside – exposure to green space and natural areas is associated with positive benefits for youth mental health <sup>(46)</sup>.



These elements (having fun, spending time outside, socializing with others, and learning new skills) are all key components for encouraging future engagement in physical activity and to help students reap the mental, physical, and social benefits that come along with it.

### Riding with Classmates / Friends

“I got to ride with my friends and we could take a break from overwhelming schoolwork.”

“I liked that I got to bike with friends that I have in school, not just the really good friends I know”.

Students loved to be able to ride a bike and socialize with their friends and classmates at the same time. In addition, a number of students mentioned that they interacted with classmates they may not have otherwise, and that they liked making new friends on the bike.

### Learning

“I liked learning about the many things I have to check before riding”

“I liked most riding the bikes and learning the traffic laws when riding”

Students also remarked that they were happy to learn not only about how to ride and build their confidence while on a bike, but also important safety components like pre-ride equipment checks and traffic rules.



Photographer: Eric Arce



Photographer: Eric Arce

## What Students didn't like about Riding for Focus

Students also had the ability to provide feedback on what aspects of the program they didn't like. Collecting this feedback is important to understand whether there are common challenges that may emerge either within a particular school, or across programs across the country. Here are some of the top feedback themes.

### Getting tired / going out of comfort zone

❗ *"I don't usually like going out of my comfort zone, and in this unit I had to".*

— Students mentioned that riding a bike wasn't always easy. Sometimes, they had to go up hills, anticipate shifting, and work their legs. However, many students also recognized that this was also a positive thing and that it helped them to push their boundaries and build confidence.

### Differences in skill levels

❗ *"I had to do the basic stuff with everyone else first instead of me going on the bike trail because I already know how to ride a bike."*

*"Other bikers begging us to go faster"*

— Some schools had larger disparities in student skill levels: ranging from very experienced students who may engage in racing outside of school to students who have never learned to ride a bike or have limited confidence riding. More experienced students may not always feel challenged, while students newer to riding may feel pressure to quickly reach the level of their peers.

### Not getting to ride as much as they'd like

❗ *"Not getting to ride everyday when it is nice".*

— Some students mentioned they wished they could ride everyday while others wished their class periods were a bit longer so they could ride further.

### Weather

❗ *"It was windy and we rode, I do not like riding against the wind".*

— Whether it was hot and humid, or brisk and cold or windy, weather was a common contributor to student enjoyment.

While many students used this question to reiterate how much fun they had in the program, other students provided valuable insights for program providers in terms of how they could continually improve the program and keep students engaged. Partnering with local community groups to provide students with additional riding opportunities or bringing in community volunteers to help provide capacity to work with different skill levels or to speak

about specialized topics (e.g. riding in different types of weather, sharing opportunities to become more engaged with bicycling) are just a few ways to incorporate this student feedback. Additionally, inviting further youth input on how they would like to (or not like to) continue to engage with cycling may result in creative ideas for additional youth and community involvement (e.g. through organized youth rides or themed tours, community events, etc.).



Photographer: Eric Arce

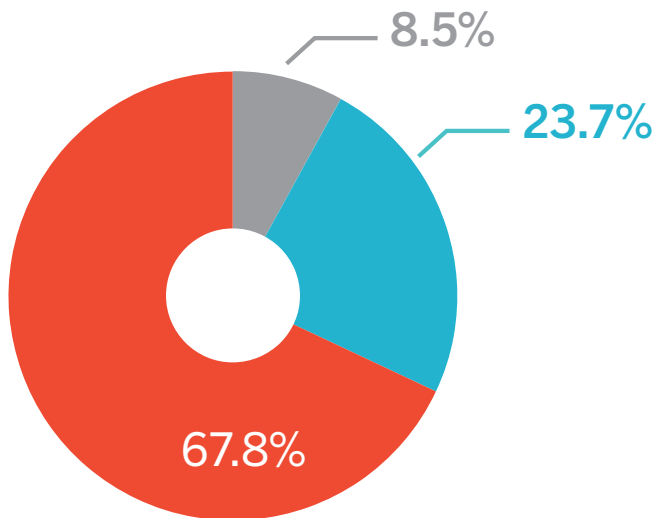
## Student Interest in Continuing Riding Outside of School

Beyond riding during the school day, 91.5% of students reported being at least a little interested in continuing to ride outside of school, with 67.8% of students reporting a strong interest in continuing to ride. While there were very few differences across groups in terms of riding interest, male students did report stronger

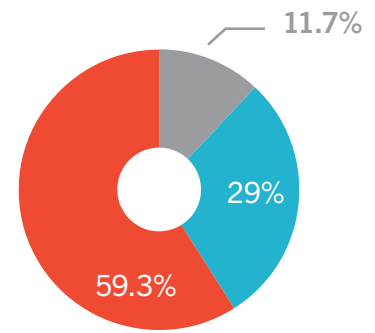
rates of interest than female students (75.5% vs 59.3% reporting strong interest). It is also clear from the data that there are differences across groups in terms of where students want to ride, who they want to ride with, and the types of riding activities they want to participate in.

### Interest in Continuing Riding Outside of School

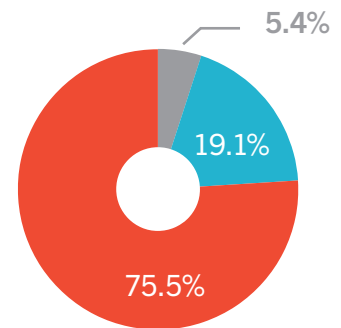
■ No interest    ■ A little interest    ■ Strong interest



Overall



Female



Male

**91.5% of students reported being at least a little interested in continuing to ride outside of school**

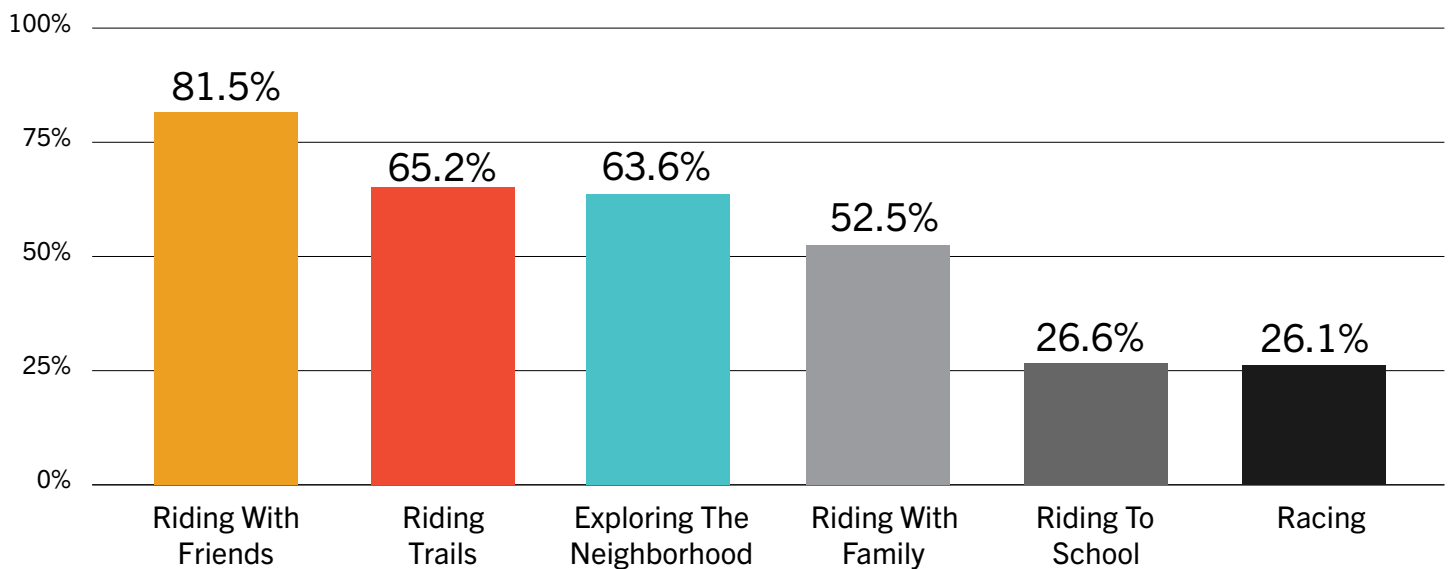
*Resulting from 67.8% of overall students having a strong interest and 23.7% of overall students having a little interest*

