



HALIFAX
BIKE LAB

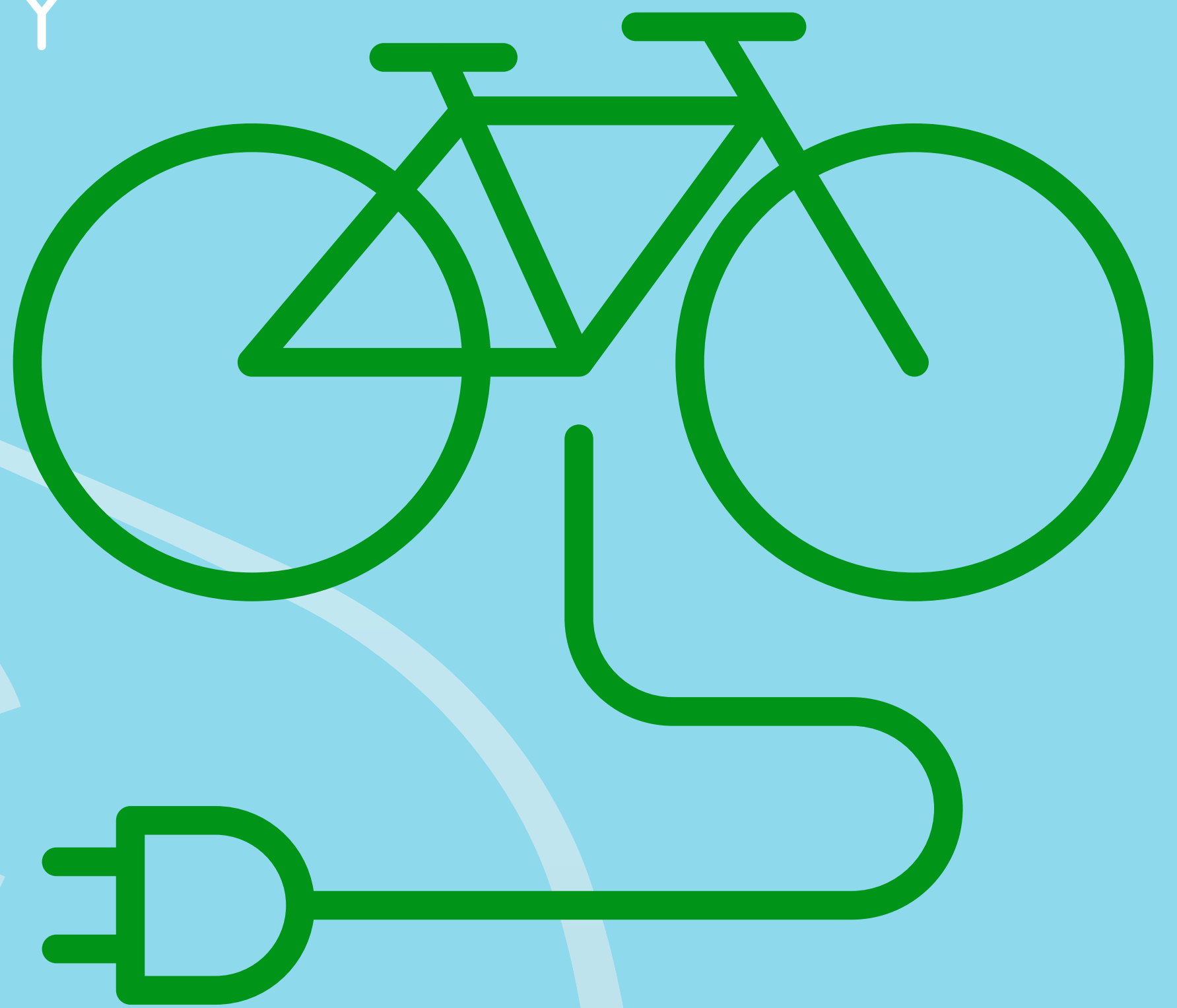
Ecology Action Centre



A QUALITATIVE EXPLORATION OF THE ECOLOGY ACTION CENTRE'S E-BIKE LOAN PROGRAM

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HEALTHY
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SUMMARY

E-bikes are increasingly being recognised as an alternative to single occupancy vehicle journeys. Loan programs allow people to try out an e-bike without the financial commitment of a purchase. The Ecology Action Centre's Easyride e-bike loan program was in operation from 2020-2023 in Kjiptuk/Halifax, Nova Scotia and provided the opportunity for participants to try out an e-bike for six weeks.

This report describes the findings of qualitative interviews conducted with 21 participants of the e-bike loan program. The study sought to answer three research questions:

- 1) Can e-bikes be used as a tool for expanding bicycle use to a more diverse group in Kjiptuk/Halifax, Nova Scotia?
- 2) Can e-bikes overcome common barriers to cycling use for daily trips including topography (hills), distance, fitness, and age?
- 3) Can e-bikes be used for transportation in place of single occupancy vehicles?

Participants were relatively diverse with respect to gender and age. Participants found that using an e-bike enabled them to overcome common barriers associated with cycling, such as hills or their own physical limitations. The e-bike also helped participants to feel more confident cycling, and 81% of participants reporting replacing trips by single occupancy vehicle with their e-bike during the loan period.

While participation in the program was viewed positively, the lack of protected infrastructure for safe cycling in Kjiptuk/Halifax was considered a barrier to the uptake of this active travel mode.

