NYC DEPARTMENT OF TRANSPORTATION TESTIMONY ON SHARED MOPEDS AND E-SCOOTERS AND INTRO. 2061 BEFORE THE CITY COUNCIL COMMITTEE ON TRANSPORTATION
October 27, 2020

Good morning Chair Rodriguez and members of the Transportation Committee. I am Polly Trottenberg, Commissioner of the New York City Department of Transportation and I am joined by Rebecca Zack, Assistant Commissioner for Intergovernmental and Community Affairs, Will Carry, Senior Director for Special Projects, and John Frost, Executive Director for Bike Share. Thank you for the opportunity to testify today on behalf of Mayor Bill de Blasio on shared mopeds and e-scooters, as well as Intro 2061.

Citi Bike

Any discussion of shared micromobility programs in New York City should begin with Citi Bike, the largest and most successful bike share system in North America, something of which we at DOT are very proud. Citi Bike has seen over 108 million rides since its 2013 launch and has a strong track record on safety. The system now includes over 1,100 stations in four boroughs and a fleet of about 17,600 bikes. Let me share with you some of the key factors in Citi Bike's success, as they are very relevant to the discussion of shared e-scooters and mopeds.

First and most importantly, Citi Bike is a public/private partnership that was designed as a public transportation system from the start, and the DNA of this approach is evident in its key features:

- **A multi-year contract** which grants the private sector partner exclusivity and an incentive to invest and deliver results for the long term;
- **A station-based approach, with strong rebalancing** which makes the system reliable for riders and keeps bicycles locked in orderly docks that minimize clutter and inconvenience for local residents;
- **High safety and maintenance standards**, established through service level agreements and other contract terms, have incentivized the operator to identify and address equipment issues before serious problems occur;
- **Extensive community outreach** through which local stakeholders work with DOT to identify the best station locations while maintaining the spacing essential to the functionality of the system;
- **Affordable membership-based pricing** that encourages frequent, regular riding and mode-shift to cycling, compared to per minute pricing, which is geared towards discretionary trips, such as those typically taken by for-hire vehicles; and
- **Required discounts for low-income New Yorkers** including NYCHA residents and SNAP recipients that make the service even more equitable and affordable.

The mutual benefits embedded in this approach, and the large, exclusive, and potentially profitable service area, have led our private partner Lyft to commit $100 million to expand and improve Citi Bike, and they are making good on this commitment, even in a time of industry uncertainty.

In 2019, the "Phase 3" expansion brought Citi Bike service to Bushwick and Ridgewood, and has continued in 2020, despite the challenges of COVID-19, to Harlem, Washington Heights, and the South Bronx. We are also adding dramatically more station capacity through infill in the densest parts of the existing network. When Phase 3 is complete by 2024, Citi Bike will serve over half of NYC's population with more than 40,000 bikes.

To ensure the system is equitable and inclusive, Citi Bike, DOT, and DOH have partnered with the Bedford Stuyvesant Restoration Corporation to form the Better Bike Share Partnership, which promotes ridership in low-income neighborhoods and communities of color. This summer, Citi Bike, DOT, and community partners organized rides in Upper Manhattan and the South Bronx to promote cycling, including the "Tour de Heights," where the Chair and I joined residents on a bike ride highlighting the history, culture, cuisine and political activism of Washington Heights.

And this spring, with generous financial contributions from long-time sponsors Citi Bank and Mastercard, Citi Bike and the de Blasio Administration launched the Critical Workforce Membership Program. This program provided 19,000 free annual memberships to essential health care and front line workers, who have taken nearly 740,000 rides to date.

So as we consider the design of shared e-scooter and moped programs in New York City, which can be a tough place to operate, our experience with Citi Bike teaches us that we need committed partners with robust resources, deep management expertise, a commitment to equity, and a willingness to invest for the long haul, particularly in difficult budget times.