## Bicycling Activities Students are Interested In

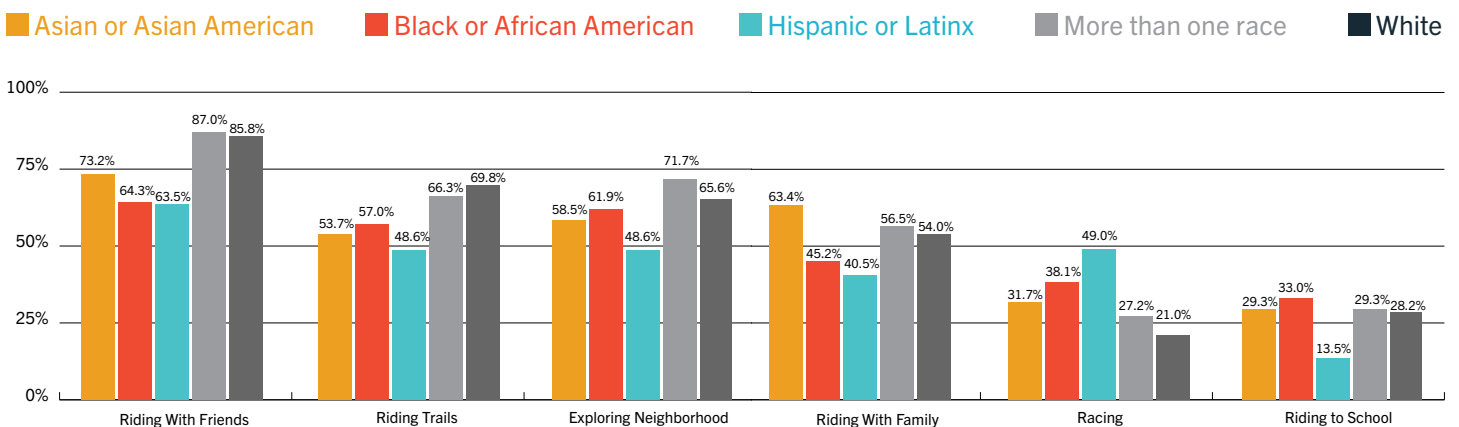
When asked what activities students were most interested in, the social component of bicycling rose to the top. 81.5% of students reported that riding with friends interests them. At a time when students are spending more and more time in front of screens, it is clear that **bicycling provides students with important opportunities to foster real-life social connections.**

Riding on trails (65.2%) and exploring their neighborhood (63.6%) were the next most popular activities for students, with racing (26.1%) and riding to or from school (26.6%) garnering the least amount of student interest. However, these preferences were not the same across all students, and we observed a number of differences across gender, child poverty rate, rurality, and race and ethnicity.

Proportion Of Students Interested In Activity



Student Interest in Bicycling Activities by Race



**Interest in Racing**

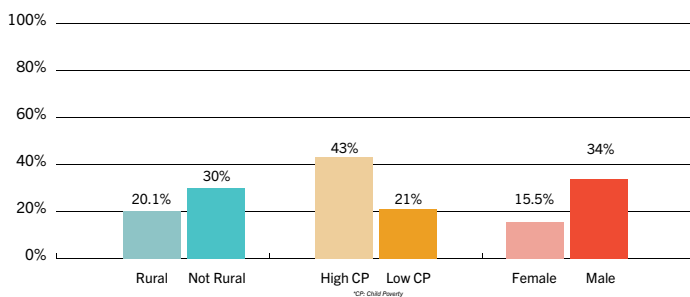
Students at schools in areas with high rates of child poverty (43%), male students (34%), and Asian (31.7%), Black (38.1%), and Hispanic or Latinx (48.6%) students were more likely to report being interested in trying racing than students at schools with low rates of child poverty (21.4%), female students (15.5%), and White students (21%) respectively. This is in sharp contrast to the largely white and higher socioeconomic status population of people who currently race in USA Cycling Events in the United States (86% White, only 9% with household income < \$50K; <sup>47</sup>). This highlights the need for programs and support to increase equitable access and opportunities for racing where the interest is there but access to equipment, safe places to ride, and opportunities to race may be limited.

**Interest in Riding to/from School**

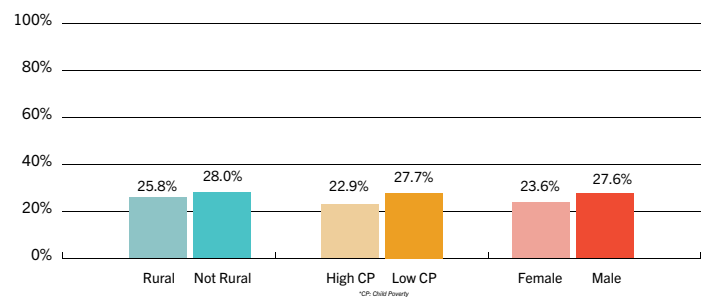
Across all subgroups, riding to or from school consistently elicited some of the least amount of interest from students (26.6%), but it was particularly

low for Hispanic or Latinx students (13.5%). Research has suggested a number of barriers to active commuting to school for youth, including physical (i.e., travel distance), motivational and social (i.e., no one else to bike with) barriers <sup>(48)</sup>. Furthermore, though data has shown that Hispanic or Latinx and Black youth tend to engage in active transportation (i.e., walking, biking) to school more frequently than White youth <sup>(49)</sup>, this doesn't mean they do it by choice or that they have positive experiences with it due to a number of environmental and social variables (e.g., inequities in infrastructure, safety concerns, harassment, perceptions of bicycling, etc.) <sup>(50)</sup>. Given that active transportation to school represents an opportunity for youth to engage in physical activity each day, understanding what contributes to these discrepancies is critical to closing physical activity gaps across gender and race and ethnicity.

**Proportion Of Students Interested In Racing**



**Proportion Of Students Interested In Riding To School**



**Interest in Riding Trails**

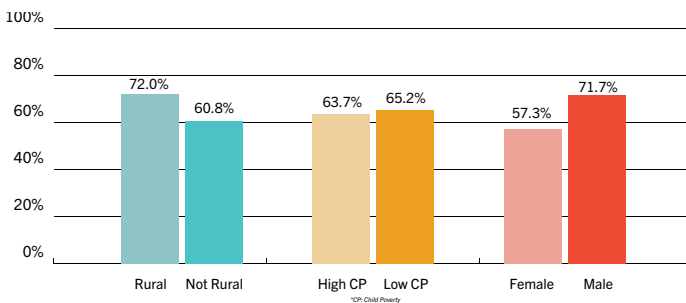
Asian (53.7%), Black (57.1%), and Hispanic or Latinx (48.6%) students, as well as female students (57.3%) and students in non-rural areas (60.8%) had lower levels of interest in riding trails than their White (69.8%), male (71.7%), and rural (72%) peers, respectively. Access to and knowledge about local trails, under-representation of racially diverse trail users in the media, institutional discrimination, and fears around personal safety may all contribute to these differences <sup>(51,52)</sup>.

**Riding with Friends and Family**

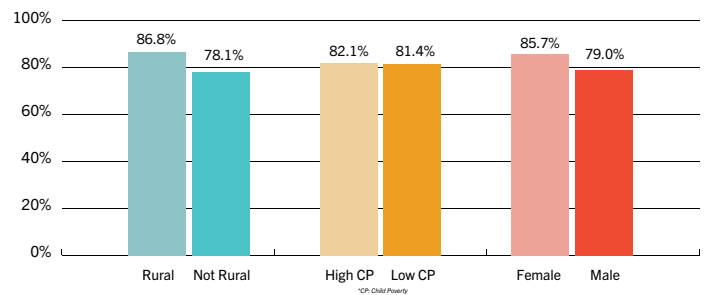
Female students were more likely to report being interested in riding with friends (85.7%) and with

family (60%) than male students (friends: 79%, family: 48.8%). Riding with friends and riding with family were less popular among Black (friends: 64.3%, family: 45.2%) and Hispanic or Latinx (friends: 63.5%, family: 40.5%) students compared to White students (friends: 85.8%, family: 54%). While we do not know what is driving these results based on our data alone, differences in how youth think their family and friends perceive bicycling, wanting to use bicycling as a solo form of escape as opposed to a social activity, access to bikes, and confidence in their riding ability may all contribute.

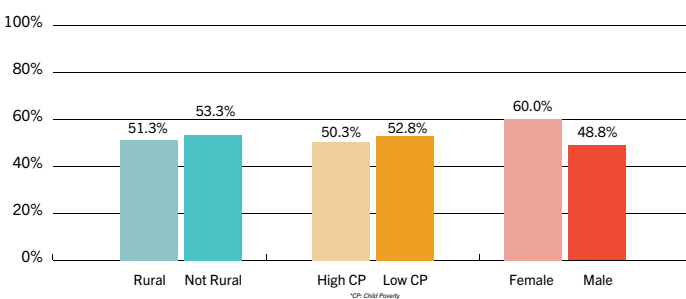
**Proportion Of Students Interested In Riding Trails**



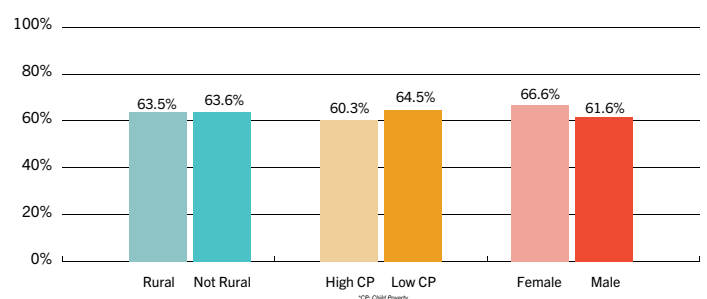
**Proportion Of Students Interested In Riding With Friends**



**Proportion Of Students Interested In Riding With Family**



**Proportion Of Students Interested In Exploring Their Neighborhood By Bike**



As bicycling behavior starts to drop off <sup>(53)</sup> and positive perceptions around bicycling start to fade by the time youth reach high school <sup>(54)</sup>, understanding what adolescents like about bicycling is important for keeping interest levels high and providing pathways for continued engagement that are relevant to youth. In addition, during adolescence, social norms and

peer pressure have a strong influence on individual behavior. Incorporating student feedback and involving youth in the development of both curricular and extracurricular bicycling programs may help schools and communities develop a culture of bicycling, with opportunities to participate from youth to adulthood.