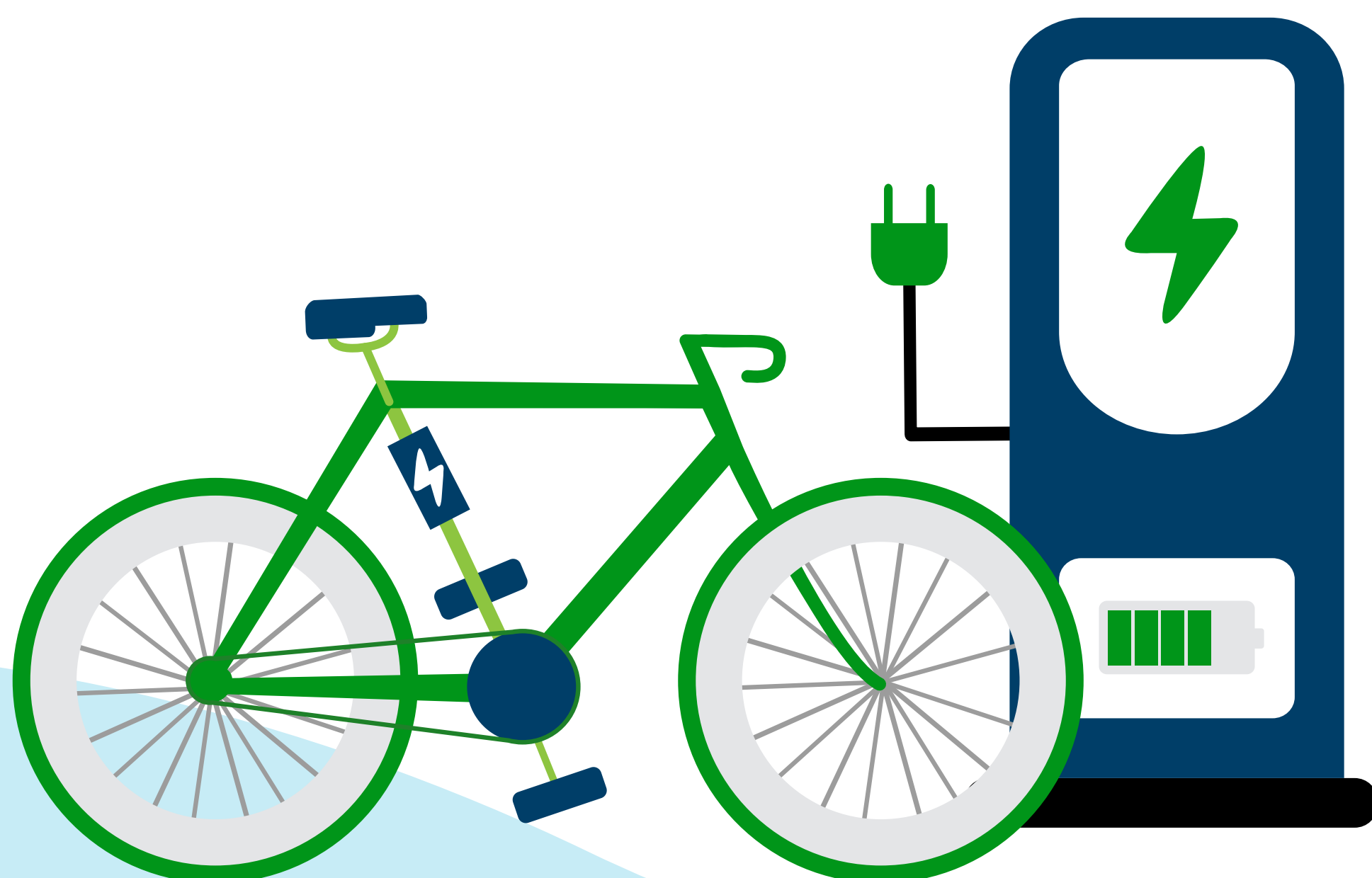
INTRODUCTION

The predominant pattern of single occupancy vehicle (SOV) use, including electric cars, has been associated with negative environmental and health impacts.^{1,2} Replacing car trips with journeys by bicycle offers a means to mitigate these impacts.³ Although cycling is a healthy, affordable, and efficient form of travel,⁴ data show substantial geographic and demographic patterning in cycling across Canada. Analysis of data from the 2013-14 Canadian Community Health Survey identified seven Canadians who cycle for leisure for every one Canadian that cycles to commute.⁵ A recent analysis found that the bicycle commute mode share in Canada increased from 1.3% in 1996 to 1.5% in 2016.⁶ However, racialized people bicycle at lower rates than non-racialized people⁶ and women comprise only one-third of bicycle commuters across Canada.^{6,7} If we are to realise the health and environmental benefits of cycling as a utilitarian travel mode, we need to better understand the barriers and enablers to their use and explore opportunities to incentivise behaviour change.

Previous studies have demonstrated the difficulty in getting frequent drivers to reduce car use even though it has been demonstrated that a car-centric design is unsustainable.⁸ Electric assist bicycles (pedelecs, referred to in this report as e-bikes) are defined as bicycles with battery-powered motors that assist the rider as they pedal. While still classified in most countries as bicycles (as opposed to mopeds), e-bikes provide an opportunity to stimulate behaviour change in favour of active and sustainable transportation modes. Previous e-bike studies have reported benefits such as increased confidence riding with vehicular traffic due to increased speed and quick acceleration, ability to arrive at one's destination without looking disheveled or sweaty, reducing pain and exertion while navigating hills and bridges, and reducing an individual's environmental footprint.⁹ E-bikes can contribute to well-being through promoting independent travel, extending geographical reach,¹⁰ and fostering demographic diversity.¹¹ A study from 2017 in the UK tracked an e-bike loan program and found that it led to a 20% reduction in car miles driven by participants.¹²

A recent randomized control trial (RCT) from Sweden explored the e-bike substitution effect on modal choice, trip frequency, distance travelled and perceptions as a substitute for the car, demonstrating favorable results for e-bike adoption, even in frequent car users.¹³ The study found that, on average, frequent drivers increased their cycling by one trip or 6.5 km per day after getting access to an e-bike.¹³ In Switzerland, an e-bike trial for two weeks was a favorable intervention that disrupted vehicle owners' mobility habits as well as supported a higher likelihood to purchase an e-bike. The defining difference in this study was that participants traded the keys to their personal motor vehicle for the free use of an e-bike for the duration of the loan period, which forced participants to find another method of transportation for any trip they previously would have done by car. Personal transportation methods are highly habitual and the higher degree of disruption caused by losing access to their private vehicle allowed participants to more readily accept the e-bike as a viable alternative.¹⁴

Like cities and regions across the world, both the province of Nova Scotia and the Halifax Regional Municipality have identified the promotion of active travel (AT) as an important action to mitigate climate change.^{15,16} In 2020, the Ecology Action Centre, a member-based environmental charity, introduced the Easyride program within the Halifax region, funded by the Nova Scotia government.¹⁷



The Easyride program allowed participants to try out an e-bike for a period of six weeks, with the goal of creating opportunities for people to experience how an e-bike could fit into their work commute and daily life and overcome common barriers to cycling. Participants who volunteered for the e-bike loan program received training on e-bike use and road safety, and use of an Electra Townie Go! 8i Step-Thru bike during their loan period.

Building on earlier studies of e-bike loan programs, we invited participants of the Easyride program to share their experiences with using an e-bike for promoting sustainable active transport mobility behaviours, and to identify contextual factors influencing participation in the program.

We asked three research questions:

- 1) Can e-bikes be used as a tool for expanding bicycle use to a more diverse group in Kijipuktuk/Halifax, Nova Scotia?
- 2) Can e-bikes overcome common barriers to cycling use for daily trips including topography (hills), distance, fitness, and age?
- 3) Can e-bikes be used for transportation in place of single occupancy vehicles?



METHODS

Study Context: Kijipuktuk/Halifax is a mid-sized city on the east coast of Canada. The Halifax Regional Municipality encompasses urban, suburban and rural areas, with a total population of over 439,00 people in 2021, and 348,634 people living within its population centre.¹⁸ Following unanimous approval of its Integrated Mobility Plan in 2017, the municipal government committed to “deliver a Regional Centre all ages and abilities bicycle network by 2022”.¹⁹ With high latent demand, growth in cycling in Halifax is likely to occur once a safe and connected network is completed, but the current lack of safe infrastructure is an identified barrier, as is Halifax’s hilly topography.²⁰

Study Design: To better understand participant experiences with the Easyride program, we conducted semi-structured interviews with a sample of participants from six cohorts that ran from September to October 2020 (two cohorts), and May to September 2021 (four cohorts). The study protocol was approved by the Saint Mary’s University Research Ethics Board. Participants in the Easyride program first completed a short online survey which included an invitation to participate in an interview about their experiences with the e-bike. The survey captured basic demographics (e.g., gender, race/ethnicity, age range, occupation, commuting patterns and cycling experience) and perceived barriers to cycling. After completion of the loan period, participants were invited to an interview with a member of the research team. Interviews were conducted via online video conferencing software (Zoom) or by telephone due to gathering restrictions associated with the global COVID-19 pandemic at the time of data collection. Participants provided informed consent at the start of the interview before being asked a series of open-ended questions.

Analysis: Interviews were audio-recorded, transcribed and imported into Nvivo 12, a qualitative data analysis software that helps organize, code and theme data according to the stated study purpose. Data were then analyzed using Qualitative Description to remain close to the data and the experiences of participants.^{21,22} In the following sections, participants are identified using an alias to maintain confidentiality.

RESULTS

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In total, 21 people participated in interviews over the six cohorts, representing 68% of overall participants in the program (see Table 1).