## Effects of Previous Participation in Riding for Focus

While Outride does not track individual students year over year, 10 of the 20 participating schools within our survey sample have included the R4F unit in their curriculum for multiple years and allow students to take the unit more than once. As a result, there were a subset of students that have participated in R4F multiple times. This allows us to compare reported trends in the baseline surveys of students who had participated in the past (32.5% of students) to students who have never previously participated (67.5%) across 916 students at these 10 schools.

Fewer students who had previously participated in R4F reported low levels of bike riding confidence (12.4%) compared to those who had not yet participated (20.3%), suggesting a retention of knowledge and skills even in the absence of consistent practice and access to school bikes. Repeat participants were also slightly less likely to not have a bike at home (15.8%) than those who had not yet participated

(19.6%). This aligns with qualitative reports we've received from teachers, parents, and students, where students are more interested in getting a bike to ride at home after participating. One Riding for Focus student even commented: "I did not know how to ride a bike before and I never thought I could ride one, but now I'm getting a bike for Christmas and I confidently ride bikes."

There were no differences in weekly riding frequency *outside of school* across the groups. One possibility is that because repeat participants ride relatively regularly at school already, they do not ride additionally outside of school. Another possibility is that students don't have access to or knowledge of safe places to ride or access to additional programs to engage in cycling beyond the school day.

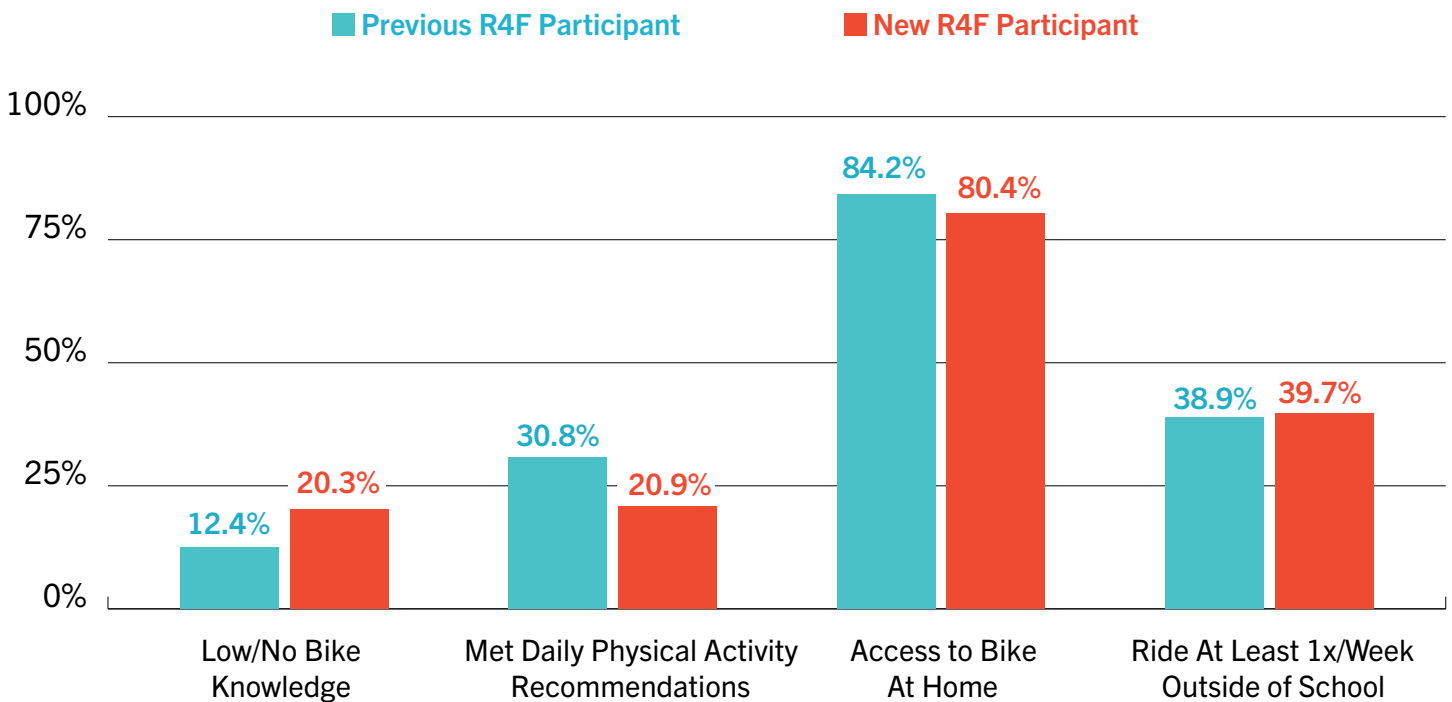
Understanding what encourages student uptake in bicycling *outside of school* is an important question for future research, and where possible, should include youth voices and input on what they'd like to see.



Beyond cycling behavior, previous participants were also more likely to report meeting the daily physical activity recommendations at baseline (30.8%) compared to those who had not yet participated (20.9%). The R4F curriculum has a strong focus on equipping youth with the motivation and skills to be active, no matter the activity, with an emphasis on building physical literacy: “the ability, confidence, and desire to be physically active for life” (55, p. 9). As increased physical literacy has been associated

with increases in physical activity participation (56), this may contribute to the differences in physical activity rates we see across two groups. However, it is an open question whether the R4F program itself is responsible for this difference, or whether students who are already more physically active are more likely to want to take R4F again. Additional work is needed to better understand the long-term behavior impacts of the program on students.

### Baseline Comparisons Across Repeat and New R4F Participants



## Teacher Experience with Riding for Focus

In addition to learning about the student experience with R4F, we also surveyed teachers to better understand their experience implementing the program. 84 teachers responded, and just under half of the respondents (45%) were unable to implement R4F during the 2020-2021 school year due to COVID policies or restrictions within their school (i.e., remote learning, changes in class schedules, equipment sharing).

For the schools that were able to implement at some point during the 2020-2021 school year, 48 teachers shared how R4F has impacted their students, schools, and community, despite the pandemic. Altogether, teachers highly recommended the program, with **100% of teachers saying they'd recommend the Riding for Focus program to other schools.**

*Photographer: Eric Arce*



## What Teachers Like Best about Riding for Focus

When asked what they liked best about R4F, common themes emerged around engaging their students and giving them the opportunity to learn a new skill, all while getting youth outside during the day. Here are the top themes:

### Student Engagement

▮ *“My students are so engaged and excited to ride.”*

▬ Across a number of schools, bicycling generated a lot of student buy-in. Teachers also noted that students who typically presented behavior challenges during class were focused and engaged, and it was an enjoyable activity for those who do not typically like team sports. Additionally, some teachers provided leadership and mentorship opportunities to students to help engage students of varying levels.

### Getting Students Outside

▮ *“I like getting the students out of the regular classroom environment and outside. The unit made students feel as if they weren’t really at school.”*

▬ Teachers also reflected on how riding outside provides students the freedom to explore their environment and learn about places to ride they may have never seen before.

### Teaching Safe Cycling

▮ *“Provides an excellent framework for teaching bike riding with steps to ensure safety.”*

*“I feel like the program teaches good safe cycling habits. In the end most are more aware of vehicle traffic than they previously were.”*

▬ Teachers remarked that the curriculum is informative for students, and teaches the skills necessary for youth to ride safely.

### Teaching Students to Ride for the First Time

▮ *“I have loved seeing my students’ confidence increase. We have had some students who didn’t know how to ride a bike, or who could barely ride a bike prior to the class. By the end they were doing a great job riding with everyone and I could see their confidence had improved a ton!”*

▬ Teaching students who have never ridden how to ride a bike is often a rewarding experience for many teachers.

## Challenges Faced by Riding for Focus Teachers

Understanding what challenges teachers face is also important both for continued program improvement and to identify potential areas where community support may be beneficial. When discussing challenges, the following themes arose:

### Accommodating different skill levels

▮ *"Meeting the needs of all skill levels when teaching a big group."*

*"Keeping the kids who are already proficient at riding bikes engaged in the early days."*

▬ As the student surveys also revealed, the ability to accommodate different skill levels within a class can be difficult, especially when there's only one teacher for the entire class.

### Maintenance

▮ *"We had a tricky year with bike maintenance. We didn't have a bike shop working with us."*

▬ Bicycles require regular maintenance and upkeep to prolong their lifetime. Some regions of the country have terrain that is more prone to getting flat tires, whereas other regions may have harsh weather or soil that can impact the equipment.

### Weather

▮ *"The weather. Snow came early in the fall and lasted well into March."*

▬ Riding in adverse weather can impact student enjoyment and safety without proper gear and training, and in some areas of the country, the majority of the school year could be impacted by unfavorable weather.

### Limited time to implement / time management

▮ *"Managing our time setting up and taking down the bikes during the short time in class."*

*"Getting started was intimidating, but once I did, it was great. The biggest challenge was organization."*

▬ For teachers already facing short Physical Education class times, getting a fleet of bikes ready to go, and then putting them away after class can take up precious minutes.

Providing students with the knowledge and skills to safely ride a bike is a powerful experience, and this sentiment is echoed by our Riding for Focus teachers. However, as a school-based program, it is perhaps unsurprising that many of the common challenges center around staffing, funding/support, and policy around Physical Education schedules.