Table 1: Participant Characteristics

Characteristics	N (%)	Participants
Gender:		
Female identifying	11 (52.4%)	Amy, Anna, Diane, Jane, Kayla, Lisa, Mary, Mia, Molly, Rosa & Sue
Male Identifying	10 (47.6%)	Bill, Dan, Doug, Jose, Kyle, Miles, Noah, Percy, Peter & Raj
Age range:		
20-29	3 (14.3%)	Amy, Dan, & Kayla
30-39	8 (38.1%)	Anna, Bill, Kyle, Mary, Mia, Miles, Noah & Rosa
40-49	5 (23.8%)	Lisa, Molly, Percy, Raj & Sue
50-59	4 (19.1%)	Doug, Jane, Jose & Peter
60-69	1 (4.8%)	Diane
Race:		
Caucasian	17 (81.0%)	Amy, Anna, Bill, Diane, Doug, Jane, Kayla, Kyle, Lisa, Mary, Mia, Miles, Molly, Noah, Percy, Peter & Sue
Latin American/Latino	2 (9.5%)	Jose & Rosa
Indian	1 (4.8%)	Raj
Afro-Caribbean	1 (4.8%)	Dan
Physical limitations that might impact ability to cycle	0 (0%)	N/A
Prior commuting method:		
Only drove	9 (43%)	Anna, Bill, Diane, Doug, Jane, Lisa, Mary, Miles & Sue
Multimodal	8 (38%)	Amy, Dan, Kyle, Mia, Molly, Noah, Peter & Raj
Only walked	3 (14%)	Jose, Kayla & Rosa
Only bussed	1 (5%)	Percy
Only cycled	0 (0%)	N/A

Our first research question asked whether e-bikes could be used as a tool for expanding bicycle use to a more diverse group of people. In the population centre of the municipality, 4.3% of male-identifying commuters report cycling to work, while only 2.3% of female-identifying commuters do.²³ In the surrounding suburbs, this drops to 0.8% of male-identifying commuters and 0.2% of female-identifying commuters. Given this gender gap, an important goal of the study was to have a percentage of female-identifying participants that reflected the general population. With respect to gender, over half of the participants (52.4%) identified as female. None of the participants identified outside the gender binary.

Eight of the 21 participants identified as being over 45 years. None of the participants felt that their age was a barrier to cycling, although the oldest participant, Diane, reported that her age (68 years) and the length of time since she had last ridden a bicycle caused her to be more apprehensive about using an e-bike.

We were also interested to find out more about racial diversity and equity. Previous studies in other locations have noted that racialized communities are slower to adopt bicycles as a form of transportation for a range of reasons, including the cultural construction of cycling as a “white” activity, as well as racial bias and patterns of fear.^{24,25}

Participants self-identified their race, with four of the 21 participants identifying as racially visible. Dan self-identified as “Black, Caribbean”; Jose as “Latino”; Raj as “Indian origin”; and Rosa as “Latin American”. Dan, Raj and Rosa reported that their race did not impact their experience riding an e-bike. Jose did not specify if his race impacted his experience.

No participants reported a disability that they felt could affect their experience riding an e-bike. One participant noted a back injury but did not see it as a barrier to using an e-bike (although subsequently identified it as contributing to not using the bicycle as much during the loan period as they had wanted to). Percy noted that due to a brain injury 11 years prior, he had difficulty seeing in low-light conditions. He felt this did not affect his ability to use the e-bike other than that he avoided riding at night.



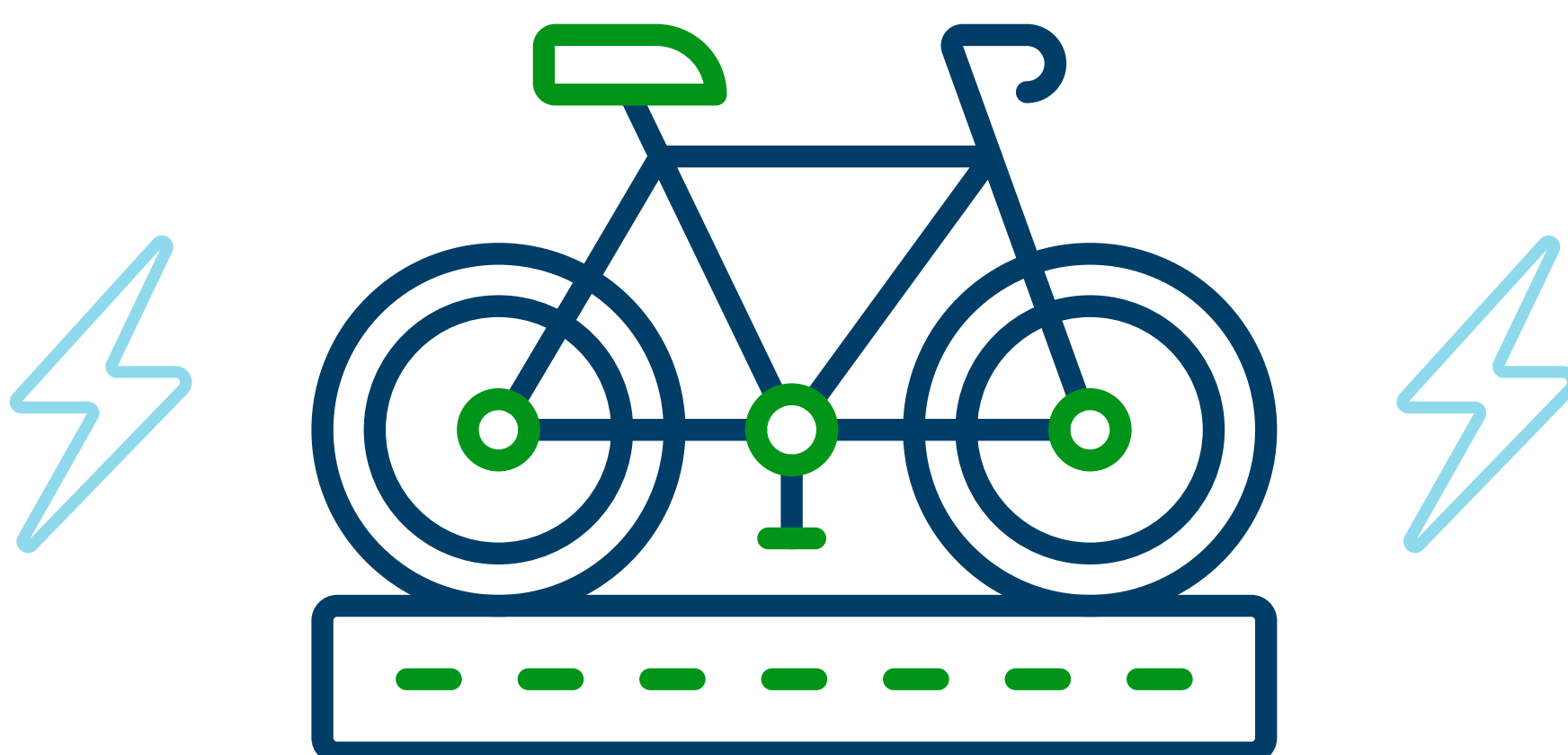
Motivations for participation

Participants shared their main motivations for joining the e-bike initiative. Five participants wanted to try an e-bike for the experience, as they had never used one before. Five participants wanted help with overcoming hills near their homes, while three wanted to see if the use of an e-bike could reduce their exertion, particularly on hills, so they wouldn't arrive at their destinations sweaty. Two participants worked for the municipality on bicycle infrastructure but had never commuted on that infrastructure, so their main motivation was to experience the product of their work. Another participant, who also worked for the municipality, used the e-bike for their job as a parking compliance officer.

Of the remaining participants, motivations included being active, reducing their carbon footprint, replacing car trips, mitigating challenges with parking, or building confidence in cycling. One participant noted that their partner had started using an e-bike and that it "honestly changed [their] life", so they wanted to ride with them. Another participant wanted to "contribute to making the infrastructure in Halifax better for everyone".

Participant perspectives of e-bikes for overcoming common barriers to cycling use for daily trips

Through our second research question, we wanted to learn about the common barriers that participants had previously experienced when cycling, and whether they were able to overcome them with an e-bike. Eight themes were identified, and are described below.



1) *E-bikes saved time:*

Participants noted that using the e-bike took a similar amount of time, or even saved time, compared to other transit modes. Raj said: “Yeah and also the time to drive, in a car it takes half an hour. By bike it takes half an hour, thirty-five minutes max.” Sue reported previously using the bus or combining walking and the ferry from her suburban home to her work at a hospital in the city. After the COVID-19 pandemic was declared, she felt forced to switch to driving. She was happy to discover that the e-bike was faster than her former commuter pattern:

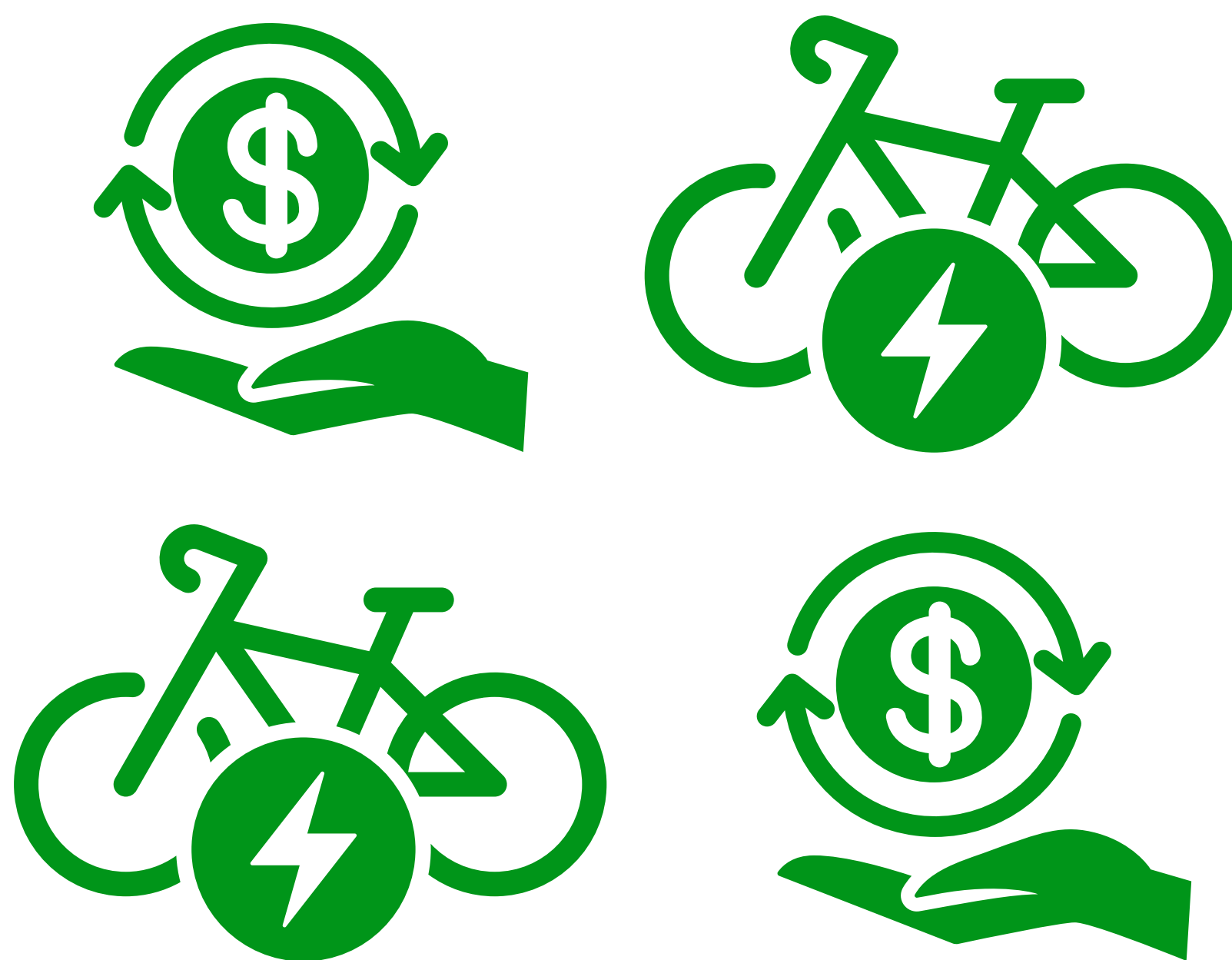
“It was a lot of fun. Just the decrease in my overall commute time, because it used to be 30 minutes door to door, and with an e-bike it became 20 minutes”. She further noted that, “Time is precious to me, so the fact that I can get home and get to work ten minutes faster, that's twenty minutes of my day that I can be spending with my family or doing something else”.

Bill also found the e-bike to be an efficient way to get to work, spending only an extra fifteen minutes each way from his home to his work, but also noting that when he factored in time to find car parking, the difference was negligible.



2) *E-bikes saved money:*

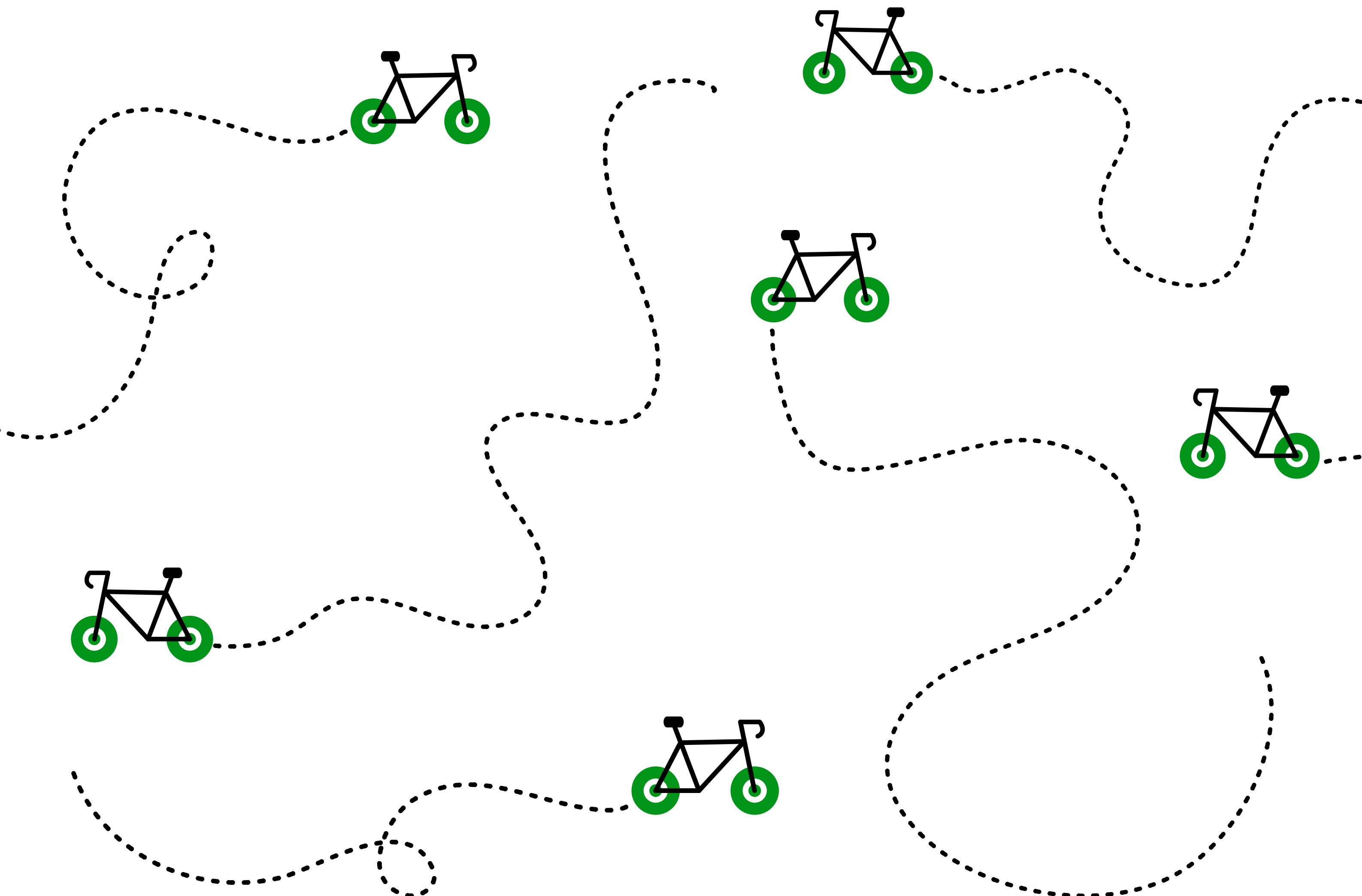
One of the motivations that participants gave for taking part in the program and for thinking of switching commuter modes to cycling was the savings that cycling afforded them. Bill listed the cost savings as one of his main motivations for cycling for his commute. However, while he wanted to buy an e-bike, he felt the cost to buy one was prohibitive, with a new e-bike costing more than his old car was worth. Sue found herself calculating the cost of buying an e-bike based on the money she saved: “I’ve been doing the math in my head with the gas and the bridge tolls and everything, and how long I would have to ride the bike to pay it off. I think I figured out it’s definitely less than three years, probably less than two”. Several of the participants noted that the cost and inconvenience of car parking was a factor in favour of an e-bike. Mary found it “harder and harder to find parking in the downtown area for work”, such that, with improved bicycle infrastructure, it would become increasingly attractive for people to commute by bike. Raj noted: “There is no parking spot for me [at work] so I have to look for parking and you can pay almost \$120 (CDN) for parking per month. Biking is the best if I can continue this option.”