Despite high levels of engagement from students and teachers, **the most successful programs will be the ones that are able to mobilize their communities to build a culture around bicycling for all ages.**



## Recommendations & Future Directions

*Photographer: Lauren Freeman*

## Recommendations

Providing youth with the opportunity to ride during the school day gets students excited about riding. But increased interest can't translate to increased behavior and benefits to mental and physical health if they don't have a bike, a safe place to ride, or a peer group that may help motivate them. Below are our top recommendations based on our experience and research with both school and community youth cycling programs across the country.

### **Meet Students Where They're At and Provide Student Leadership Opportunities:**

Both students and teachers acknowledged disparities in experience with bicycling within any given class. Increasing teacher bandwidth where possible (i.e., student teachers, co-teaching, community volunteers) to allow for grouping by experience level or introducing student-led learning opportunities were two of the top recommendations from our R4F teachers with regards to how they overcame this challenge.

### **Connect Youth with Access to Bikes:**

To help connect students with access to bikes, research local organizations that may offer earn-a-bike programs (e.g. bike coalitions or bike co-ops), or refurbished bikes to youth (e.g., [Free Bikes 4 Kidz](#)). This is particularly effective when the bike-granting organization partners with existing community organizations and networks.

### **Advocate for Safe Riding Routes and Resources in Your Community:**

Work with your community to adopt [Safe Routes to School](#) policies. Where possible, include youth in the process of identifying gaps and needs for bicycling in your area.

### **Provide Continued Pathways for Youth Engagement with Cycling:**

Provide after-school bicycling programming or connect with local cycling organizations to build youth-focused programs (ideally with youth input). Programs should be focused on fun and building skills and confidence (e.g. [Little Bellas](#), [Trips for Kids](#), local programs) but could provide options for competition for those who are interested (e.g., [NICA](#)).

### **Share How Bikes Can Serve as Economic Opportunity:**

Given the economic disparities that contribute to differences in access to bikes and cycling opportunities, programs that prepare youth for careers and/or economic opportunities while simultaneously giving the knowledge and capacity to maintain bicycles could be particularly powerful. [Project Bike Tech's Bike Tech in School](#) program is one such program. These programs can also provide critical maintenance support in regions that have limited access to bike shops or maintenance knowledge.

### **Share Stories and Experiences that are Relevant to the Youth You Work With:**

Ensure youth have access to role models within cycling that represent their varied experiences. Elevate youth stories told from their own perspective.

### **Collect Data and Share What You're Learning:**

There is relatively limited research and data available that focuses specifically on youth cycling. Collecting data is not only important for helping programs understand where they're making a difference and where they can make improvements, but it can also help organizations secure funding to support their work. Have data or research you'd like to share? Consider presenting at a relevant conference or hosting a webinar or workshop so others can learn from you.

## Future Directions

This report provides important insights into youth access to, experience with, and perceptions around bicycling. It also sheds light on student and teacher reception of an in-school bicycling education program, Riding for Focus. While the program is well-received by both teachers and students and indicates high levels of interest in continuing riding beyond the school day, additional research is needed to understand the longitudinal impact of the program and key factors that translate student interest into action. This work would also provide clarity on the associations we observed between students who have participated in R4F more than once and their cycling knowledge and physical activity rates. Additionally, more research is needed to examine what factors influence student reception of the program, as well as how variations in implementation across schools (where students can ride, weather, class structure, etc.) affect program outcomes.

The report also presented a number of associations between physical activity and well-being and other important outcomes in adolescents. Though these results align with a large body of research that has demonstrated the positive benefits of physical activity (U.S. Department of Health and Human Services, 2018), the associations observed in this data alone do not indicate the existence of causal relationships. While the wide variability in school schedules and student attendance due to COVID-19 prevented us from directly comparing the pre- and post-survey outcomes across all participating schools, we were able to examine pre-post differences using a subset of schools. However, this reduced the sample size available in each of the subgroups, limiting our ability to do extensive analyses across multiple subgroups. Future work will include more in-depth and intersectional comparisons across pre- and post-survey responses, including appropriate control groups where possible.

This is one of the few comprehensive reports to examine disparities in youth bicycling access, experience, and perceptions across gender, race and ethnicity, socioeconomic status, and rurality. However, we were limited in our ability to report on gender minority youth, as well as on youth of Native American, Pacific Islander, and other racial backgrounds due to small sample sizes. This masks the varied experiences of these individuals, and where possible, descriptive statistics of further disaggregated data are made available in the appendix. These small sample sizes, and Outride's organizational mission to diversify the next generation of cyclists, also directly informed changes to our grant making processes – and we are working to ensure these communities will be better represented in future work with our R4F school partners.

While this report did not address barriers to access faced by youth with physical and mental disabilities, many schools have implemented creative solutions depending on the unique needs of their students. This is important work, as teachers may need support and resources to equip them with adaptive options so that all of their students can participate. Outride will continue to compile resources and strategies that we can share with others.

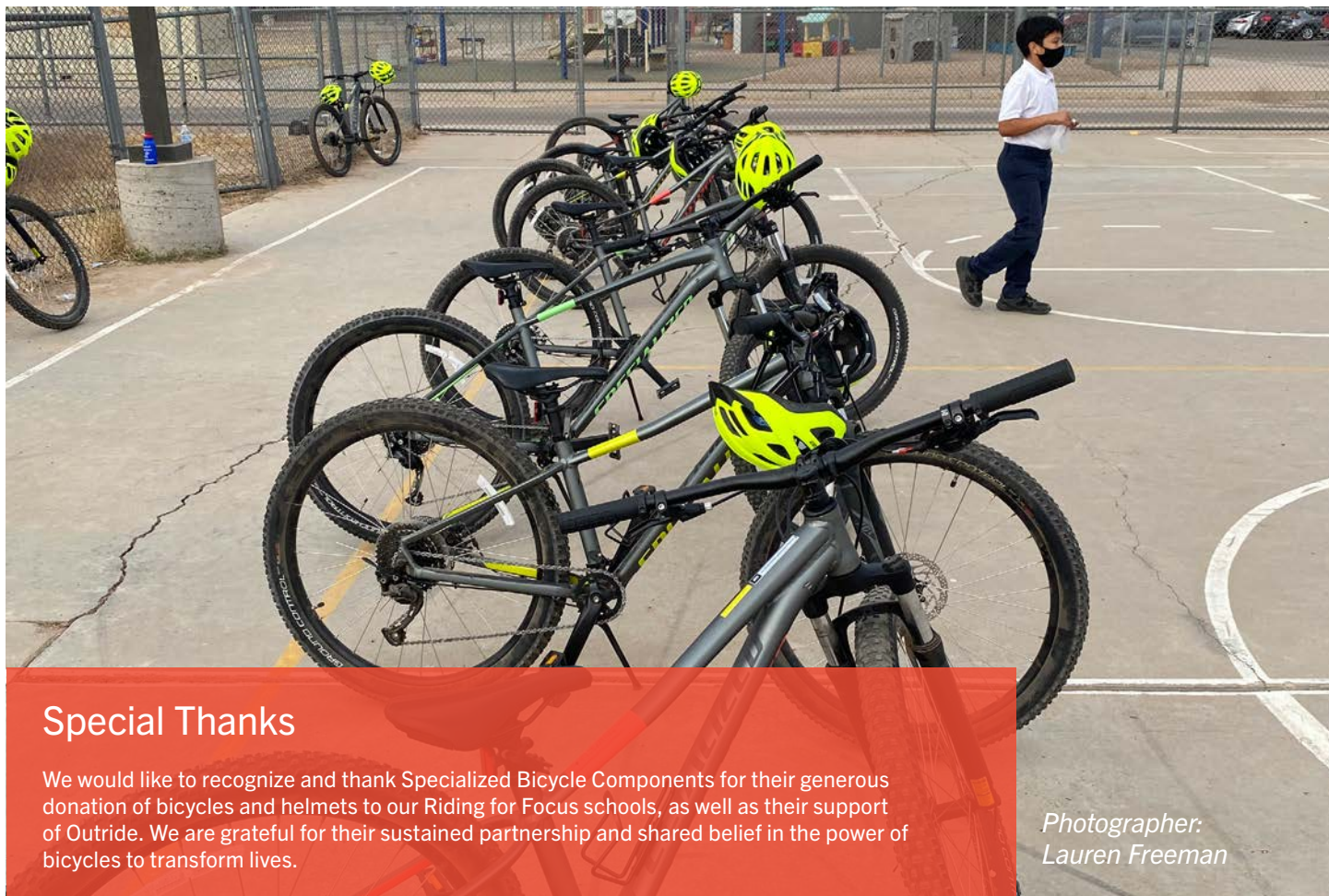
This report has helped to identify key open questions for future research, including how to best translate increased *interest* in bicycling to *actual riding* outside of school (whether through programs, community clubs, active transportation, etc.), understanding barriers to riding outside of school, and capturing youth perspectives on riding in their community. We look forward to sharing the continuation of our work with you, and to learning from others carrying out research in these domains.



## Conclusion

Bicycling is a form of physical activity that engages and excites students – gets them moving, gets them outside (away from screens!) – and this can come with benefits to mental, physical, and social health. Not everyone knows how to ride a bike by the time they reach middle school, and there are disparities across gender, socioeconomic status, race and ethnicity, and zip code in terms of access to bikes, bicycling education, and safe places to ride. Providing cycling programming during the school day supports the

mental, physical, and socio-emotional well-being of students, increases access and exposure to bicycles, equips students to ride safely and confidently, and captures student interest in continuing to ride. But in order to continue to build that interest and support healthier and happier youth and communities, we must come together to provide equitable access to bikes, safe places to ride, and programming relevant to youth.

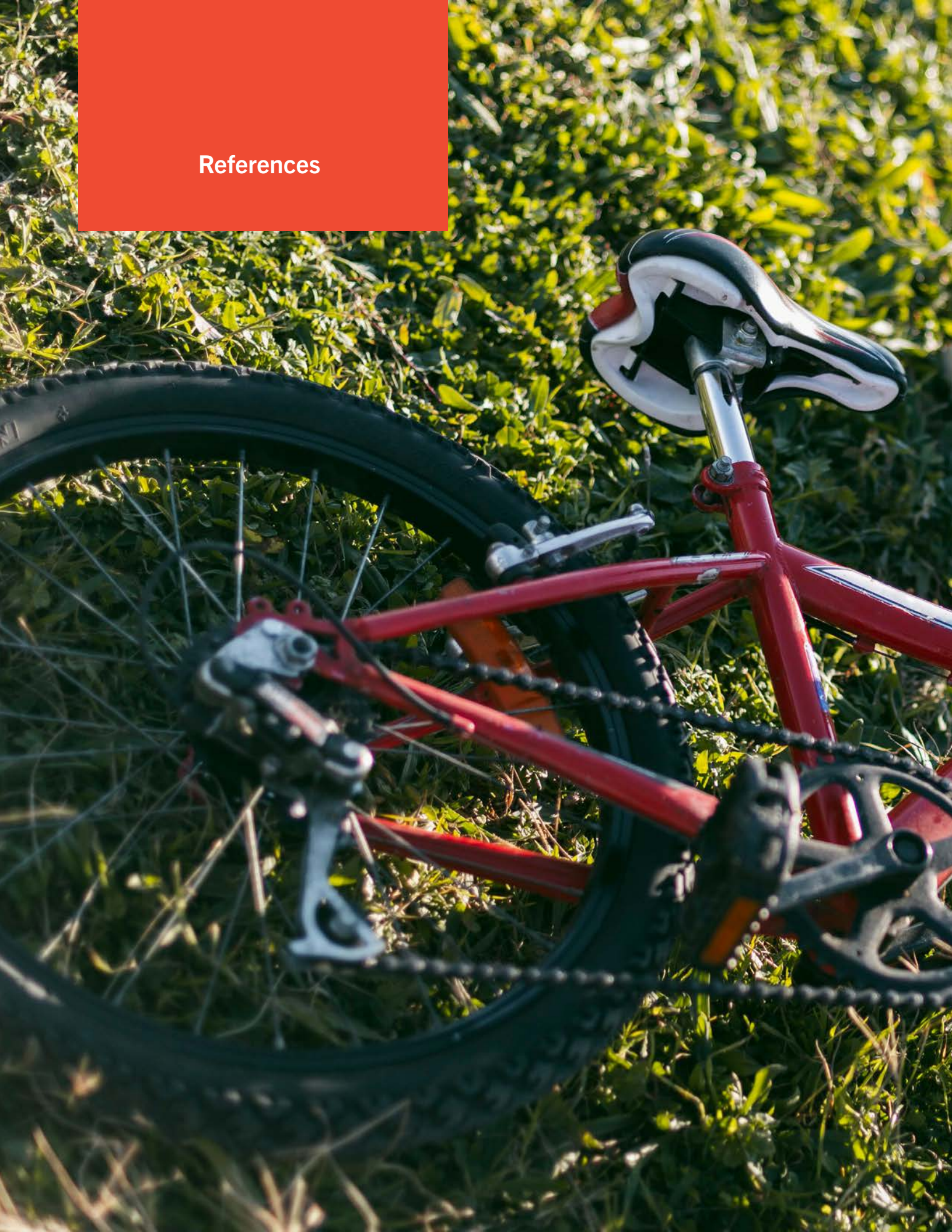


### Special Thanks

We would like to recognize and thank Specialized Bicycle Components for their generous donation of bicycles and helmets to our Riding for Focus schools, as well as their support of Outride. We are grateful for their sustained partnership and shared belief in the power of bicycles to transform lives.

*Photographer:  
Lauren Freeman*

## References



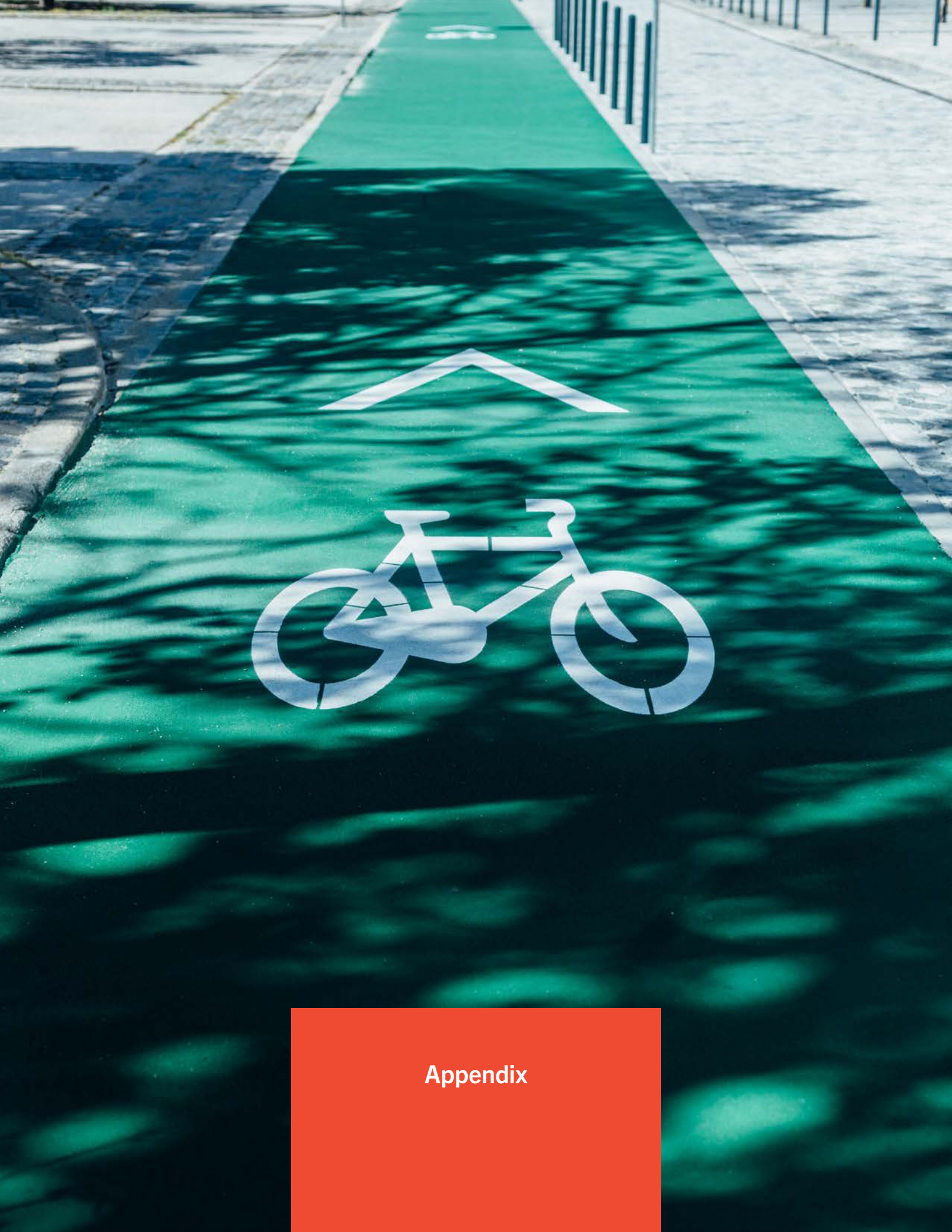
1. Healthy People 2030 [Internet]. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion [cited December 1, 2021]. Available from: <https://health.gov/healthypeople/objectives-and-data/browse-objectives/physical-activity/increase-proportion-adolescents-who-do-enough-aerobic-physical-activity-pa-06>
2. Whitney, D.G. & Peterson, M. (2019). US national and state-level prevalence of mental health disorders and disparities of mental health care use in children. *JAMA Pediatrics*, 173(4), 389-391. doi:10.1001/jamapediatrics.2018.5399
3. Armstrong, S., Wong, C.A., Perrin, E., Page, S., Sibley, L., & Skinner, A. (2018). Association of physical activity with income, race/ethnicity, and sex among adolescents and young adults in the United States: findings from the National Health and Nutrition Examination Survey, 2007-2016. *JAMA Pediatrics*, 172, 732–740.
4. Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: a systematic review. *Social Science & Medicine*, 90, 24–31. <https://doi.org/10.1016/j.socscimed.2013.04.026>
5. Dunton, G.F., Do, B. & Wang, S.D. (2020). Early effects of the COVID-19 pandemic on physical activity and sedentary behavior in children living in the U.S.. *BMC Public Health*, 20, 1351. <https://doi.org/10.1186/s12889-020-09429-3>
6. Xiang, M., Zhang, Z., Kuwahara, K. (2020). Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected. *Progress in Cardiovascular Diseases*, 63(4):531-532. doi:10.1016/j.pcad.2020.04.013
7. Nagata, J.M., Cortez, C.A., Cattle, C.J., et al. (2021). Screen Time Use Among US Adolescents During the COVID-19 Pandemic: Findings From the Adolescent Brain Cognitive Development (ABCD) Study. *JAMA Pediatrics*, 176(1), 94–96. doi:10.1001/jamapediatrics.2021.4334
8. Nagata, J.M., Cortez, C.A., Dooley, E.E., Iyer, P., Ganson, K.T., & Gabriel, K.P. (2022). Moderate-to-vigorous intensity physical activity among adolescents in the USA during the COVID-19 pandemic. *Preventive Medicine Reports*, 25, 101685. <https://doi.org/10.1016/j.pmedr.2021.101685>
9. United States. Public Health Service. Office of the Surgeon General. (2021). Protecting Youth Mental Health: The U.S. Surgeon General's Advisory. U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General.
10. Centers for Disease Control and Prevention (2019). Increasing Physical Education and Physical Activity: A Framework for Schools. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services. [https://www.cdc.gov/healthyschools/physicalactivity/pdf/2019\\_04\\_25\\_PE-PA-Framework\\_508tagged.pdf](https://www.cdc.gov/healthyschools/physicalactivity/pdf/2019_04_25_PE-PA-Framework_508tagged.pdf)
11. U.S. Department of Health and Human Services (2018). Physical Activity Guidelines for Americans, 2nd edition. Washington, DC: U.S. Department of Health and Human Services. Retrieved from [https://health.gov/paguidelines/second-edition/pdf/Physical\\_Activity\\_Guidelines\\_2nd\\_edition.pdf](https://health.gov/paguidelines/second-edition/pdf/Physical_Activity_Guidelines_2nd_edition.pdf)
12. Telama, R., Yang, X., Viikari, J., Välimäki, I., Wanne, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood: A 21-year tracking study. *American Journal of Preventive Medicine*, 28(3), 267-273.