3) *E-bikes made it easier to travel longer distances:*

Several participants found the e-bike allowed them to cycle further than they would otherwise be able to with a regular bicycle. Raj expressed that: “Right now, I like the e-bike because of the distance, I do almost 10 kilometers. When I get more used to riding, I may change to a regular bike but right now I really need the e-bike.”

For some participants, the use of the e-bike for commuting still wasn't feasible. Kayla was in the process of buying a house that was a 25-minute highway drive from her work and didn't foresee herself being able to use an e-bike to cycle there due to the distance and having to cycle on the highway. Similarly, Miles shared that he hadn't been able to find a cycling route into downtown from where he lived in the suburbs without having to cycle along a highway, which was a deterrent.



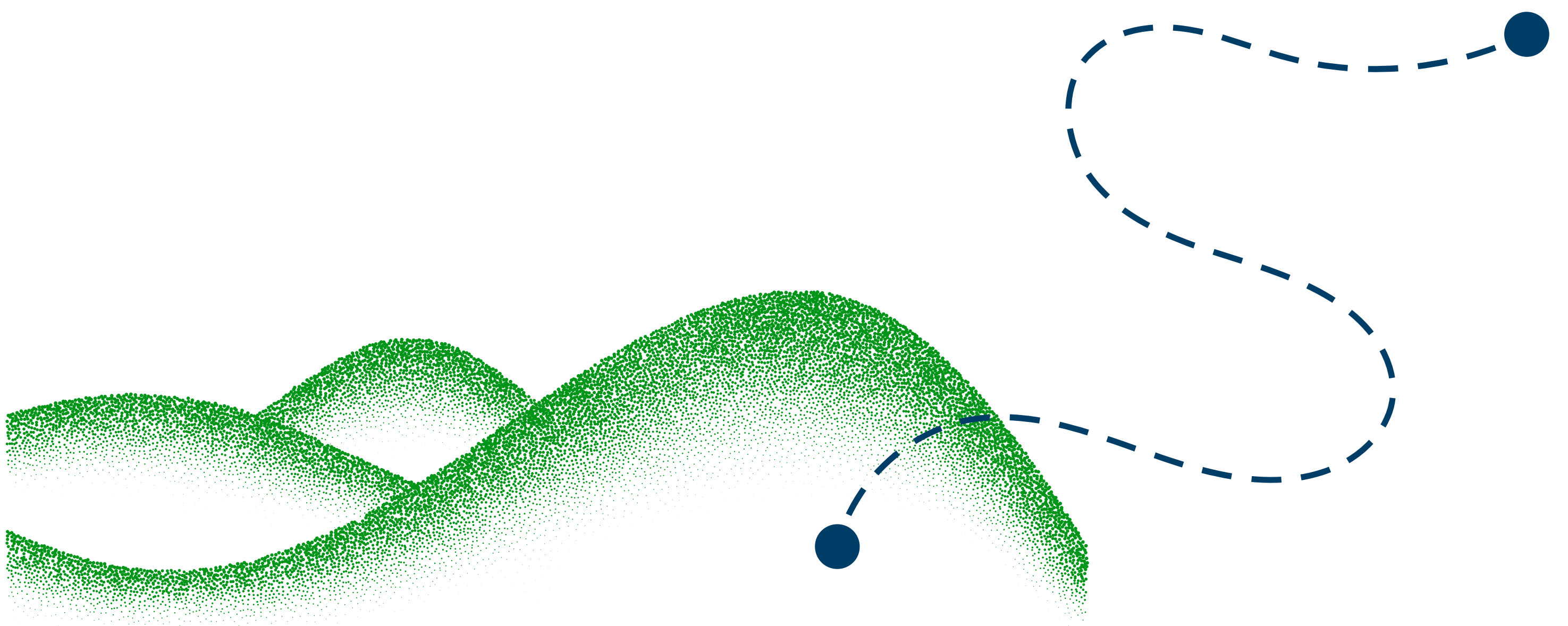
4) *E-bikes made it easier to cycle on hilly terrain:*

Halifax is hilly, so it was no surprise that a primary reason for using an e-bike was to overcome them. Jane noted that: “I find [the e-bike] gives you that extra, it seems to make that form of transportation more doable and accessible because you don't have this daunting feeling about doing hills, especially going to work.”

Bill reported that he cycled more often with the e-bike than he would have with a regular bike:

“On my first day there were some [hills] I didn't think I would be able to handle on this bike...I looked at it and I was like ‘I don't know the settings on this bike very well, I'm not going to do it,’ and then this old lady pedaled past me and I was like ‘well maybe I'll give it a try tomorrow’. Then I turned it to its lowest setting, and I was like, ‘Oh, this is easy’, and it made hills a lot easier than I was expecting”.

Similarly, Doug noted previously struggling to cycle up hills, with the effort leaving him breathless. He shared that using the e-bike during the loan period encouraged him to use his own conventional bicycle more often, and that he would continue to do so until he could purchase an e-bike.



For a third of the participants, overcoming hills was not confined to features of the natural environment, but to a key active transportation connection in the city - a bridge connecting two communities on either side of the harbour. This bridge has a bicycle path on one side, but accessing the path requires people to cycle to the bottom of a steep hill and then back up again, with no way to access the bridge without doing so. Doug, who used the bridge as part of his commute, was vociferous in his condemnation of this piece of bicycle infrastructure, noting that: “the bridge is an act of violence against cyclists. If you designed a road system that was trying to punish cyclists, or endanger cyclists, you would not come up with a different design. The engineers should be sacked, and the people who signed off on that work should resign.” Molly also shared her frustrations: “Fix the bridge, for crying out loud. It's like, the dumbest thing ever. It's so insulting. Every time I go over it, I feel like somebody is just trying to punish me. So, yeah, you just have some really obvious infrastructure gaps”. Regarding the same infrastructure, Mia simply stated:

“That bike access - it should just be illegal”.



5) *E-bikes helped with physical limitations:*

Several participants noted that they were nervous about cycling due to physical challenges with hills and distance. A prominent motivation for Bill to take up cycling was to be able to ride with his wife and children, despite having physical limitations: “She [wife] doesn’t drive [for health reasons]...but she does cycle and she’s happy to bike...I was the only one without a bike...so we’re changing the dynamic of the family right now.”

Amy identified that before the loan period she had considered buying a bicycle for mostly recreation but would also consider using it to commute. She saw the loan period as an opportunity to build up the strength required to transition to a conventional bicycle. The e-assist allowed Amy to be active, knowing she could switch to battery power for hills or for increased speed.