13. Graham, D. J., Sirard, J. R., & Neumark-Sztainer, D. (2011). Adolescents' attitudes toward sports, exercise, and fitness predict physical activity 5 and 10 years later. *Preventive Medicine*, 52(2), 130–132. <https://doi.org/10.1016/j.ypmed.2010.11.013>
14. Beni, S., Iletcher, T., & Chróinín, D.N. (2017). Meaningful Experiences in Physical Education and Youth Sport: A Review of the Literature. *Quest*, 69(3), 291-312, doi: 10.1080/00336297.2016.1224192
15. Visek, A. J., Achrafi, S. M., Mannix, H., McDonnell, K., Harris, B. S., & DiPietro, L. (2015). The fun integration theory: toward sustaining children and adolescents sport participation. *Journal of physical activity & health*, 12(3), 424–433. <https://doi.org/10.1123/jpah.2013-0180>
16. Larouche, R., Mire, E. F., Belanger, K., Barreira, T. V., Chaput, J., Fogelholm, M., et al. (2019). Relationships Between Outdoor Time, Physical Activity, Sedentary Time, and Body Mass Index in Children: A 12-Country Study. *Pediatric Exercise Science*, 31(1), 118-129.
17. Larson, L. R., Szczytko, R., Bowers, E. P., Stephens, L. E., Stevenson, K. T., & Floyd, M. F. (2019). Outdoor Time, Screen Time, and Connection to Nature: Troubling Trends Among Rural Youth? *Environment and Behavior*, 51(8), 966–991. <https://doi.org/10.1177/0013916518806686>
18. Touloumakos, A.K. & Barrable, A. (2020). Adverse Childhood Experiences: The protective and therapeutic potential of nature, *Frontiers in Psychology*, 11, 1-9. doi: <http://dx.doi.org/10.3389/fpsyg.2020.597935>
19. Guide to Community Preventive Services. Physical Activity: Interventions to Increase Active Travel to School. <https://www.thecommunityguide.org/findings/physical-activity-interventions-increase-active-travel-school>. Page last updated: February 02, 2021. Page accessed: December 30, 2021.
20. Børrestad, L. A. B., Østergaard, L., Andersen, L. B., & Bere, E. (2012). Experiences from a randomised, controlled trial on cycling to school: Does cycling increase cardiorespiratory fitness? *Scandinavian Journal of Public Health*, 40(3), 245–252. <https://doi.org/10.1177/1403494812443606>
21. Dill, J., & McNeill, N. (2012). Four types of cyclists? Testing a typology to better understand bicycling behavior and potential. Working Paper, Oregon Transportation Research and Education Consortium, Portland State University, Portland. [http://web.pdx.edu/~jdill/Types\\_of\\_Cyclists\\_PSUWorkingPaper.pdf](http://web.pdx.edu/~jdill/Types_of_Cyclists_PSUWorkingPaper.pdf)
22. Sallis, J.F., Slymen, D.J., Conway, T.L., Frank, L.D., Saelens, B.E., Cain, K., & Chapman, J.E., (2011). Income disparities in perceived neighborhood built and social environment attributes. *Health & Place*, 17(6), 1274-1283.
23. Yu, C. (2014). Environmental supports for walking/ biking and traffic safety: Income and ethnicity disparities. *Preventive Medicine*, 67, 12-16.
24. Brown, C., Blickstein, S., Yang, S., Jain, A. & Sinclair, J. (2021). Where do we go from here? Breaking down barriers to bicycling in the U.S. PeopleForBikes, <https://www.peopleforbikes.org/reports/where-do-we-go-from-here-breaking-down-barriers-to>

25. Sampasa-Kanyinga, H., Standage, M., Tremblay, M.S., Katzmarzyk, P.T., Hu, G., Kuriyan, R., et al. (2017). Associations between meeting combinations of 24-h movement guidelines and health-related quality of life in children from 12 countries. *Public Health*, 153, 16-24. <https://doi.org/10.1016/j.puhe.2017.07.010>
26. Diener, E., Scollon, C.N., & Lucas, R.E. (2009). The evolving concept of subjective well-being: the multifaceted nature of happiness. In: E Diener (ed.) *Assessing well-being: the collected works of Ed Diener*. New York: Springer; 67–100.
27. Sampasa-Kanyinga, H., Colman, I., Dumuid, D., Janssen, I., Goldfield, G.S., Wang, J.L., et al. (2021). Longitudinal association between movement behaviours and depressive symptoms among adolescents using compositional data analysis. *PLoS ONE* 16(9), e0256867. <https://doi.org/10.1371/journal.pone.0256867>
28. Whitfield, G.P, Carlson, S.A., Ussery, E.N., Fulton, J.E., Galuska, D.A., & Peterson, R. Trends in meeting physical activity guidelines among urban and rural dwelling adults—United States, 2008–2017. *Morbidity and Mortality Weekly Report*, 68, 513–518.
29. Christiana, R.W., Bouldin, E.D., & Battista, R.A. (2021). Active living environments mediate rural and non-rural differences in physical activity, active transportation, and screen time among adolescents. *Preventive Medicine Reports*, 23, 101422.
30. Moore, S.A., Faulkner, G., Rhodes, R.E., Vanderloo, L.M., Ferguson, L.J., Guerrero, M.D., et al. (2021). Few Canadian children and youth were meeting the 24-hour movement behaviour guidelines 6-months into the COVID-19 pandemic: Follow-up from a national study. *Applied Physiology, Nutrition, and Metabolism*, 46(10), 1225-1240. <https://doi.org/10.1139/apnm-2021-0354>
31. Twenge, J.R., & Campbell, W.K. (2018). Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive Medicine Reports*, 12, 271-283.
32. Wheaton, A.G., Jones, S.E., Cooper, A.C., & Croft, J.B. (2018). Short Sleep Duration Among Middle School and High School Students — United States, 2015. *Morbidity and Mortality Weekly Report*, 67, 85–90. <http://dx.doi.org/10.15585/mmwr.mm6703a1>
33. Paruthi, S., Brooks, L. J., D'Ambrosio, C., Hall, W. A., Kotagal, S., Lloyd, R. M., et al. (2016). Consensus Statement of the American Academy of Sleep Medicine on the Recommended Amount of Sleep for Healthy Children: Methodology and Discussion. *Journal of Clinical Sleep Medicine*, 12(11), 1549–1561. <https://doi.org/10.5664/jcsm.6288>
34. Guglielmo, D., Gazmararian, J.A., Chung, J., Rogers, A.E., & Hale, L. (2018). Racial/ethnic sleep disparities in US school-aged children and adolescents: a review of the literature. *Sleep Health*, 4(1), 68-80.
35. Gillis, B. T., Shimizu, M., Philbrook, L. E., & El-Sheikh, M. (2021). Racial disparities in adolescent sleep duration: Physical activity as a protective factor. *Cultural Diversity and Ethnic Minority Psychology*, 27(1), 118–122.
36. Johansen, K. (1998). The use of well-being measures in primary health care – the Dep-Care project; in World Health Organization, Regional Office for Europe: *Well-Being Measures in Primary Health Care – the DepCare Project*. Geneva, World Health Organization, target 12, E60246.