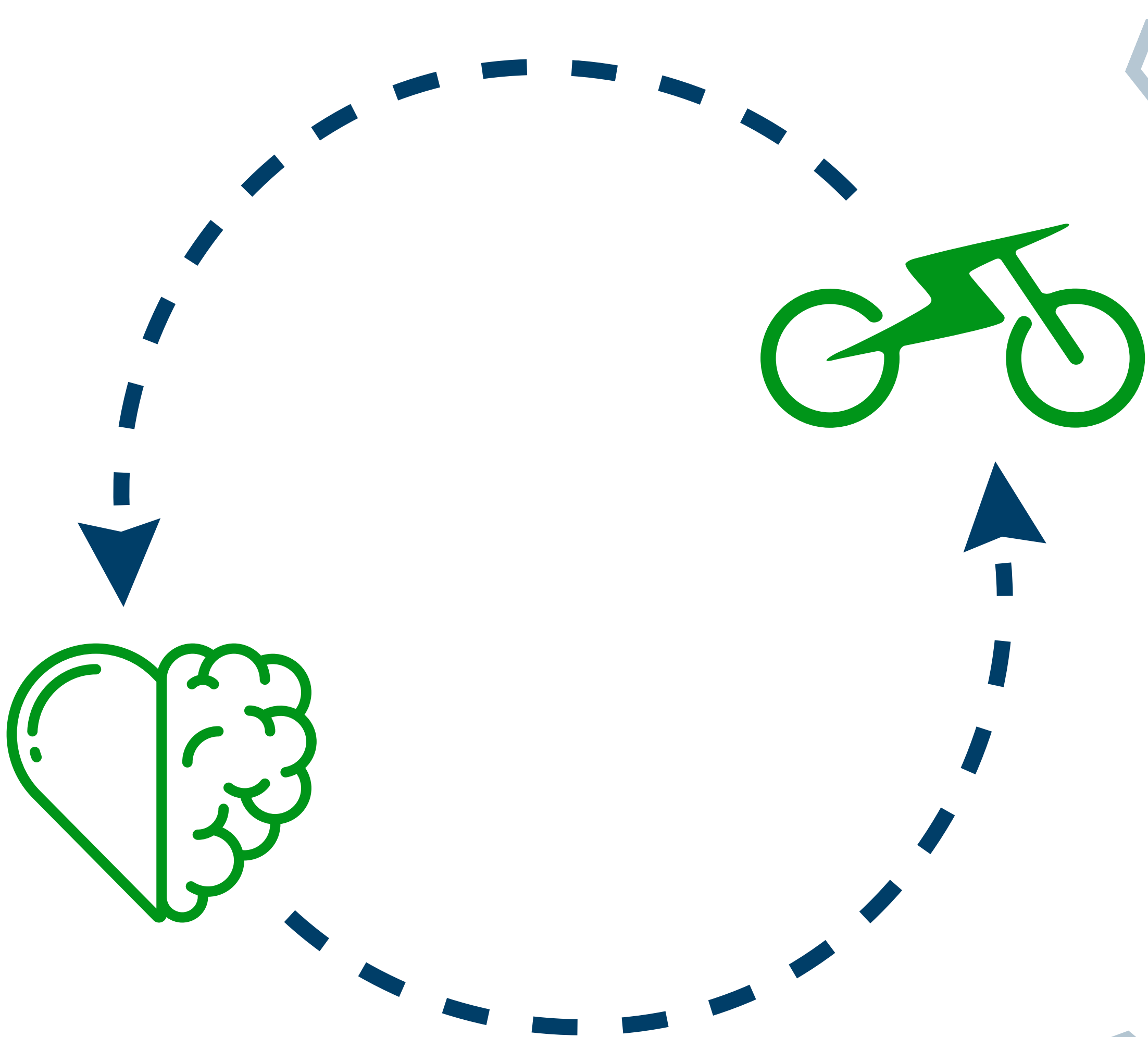
Mia reported getting “out of shape” during the COVID-19 pandemic and that a motivation for her to use an e-bike was the ability to overcome the barrier of hills. She expressed that it was difficult for her to go from having not biked recently to biking up a hill every day for her commute.



A few participants described how they were attracted not only by the physical benefits, but also the emotional benefits that cycling offered. Sue illustrated this by sharing:

“The savings and time in my commute, also stress level, I guess I can’t forget about that. It’s very relaxing to ride a bike, I find. Therapeutic almost, especially going across that bridge where you’re totally safe, in a designated bike lane so you’re not having to worry about traffic for that part of your commute and the fog and the sun coming up or going down, things like that, it’s lovely”.

While e-bikes helped with physical limitations, they also tend to be heavier than regular bikes. This was noted by Anna who disclosed that, although a younger and able-bodied person, she found the e-bike was very heavy for her to lift and required two people to put into her car to transport it.



6) E-bikes mitigated the effect of age:

Four participants mentioned that e-bikes would be particularly useful for older people. Doug commented on how the e-bike helped him get up hills, and that would be something he would appreciate as he aged. Sue remarked that:

“I don’t ever want to stop cycling but as I get older and if you start to get bad hips, bad knees all that kind of stuff. We talked about this at work with a few other people, it would be a great option to allow people as they get older to still cycle when they have some of those physical injuries or age-related joint issues.”

Diane felt that older people would particularly benefit from owning an e-bike and that the hurdles faced by cyclists, such as hills, would be easier on an e-bike compared to a conventional bicycle. Similarly, Jane cited a conversation with an older neighbour who was deterred from cycling because of hilly terrain: “I talked with a gentleman...and because of his age the hills in this area were a deterrent for him to bike”. Mia’s parents had expressed an interest in the e-bike, leading her to comment that e-bikes would be a good option for them to be able to continue cycling as they aged.



7) *E-bikes helped participants to feel more confident or safe while cycling:*

Feeling uncomfortable about the safety of riding in Halifax was one of the most frequently expressed barriers to bicycle commuting, and a topic that the participants discussed frequently, either directly through their own experience or in reports of how people reacted to their participation in the program with negative comments, such as “are you crazy?” While one third of participants described how the e-bike and accompanying safety training improved their confidence cycling on the road, a few participants also noted that they felt safer cycling because the e-bike allowed them to go faster. Sue had been a regular bicycle commuter until an incident in 2016 undermined her confidence to ride. The e-bike allowed her to regain enough confidence to start commuting by bicycle again:

“Right away I felt safer because I felt like I could keep up with traffic more. Like when you're at a traffic light and everybody is stopped and you're waiting, then when you get to go, the part that always makes me nervous is when people are trying to zoom out, accelerate past you and with the e-bike, at a lot of intersections during traffic, I could keep up and stay in my spot in the traffic. So from that perspective, I felt the e-bike was safer for me than my regular bike.”

Other participants also identified that e-bikes helped them to feel more confident cycling. For example, Amy found road safety training and in-person e-bike training that was provided by the Ecology Action Centre as part of the program dramatically increased her confidence using the e-bike. She also shared that the e-bike helped her to feel more confident biking up hills, as it would prevent her from wobbling due to low speeds. Not struggling while biking up hills allowed her to pay more attention to her surroundings. Additionally, she felt that drivers paid more attention to her while she was using the e-bike, due to her traveling faster than she would on a conventional bicycle.

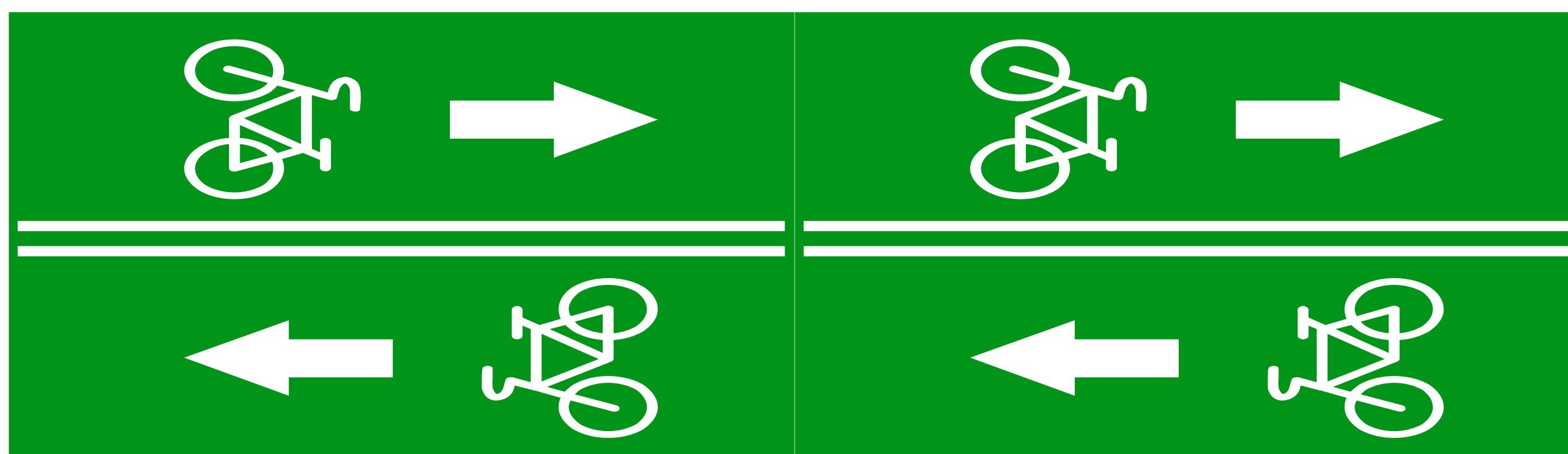


Jane was nervous about cycling because of the lack of a safe route downtown from her home in the suburbs. She described how, prior to starting the loan period:

“Going up [a busy street] was making me nervous because I've driven up it enough to know that at 6:30 in the morning it's not horrendous but the lanes are narrow and I often thought, how are cyclists doing that and feeling safe? I thought well, you know, I can't ride on the sidewalk, or you're not supposed to do so, but I said I have an e-bike, I should be able to just ride up and I felt pretty good this morning. Definitely, being on an e-bike makes a difference.”

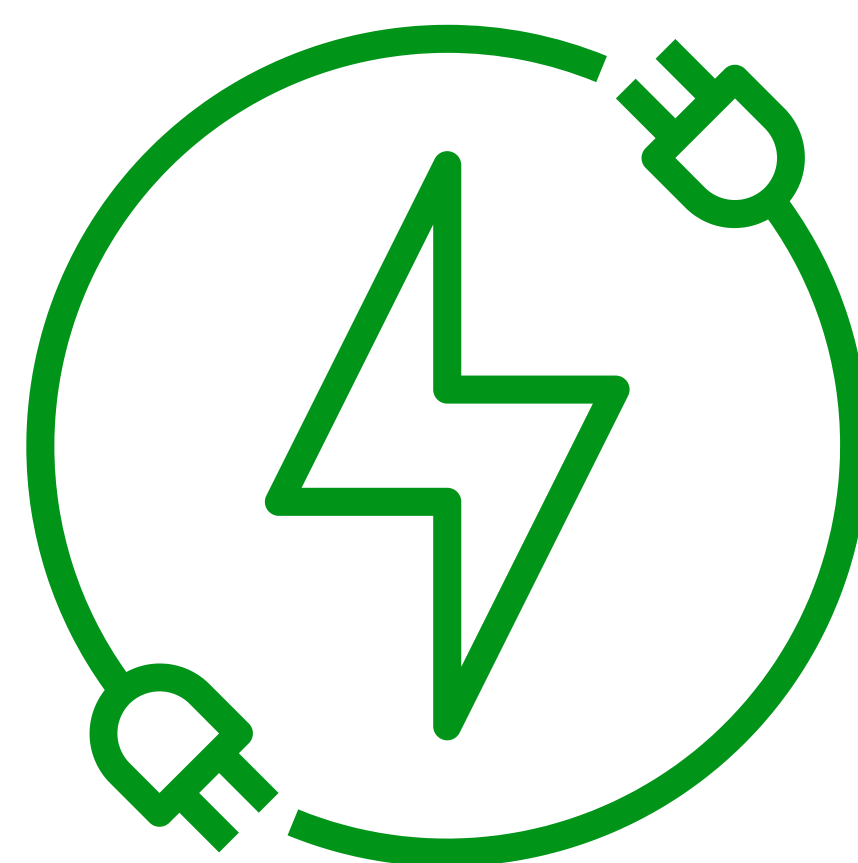
Bill used to bike as an adolescent, but mostly stuck to quiet side streets, and hadn't cycled in a number of years before participating in the Easyride program. He said: “I didn't feel safe before, only because as a driver I've seen how other drivers behave and they rarely follow road rules properly. There's a lot of entitlement and that was a huge deterrent for me to cycle.”

Diane, the oldest participant at 68 years, shared that although there were bike lanes along much of her route to work, she felt that she didn't have enough time to use the e-bike during the loan period to feel comfortable riding in traffic. She had never used an e-bike before and stated that more time to get familiar with the e-bike in areas without traffic would help her to build the confidence needed to attempt longer rides such as commuting to work. Although apprehensive, Diane did use the e-bike to get from her workplace to an appointment twice during the loan period. She noted feeling most comfortable cycling in bike lanes, especially separated bike lanes.



Anna shared that she was surprised to find that she was comfortable biking on the road with traffic. She had expected to need a protected bike lane in order to feel safe but found that she was “actually pretty comfortable” on the road. By contrast, Kyle reported feeling very comfortable cycling on side streets but not fully comfortable on the main roads alongside heavy traffic. The larger and heavier frame of the e-bike helped Kyle feel more confident and the e-assist allowed him to keep pace with the rest of traffic, especially pulling away from traffic lights, because he did not feel like he was in the way or holding up traffic behind him.

Not all participants experienced greater confidence. For example, Mia had not used an e-bike before the loan period and hoped that it could be an option for her to drop her child off at daycare. However, she decided after a few weeks with the e-bike that she didn't feel confident enough to take her child in an attached bike seat while riding on the road. She cited concerns of falling off the bike and of her child not cooperating with being fastened into the bike seat.



8) *E-bikes addressed issues of arriving at a destination sweaty:*

One of the often-cited benefits of e-bikes is not exerting so much effort that you arrive at your destination sweaty. Nine out of the 21 participants recognized this advantage without being prompted. Sue noted that using the e-bike led to: “Faster commute time, also I didn't get sweaty so when you're arriving to work or coming home you don't feel like you have to take another shower because you can, depending on which level of boost, you put the e-bike on, you can gauge how much you actually work to pedal”. Jose described how: “I would prefer to bicycle to work but with the hills I end up exerting so much energy going up the hills I end up all sweaty. And then when I get to work I have to change my clothes. So any time I save I lose because I have to change my clothes”.



E-bikes as a replacement for journeys in single occupancy vehicles

The participants in the study used a variety of methods to commute to work prior to the e-bike loan period. Nine of the 21 participants exclusively drove to work, three exclusively walked, one exclusively used public transit, and the remaining eight participants either switched their transportation methods regularly or had multimodal commutes.

17 of the 21 participants used the provided e-bikes for trips that otherwise would have been by a SOV. Of the remaining four participants, three of them used the e-bikes for trips they would have used public transit for, as they did not use private vehicles. Only one participant didn't replace any motor vehicle trips with the e-bike and this was due to only walking for transportation before the program, and not using the e-bike for utilitarian trips during the loan period.

19 of the 21 participants intended to continue cycling for utilitarian purposes after the end of the loan period. 10 said they had either already purchased an e-bike or would be looking to soon, and nine said they would continue cycling using a conventional bicycle.

Only two participants shared that they would likely not continue cycling after the loan period. One of these two participants cited the distance she lived from her workplace as insurmountable, even with an e-bike. The other participant disliked the style of the e-bike, felt their commute and neighbourhood were too hilly to cycle using a conventional bicycle, and did not own a conventional bicycle. Even Mary, who only used the e-bike four times to commute to work, intended buying a regular bicycle to use recreationally, noting that: "I can see myself commuting by bike but not solely using a bike for commuting. I could see myself getting into more mountain biking, seeing as my partner likes to do it."



Raj's experience was very positive, with the loan of the e-bike encouraging him to resume his former pattern of bicycle commuting that he had before moving to Halifax:

“Oh...I really, really, love it. I biked so far — almost 300 kilometers. Unless the weather is really bad, and sometimes drizzling, I’m still biking... Especially, my overall well-being, I feel great. I used to bike a lot but now that I’ve gotten back my habit, I feel a difference and after coming to work after biking it makes me ready a lot and feeling great...It is amazing, I really like it. I regret how many days I missed this opportunity.”