37. Allgaier, A. K., Pietsch, K., Frühe, B., Prast, E., Sigl-Glöckner, J., & Schulte-Körne, G. (2012). Depression in pediatric care: Is the WHO-Five Well-Being Index a valid screening instrument for children and adolescents? *General Hospital Psychiatry*, 34(3), 234-241. <https://doi.org/10.1016/j.genhosppsych.2012.01.007>
38. Topp, C.W., Østergaard, S.D., Søndergaard, S., Bech, P. (2015). The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychotherapy and Psychosomatics*, 84:167-176. doi: 10.1159/000376585
39. Topp, C.W., Østergaard, S.D., Søndergaard, S., & Bech, P. (2017). Supplementary Material for: The WHO-5 Well-Being Index: A Systematic Review of the Literature. Karger Publishers. Dataset. <https://doi.org/10.6084/m9.figshare.5127700.v1>
40. Bull, F.C., Al-Ansari, S.S., Biddle, S., et al. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, 54, 1451-1462.
41. Zander, A., Passmore, E., Mason, C. & Rissel, C. (2013). Joy, Exercise, Enjoyment, Getting Out: A Qualitative Study of Older People's Experience of Cycling in Sydney, Australia. *Journal of Environmental and Public Health*, 2013, 547453, <https://doi.org/10.1155/2013/547453>
42. Drews, Elizabeth. (2017). Bicycles and Youth: Impacts. Retrieved from Sophia, the St. Catherine University repository website: [https://sophia.stkate.edu/msw\\_papers/727](https://sophia.stkate.edu/msw_papers/727)
43. Jones, P. (2017). The impact of cycle skills training on skills, confidence, attitudes, and rates of cycling. [Masters dissertation, Waterford Institute of Technology]. Waterford Institute of Technology Open Access Repository.
44. Packham, A., & Street, B. (2019). The effects of physical education on student fitness, achievement, and behavior. *Economics of Education Review*, 72, 1-18.
45. Ladwig, M.A., Vazou, S., & Ekkekakis, P. (2018). "My best memory is when I was done with it": PE memories are associated with adult sedentary behavior. *Translational Journal of the ACSM*, 3(16), 119-129.
46. Piccininni, C., Michaelson, V., Janssen, I., & Pickett, W. (2018). Outdoor play and nature connectedness as potential correlates of internalized mental health symptoms among Canadian adolescents. *Preventive Medicine*, 112, 168-175.
47. USA Cycling, 2020. USA Cycling Demographics Survey 2020 Results. Retrieved 1/10/21 from <https://s3.amazonaws.com/usac-craft-uploads-production/documents/Demographics-Report-2020.pdf>
48. Aranda-Balboa, M. J., Chillón, P., Saucedo-Araujo, R. G., Molina-García, J., & Huertas-Delgado, F. J. (2021). Children and Parental Barriers to Active Commuting to School: A Comparison Study. *International Journal of Environmental Research and Public Health*, 18(5), 2504. <https://doi.org/10.3390/ijerph18052504>
49. McDonald, N.C. (2008). Critical factors for active transportation to school among low-income and minority students. Evidence from the 2001 National Household Travel Survey. *American Journal of Preventive Medicine*, 34, 341–344.

50. Roberts, J.D., Mandic, S., Fryer, C.S., Brachman, M.L., Ray, R. (2019) Between Privilege and Oppression: An Intersectional Analysis of Active Transportation Experiences Among Washington D.C. Area Youth. *International Journal of Environmental Research and Public Health*. 16(8):1313. <https://doi.org/10.3390/ijerph16081313>
51. Reed, J.A., Ballard, R.M., Hill, M., & Berrigan, D. (2020). Identification of effective programs to improve access to and use of trails among youth from under-resourced communities: A review. *International Journal of Environmental Research and Public Health*, 17(21), 7707, <https://doi.org/10.3390/ijerph17217707>
52. National Collaborative on Childhood Obesity Research (2021). Increasing the Health and Physical Activity of Youth from Under-Resourced Communities through Trail Programs. [https://www.nccor.org/wp-content/uploads/2021/02/NCCOR\\_Trail\\_Use\\_Program\\_Brief\\_Final1.pdf](https://www.nccor.org/wp-content/uploads/2021/02/NCCOR_Trail_Use_Program_Brief_Final1.pdf) [Accessed on: December 15, 2021].
53. PeopleForBikes (2019). U.S. bicycling participation study: Report of findings from the 2018 survey. Corona Insights. [https://prismic-io.s3.amazonaws.com/peopleforbikes/2a399be4-8bda-4e2a-b47a-8e7e06e65385\\_2018\\_Participation\\_Study.pdf](https://prismic-io.s3.amazonaws.com/peopleforbikes/2a399be4-8bda-4e2a-b47a-8e7e06e65385_2018_Participation_Study.pdf)
54. Underwood, S., & Handy, S.L. (2012). Adolescent attitudes towards active transportation: Bicycling in youth in retrospect from adulthood. UC Davis Institute of Transportation Studies Research Report, UCD-ITS-RR-12-14.
55. Aspen Institute Physical Literacy Working Group. (2015). Physical literacy in the United States: A model, strategic plan, and call to action. The Aspen Institute Project Play.
56. Cairney, J., Dudley, D., Kwan, M., Bulten, R., & Kriellaars, D. (2019). Physical literacy, physical activity and health: Toward an evidence-informed conceptual model. *Sports Medicine*, 49, 371-383.



Appendix



## Survey Distribution

The student surveys were reviewed and approved by an independent Institutional Review Board. Each school was provided with a unique electronic web link for the pre- and post- surveys that they could distribute to their students. Student responses were anonymous and student participation in the surveys was voluntary. An aggregated summary of each participating school’s survey results was distributed to each school at the end of the 2020-2021 school year.

## Survey Questions

Both pre- and post- surveys contained a combination of validated questions about movement behaviors (e.g. sleep, physical activity, screen time) and well-being (WHO-5), along with both open- and closed-ended questions focused around bicycle riding behavior and experience. The post-survey also contained a combination of open- and closed-ended questions about student experience in the Riding for Focus program.

## Survey Respondents

There were 1,268 respondents for the pre-survey and 910 for the post- survey. Only completed surveys (pre: 90.5%, post: 89.6%) were included in the analysis.

For any direct comparisons that are reported between pre- and post-surveys, only the 12 schools that were able to have the same students complete both sets of surveys were included (pre: 820 students, post: 812 students). Only completed surveys were included (pre: 85.7%, post: 85.6%).

A breakdown of the self-reported gender and self-reported race and ethnicity of respondents across the surveys is in Table 1.

**Table 1.** Summary of survey respondents across all 20 participating R4F schools.

	Pre	Post
Total Respondents	1,268	910
Completed Surveys	1,148 (90.5%)	815 (89.6%)
<b>Gender</b>		
Female	40.8%	41.1%
Male	53.2%	52.0%
A gender not listed	3.5%	3.0%
Prefer not to say / No response	2.5%	3.9%
<b>Race or Ethnicity</b>		
Asian or Asian American	3.0%	5.0%
Black or African American	4.4%	5.2%
Hispanic or Latinx	8.5%	9.1%
More than one race	12.7%	11.3%
Native American	2.4%	2.3%
Native Hawaiian or Pacific Islander	1%	1.1%
White	63.9%	61.3%
Not listed	4.0%	4.5%

**Table 2.** Summary of survey respondents across the subset of 12 R4F schools that were able to participate in both pre- and post-surveys.

	Pre	Post
Total Respondents	820	812
Completed Surveys	703 (85.7%)	695 (85.6%)
<b>Gender</b>		
Female	42.5%	41.3%
Male	51.5%	52.2%
A gender not listed	3.4%	3.0%
Prefer not to say / No response	2.6%	3.5%
<b>Race or Ethnicity</b>		
Asian or Asian American	3.8%	5.0%
Black or African American	5.1%	5.2%
Hispanic or Latinx	8.3%	9.1%
More than one race	13.6%	11.4%
Native American	1.6%	2.2%
Native Hawaiian or Pacific Islander	1.3%	1.1%
White	61.7%	61.2%
Not listed	4.6%	4.8%

## School Categorization

Rurality was determined based on zip codes listed as eligible for rural consideration by the Federal Office of Rural Health Policy <sup>(1)</sup>. Schools were only categorized as rural or not rural. Future work will explore also categorizing schools by urbanicity.

Child poverty rate of a school was based on the neighborhoods they serve and derived from zip code level information on population density and median income gathered from the American Community Survey, as made available on censusreporter.org <sup>(2)</sup>. Schools were then grouped into “low” and “high” categories for child poverty rate, based on whether the rate fell above or below the United States national average of 16.1% <sup>(3)</sup> (high: 16.1% or greater child poverty rate, low: less than 16.1% child poverty rate).

**Table 3.** Summary of school categorization by rurality and child poverty rate.

	Number of Schools Participating in Surveys	Number of Students
<b>Rurality</b>		
Rural	9	608
Not Rural	11	552
<b>Child Poverty Rate</b>		
High ( >= 16.1%)	7	453
Low (< 16.1%)	13	707

## Statistical Methods

Analyses were conducted using mixed effects models using the *lme4* package <sup>(4)</sup> in R <sup>(5)</sup>. For *lmer* models using continuous outcome variables (e.g., WHO-5), scores were first scaled and centered. Models with binary outcome variables used *glmer*. For modeling purposes, all movement behaviors (sleep, physical activity, screen time) were transformed into binary categories (1 = they met the recommendation; 0 = they did not meet the recommendation). Rurality (rural = 1, not rural = 0), child poverty (high child poverty = 1, low child poverty = 0), and bike-riding

frequency (ride at least once a week = 1, ride less than once a week = 0) were also binary. Race and gender were included as categorical variables. Each school had a unique School ID, which was included as a random effect to account for possible variation across schools. Interaction terms were not included in these analyses, but future work with larger samples will focus on possible intersectional outcomes. Statistical significance was determined at the p=.05 level, with p-values for continuous models determined by the *lmerTest* package <sup>(6)</sup>.

## Tables of Reported Data

Table 4. Baseline movement behaviors and well-being. Cells with fewer than 10 respondents are not reported.