The lack of safe cycling infrastructure was cited as a reason why cycling would not be feasible for some participants. Foremost among these is that the existing and planned infrastructure fails in most cases to protect cyclists who want to go on main roads, where most destinations are located. More importantly for mitigating traffic, the public transportation system in Halifax was not yet considered adequately efficient to persuade people to leave their cars behind. This meant that for the foreseeable future, driving remained the more practical option for these participants. This was summed up by Doug, who said: “The thing that would tip me over the edge to do more cycling is street design”, while Kayla shared that:

It'd be awesome if... all of Halifax could be really bike accessible to make it even more inclusive for everyone”



Disadvantages of e-bikes

While the overwhelming consensus of participants was that e-bikes had multiple benefits, there were still some challenges identified. First, e-bikes were viewed as more expensive to buy than regular bikes. This barrier has been somewhat ameliorated by a provincial e-bike rebate program that was introduced in 2021 and provided \$500 towards a purchase.²⁶ Second, e-bikes were noted to be heavier than regular bikes. For example, Noah mentioned that even though he was able-bodied and in decent physical shape, the e-bike was heavier than a conventional bicycle and hard to manoeuvre. He expressed that if his wife were to try to carry the e-bike upstairs into their house to store it that it would be even harder for her than it was for him.



DISCUSSION

This qualitative exploration of an e-bike loan program provides insight into barriers and benefits of e-bike use in Kijipuktuk/Halifax. Key benefits mentioned by participants were convenience, mitigating exertion, lower transportation costs, and lower environmental impact. Key barriers were safety concerns, lack of infrastructure, the weight and size of the e-bike loaned and the cost of e-bikes more generally.

With respect to our first research question, participants reflected diversity in terms of age, gender and race. It is often noted in the literature that women respond more negatively to inferior infrastructure conditions for cycling, so can be viewed as the “indicator species” for whether a city is developing adequate bicycle infrastructure.^{27,28} It is, therefore, encouraging to see that there were slightly more women than men participating in the Easyride program. The age range was from 23-68 years, with eight participants older than 45 years. Four participants were racially visible, although without a comparison group, it is not possible to say if participants were more diverse than among the general cycling population of the region.

For our second research question, participants saw the value of e-bikes for overcoming recognized barriers like hilly terrain, age, physical limitations, safety and distance, as well as for the financial, physical and emotional benefits. However, their experiences reinforced the importance of having safe and connected infrastructure to support cycling as an essential precondition for cycling with any type of bike. Just having the opportunity to use an e-bike was not a sufficient motivator to change the behaviour of most participants without them feeling safe, protected and connected to where they needed to go. Feeling safe has been identified as important in research from other countries, with gender and age identified as factors associated with lower perceived safety in a study on e-bike use in Switzerland.²⁹ It is also important to note that the participants were already invested in cycling as a mode of travel, as evidenced by their volunteering to participate in the trial program. The potential to convert others to cycling through the implementation of safe, protected infrastructure is likely even greater.

Our third research question, related to the use of e-bikes to replace SOV trips, revealed positive shifts in behaviour of participants to replace trips by SOV, with 81% of participants reporting replacing trips by SOV with their e-bike during the loan period. Most participants appreciated the opportunity to try an e-bike and felt that it would lead to permanent changes in their patterns, with almost half expressing intentions to buy either a bicycle or an e-bike. Again, the importance of safe, connected infrastructure was mentioned as critical for participants to continue cycling.

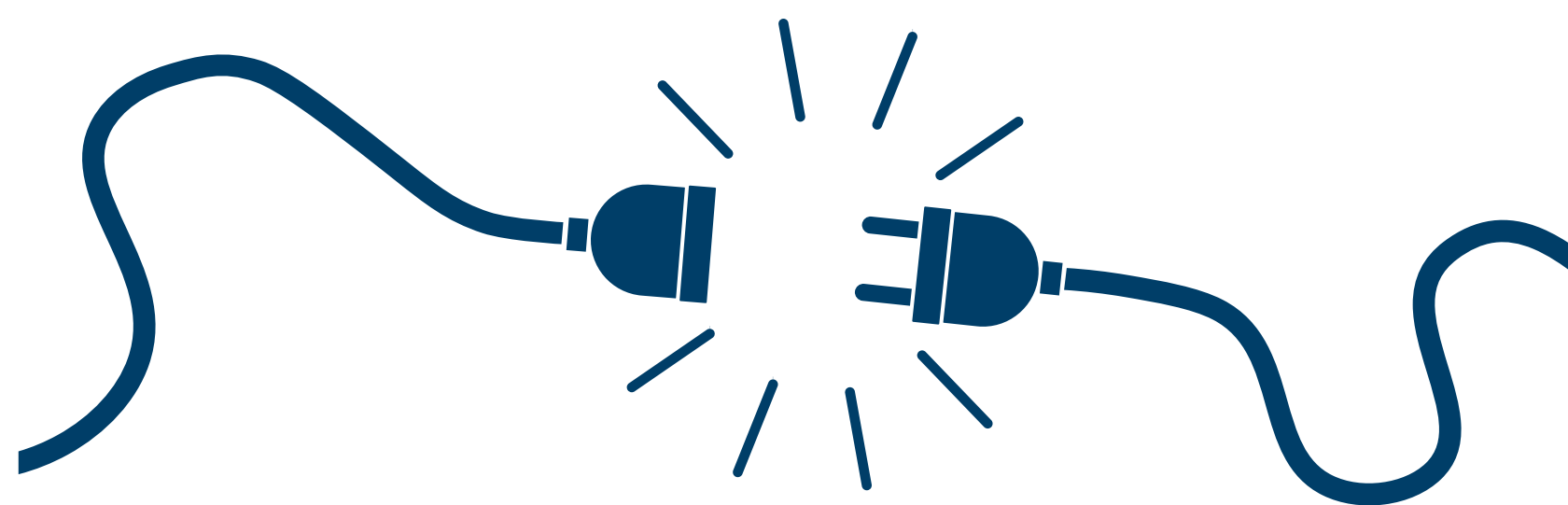
These findings are in line with those from other studies. For example, the previously mentioned randomized trial conducted in Sweden found that participants who received an e-bike loan increased their cycling at the expense of car journeys, although their sample was skewed towards more male participants.¹³ Another study in the UK reached similar conclusions, showing that after trying an e-bike for 6-8 weeks, 38% expected to increase their use of bicycles in the future and 70% reported that they would take advantage of an e-bike loan program to cycle more in the future¹² A recent scoping review on the use of pedal-assisted e-bikes identified 107 studies that met their inclusion criteria.³⁰ They found research relating to the value of e-bikes to replace shorter car trips, and identified similar barriers and facilities to our study, while noting a lack of studies that included gender dimensions. Our study,³⁰ with a similar gender split, therefore adds to our understanding of how men and women perceive the use of e-bikes for replacing shorter car journeys, and the additional considerations that women think about, such as safety and comfort in cycling in traffic and the need for protected bicycle infrastructure. The use and value of e-bikes for commuting has also been described by other researchers who also acknowledged the importance of assessing individual decision-making within social and spatial contexts, as we have sought to do.

8



Strengths of this study include the diversity of participants who joined the program. We did not have a role in participant recruitment as this was conducted through the Ecology Action Centre. However, we were pleased to see the diversity of participants in terms of gender, age and race. There was also a range of cycling experience among participants which adds richness to our data. Limitations include both cohorts being recruited to participate in the e-bike loan program during the global COVID-19 pandemic. In those that mentioned the pandemic as a motivator, participation was driven by the desire for an alternative mode of transport to public transit to mitigate exposure to the virus. However, pandemic restrictions also prevented participants from being interviewed in person. It should also be noted that traffic volumes during the pandemic may have led to a different experience during the loan period than would be the case when traffic was at non-pandemic levels.

To conclude, the Ecology Action Centre's Easyride program offers insight into barriers and facilitators to replacing SOV journeys with e-bikes in Halifax, Nova Scotia. While participation in the program was viewed positively by participants, the lack of protected infrastructure for safe cycling was considered to a barrier to the uptake of this important transportation mode. This has implications for the both the province and the Halifax Regional Municipality who each have stated goals that promote active travel to mitigate the impacts of climate change.



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