	Meet Daily Physical Activity Recommendations	Meet Sleep Recommendations	Meet Screen Time Recommendations	Average WHO-5 Well-Being
Overall	24.1%	27.8%	23.5%	62.9
Rural	28.6%	26.3%	24.8%	62.5
Non-Rural	19.2%	29.5%	22.1%	63.4
High Child Poverty	25.8%	21.8%	21.5%	61.7
Low Child Poverty	23.3%	31.4%	25.0%	64.0
Female	17.4%	27.6%	20.0%	57.5
Male	29.8%	28.7%	27.1%	68.6
A Gender Not Listed	–	–	–	46.3
Gender Not Reported	–	–	–	48.9
Asian or Asian American	12.1%	17.6%	21.2%	65.8
Black or African American	16.0%	16%	14.0%	62.2
Hispanic or Latinx	18.6%	26.8%	15.5%	61.4
More than one race	26.2%	27.8%	15.8%	60.3
Native American	–	–	–	58.7
Native Hawaiian or Pacific Islander	–	–	–	63.3
White	25.5%	29.7%	27.2%	63.8
Other / Not listed	19.1%	39.1%	21.3%	62.2

Table 5. Baseline well-being by meeting behavior recommendations

Group	WHO-5
Meet Sleep Recommendations	71.8
Do Not Meet Sleep Recommendations	60.8
Meet Physical Activity Recommendations	72.3
Do Not Meet Physical Activity Recommendations	61.2
Meet Screen Time Recommendations	71.0
Do Not Meet Screen Time Recommendations	61.6

Table 6. Baseline well-being by frequency of physical activity

Days per Week Active	Average WHO-5	Proportion of Students
0	38.8	5.1%
1	51.6	3.8%
2	56.9	6.5%
3	57.1	10.4%
4	62.0	14.3%
5	63.1	21.9%
6	68.0	13.8%
7	71.2	24.1%

Table 7. Frequency of baseline physical activity by student outcomes

	Active more than 3 days/week	Active 3 or fewer day/week
% High Quality Peer Relationships	87.6%	73.6%
% Feeling Focused during School Day	71.7%	58.6%
% Feeling Awake during School Day	59.3%	43.1%

Table 8. Baseline bicycle riding frequency and well-being

Bicycle Riding Frequency	Average WHO-5	Proportion of Students
Rarely / Never	54.2	16.9%
Infrequently (2-3x/year)	59.8	13.6%
Occasionally (Once a month)	63.3	27.1%
Often (Once a week or more)	67.1	42.5%

Table 9. Changes in well-being scores from pre to post (only includes the 12 schools that were able to participate in both pre- and post-surveys).

	Pre	Post
WHO-5 Well-Being - Overall	64.6	67.8
Female	59.1	64.3
Male	69.1	70.6
Asian or Asian American	65.1	65.8
Black or African American	60.6	67.4
Hispanic or Latinx	59.2	64.5
More than one race	62.1	67.8
White	66.2	67.8

Table 10. Changes in movement behaviors from pre to post (only includes the 12 schools that were able to participate in both pre- and post-surveys).

Outcome	Pre	Post
Meet Physical Activity (PA) Recommendations		
Overall	22.3%	24.9%
Female	16.3%	19.5%
Male	27.2%	29.1%
Meet Sleep Recommendations		
Overall	31.2%	31.5%
Female	30.0%	27.4%
Male	32.2%	34.7%
Meet Screen Time Recommendations		
Overall	25.0%	28.0%
Female	19.4%	26.7%
Male	30.7%	29.5%
Ride a Bike At Least 1x/Week Outside of School		
Overall	45.0%	44.0%
Female	38.1%	35.0%
Male	50.9%	50.5%

Table 11. Baseline riding knowledge, access, frequency

	Low/no bike knowledge / riding confidence	No access to a bike at home	Ride at least 1x/week (outside of school)
Overall	17.3%	16.5%	42.5%
Rurality			
Rural	14.2%	14.5%	45.3%
Non-Rural	20.7%	18.8%	39.3%
Child Poverty			
High Child Poverty	17.5%	21.0%	38.5%
Low Child Poverty	17.2%	13.7%	43.7%
Gender			
Female	23.0%	18.2%	35.3%
Male	12.3%	15.0%	48.9%
A Gender Not Listed	–	–	31.7%
Gender Not Reported	–	–	34.6%
Race or Ethnicity			
Asian or Asian American	18.2%	11.8%	41.2%
Black or African American	15.7%	29.4%	30.0%
Hispanic or Latinx	29.9%	33.0%	33.0%
More than one race	14.4%	18.6%	45.5%
Native American	–	–	–
Native Hawaiian or Pacific Islander	–	–	–
White	15.9%	12.7%	43.6%
Other / Not listed	23.4%	23.4%	42.6%

Table 12. Post-R4F: Fun in R4F, Interest in continuing riding

	Had Fun in R4F	Interest in Continuing Riding (At least a little interest / strong interest / no interest)
Overall	85.4%	91.5% / 67.8% / 8.5%
<b>Rurality</b>		
Rural	81.0%	90.9% / 68.0% / 9.1%
Non-Rural	88.4%	92.0% / 67.5% / 8%
<b>Child Poverty</b>		
High Child Poverty	91.4%	93.8% / 64.6% / 6.2%
Low Child Poverty	83.4%	90.6% / 68.1% / 8.4%
<b>Gender</b>		
Female	81.2%	88.3% / 59.3% / 11.7%
Male	88.4%	94.6% / 75.5% / 5.4%
A Gender Not Listed	91.3%	83.3% / 62.5% / 16.7%
Gender Not Reported	84.2%	89.7% / 58.6% / 10.3%
<b>Race or Ethnicity</b>		
Asian or Asian American	91.2%	92.7% / 82.9% / 7.3%
Black or African American	80.6%	95.2% / 73.8% / 4.8%
Hispanic or Latinx	91.1%	90.5% / 58.1% / 9.5%
More than one race	90.0%	87.0% / 65.2% / 13.0%
Native American	—	—
Native Hawaiian or Pacific Islander	—	—
White	84.3%	92.6% / 67.9% / 7.4%
Other / Not listed	80.0%	86.5% / 70.3% / 13.5%

Table 13. Post-R4F student interest in bicycling activities

	Racing	Riding To School	Riding Trails	Exploring neighborhood	Riding with Friends	Riding with Family
Overall	26.1%	26.6%	65.2%	63.6%	81.5%	52.5%
Rurality						
Rural	20.1%	25.8%	72.0%	63.5%	86.8%	51.3%
Non-Rural	30.0%	28.0%	60.8%	63.6%	78.1%	53.3%
Child Poverty						
High Child Poverty	43.0%	22.9%	63.7%	60.3%	82.1%	50.3%
Low Child Poverty	21.4%	27.7%	65.2%	64.5%	81.4%	52.8%
Gender						
Female	15.5%	23.6%	57.3%	66.6%	85.7%	60%
Male	34.0%	27.6%	71.7%	61.6%	79.0%	48.8%
A Gender Not Listed	33.3%	33.3%	70.8%	66.7%	83.3%	29.2%
Gender Not Reported	24.1%	41.4%	55.2%	55.2%	69.0%	41.4%
Race or Ethnicity						
Asian or Asian American	31.7%	29.3%	53.7%	58.5%	73.2%	63.4%
Black or African American	38.1%	33.3%	57.1%	61.9%	64.3%	45.2%
Hispanic or Latinx	48.6%	13.5%	48.6%	48.6%	63.5%	40.5%
More than one race	27.2%	29.3%	66.3%	71.7%	87.0%	56.5%
Native American	–	–	–	–	–	–
Native Hawaiian or Pacific Islander	–	–	–	–	–	–
White	21%	28.2%	69.8%	65.6%	85.8%	54%
Other / Not listed	27.0%	16.2%	62.2%	64.9%	78.4%	48.6%

Table 14. Effects of previous R4F participation

	Previously Participated in R4F	Never Participated in R4F
Number Of Students Included In Analysis	298 (32.5%)	618 (67.5%)
Low/No Bike Knowledge / Riding Confidence	12.4%	20.3%
Meet Daily Physical Activity Recommendations	30.8%	20.9%
Report High Quality Peer Relationships	88.4%	80.6%
Access To Bikes At Home	84.2%	80.4%
Ride At Least 1x / Week	38.9%	39.7%

## Appendix References

1. Health Resources & Services Administration. Federal Office of Rural Health Policy (FORHP) Data Files. <https://www.hrsa.gov/rural-health/about-us/definition/datafiles.html> Page last updated: October 2021. Page accessed: January 2, 2022.
2. U.S. Census Bureau (2019). Poverty Status in the Past 12 Months by Sex by Age American Community Survey 1-year estimates. Retrieved from <<https://censusreporter.org>>
3. Shrider, E.A., Kollar, M., Chen, F., & Semega, J., U.S. Census Bureau, Current Population Reports, P60-273, Income and Poverty in the United States: 2020, U.S. Government Publishing Office, Washington, DC, September 2021
4. Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, 67(1), 1–48. doi: 10.18637/jss.v067.i01.
5. R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
6. Kuznetsova, A., Brockhoff, P.B., & Christensen, R.H.B. (2017). lmerTest Package: Tests in Linear Mixed Effects Models. *Journal of Statistical Software*, 82(13), 1–26. doi: 10.18637/jss.v082.i13.



**OUTRIDE**

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