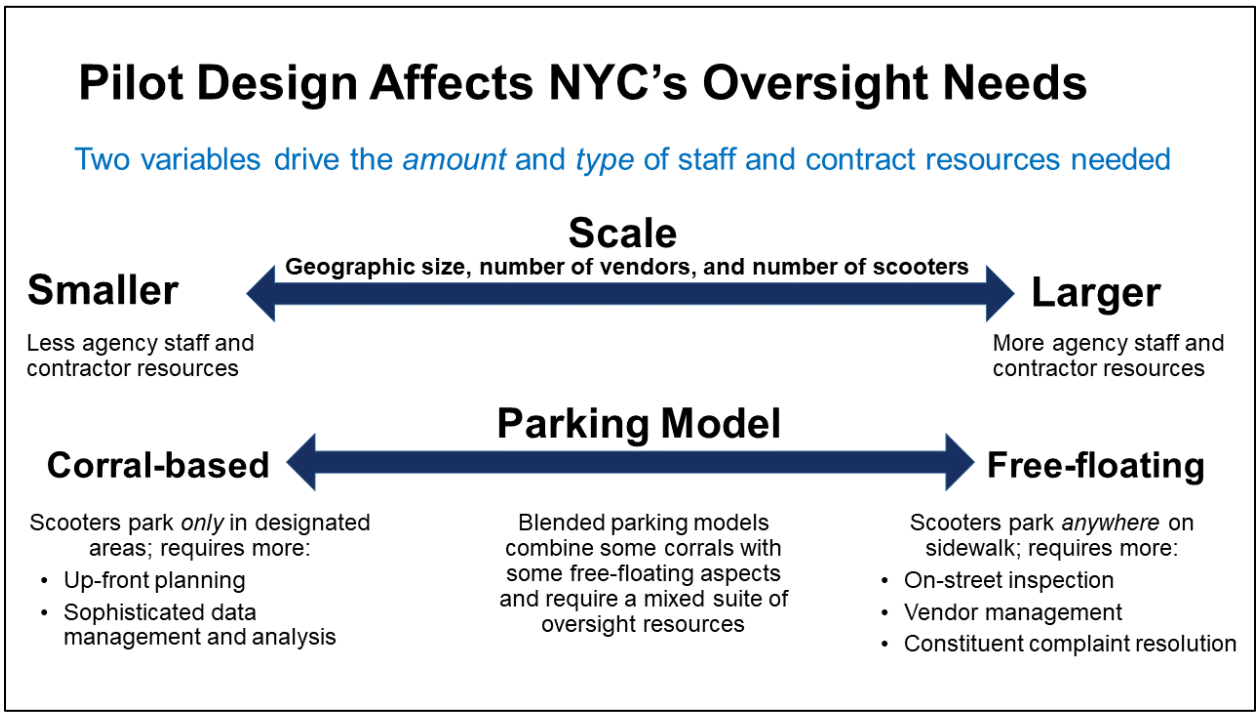
Shared E-Scooter Pilot

Now, let me turn to the City's shared e-scooter pilot, authorized by the Council in June. DOT began the solicitation process on October 6th, with an "Industry Day" that was attended by over 25 e-scooter share and related companies. We have also reached out to other cities with experience with e-scooter share programs to gather lessons learned and best practices. We are incorporating all we learned into a Request for Expressions of Interest (RFEI) solicitation for e-scooter share companies, with the goal of releasing it this week. In addition, we are releasing a supplementary RFEI targeted at companies that provide ancillary services to cities related to e-scooter share, such as data analysis, project management, and inspection services.

For the e-scooter share company RFEI, DOT will evaluate respondents on experience, safety, operations and parking management, accessibility, equity and outreach, fair labor practices, and consumer protection. We will also evaluate responses from a robust field of companies offering shared e-scooter support services. But then, once we have our submissions, we must grapple with a dire fiscal reality and hiring freeze that I have testified about previously, which will impact the type and scale of pilot DOT is able to plan and manage.

The greater the geographic size, number of scooters, and number of vendors, the more a pilot will demand from either agency staff or a contractor. For example, over 15 full-time DOT employees oversee bike share, and our General Counsel's office, Borough Commissioners' offices, and senior leadership play important roles as well. And we are nonetheless straining to keep up with all the demands of the major Phase 3 expansion underway.

So as you can see in the diagram in my testimony, different approaches for shared systems using City streets will require extensive resources: designated parking areas require more up-front planning and sophisticated data management and analysis, while a fully free-floating model requires more on-street inspection, vendor management, and constituent complaint resolution.



Many U.S. cities are now charging flat or per scooter permit fees to defray their costs regulating scooter share operators. And some cities are beginning to explore per trip surcharges as well. As you can see in the chart in my testimony, these cities generate significant revenue, from $350,000 in San Francisco to up to $3 million in Los Angeles, corresponding to the largest number of scooters of any U.S. city.

City	Permit term	Fee per scooter	# of Scooters	Max Yearly Revenue
Chicago	4 months	$120	10,000	$3.6 million
DC	12 months	$60	8,500	$510,000
LA	6 months	$65	20-25,000	$3.3 million
SF	12 months	$75	4,000	$350,000
Seattle	12 months	$150	6-7,000	$1.1 million

Note: "Max Yearly Revenues" are annualized totals showing the maximum possible revenue based on the scooter caps the cities have established, and may include other administrative fees in addition to the per-scooter fees

illustrated. In some cases, the companies might not meet the scooter caps, so the city would bring in less than the total shown.

There is, however, one large caveat when applying these figures to New York City. For the most part, these other cities allow scooter share in their central business districts, which are the most profitable areas in which to operate. Here, scooter share is excluded from Manhattan by State law, which could impact the amount companies may be willing to pay in fees to operate. That said, New York City is a market like no other and companies appear very eager to operate here.

While the question of resources will determine the type and scale of the pilot, I will also mention a couple of DOT's other top concerns. First, while we want e-scooter share to be a success, we do not want to hurt the continued viability of Citi Bike. For this reason, when designing the e-scooter pilot we want to prioritize areas outside the current and future Citi Bike service area.

Second, we have learned from our dockless bike share pilot and seen in other cities that a large number of operators competing in the same territory greatly increases the need for City management and oversight and potentially makes the program's economics unsustainable.

Third, we will judge respondents on accessibility, including their proposals for keeping sidewalks clear as well as options for people with disabilities. We hope to push the industry to think creatively about e-scooter design and, if feasible, to use the pilot to test new accessible e-scooter models.

Fourth, we will be looking closely at respondents' approach to safety, as well as monitoring and evaluating safety during any pilot. According to a 2019 NACTO study, shared e-scooter systems have a fatality rate five times higher than that of bike share systems – 0.21 vs. 0.04 fatalities per million trips.

<u>Shared Electric Moped Services and Introduction 2061</u>

Now, let me turn to shared electric moped services and Intro 2061, sponsored by Chair Rodriguez. NYC's only current shared moped provider, Revel, started service in 2018, but dramatically expanded its service area and fleet this summer in response to COVID-19. Tragically, we then saw three Revel-related fatalities in a short period. Revel made the decision to pause its service in July and work with the City on strengthening the company's safety culture and practices. We reached an interim agreement, which required Revel to adopt a series of new safety measures in order to restart operations:

- Enhance rider safety with a new required in-app training and more in-person lessons.
- Strengthen measures to ensure riders are wearing a helmet.
- Increase penalties for bad behavior, using moped GPS data and a new community reporting tool.
- Introduce a new package of measures to combat unauthorized account sharing.
- Suspend operations from Midnight – 5:00 am, a period during which DOT found a higher rate of crashes.
- Finally, provide anonymized trip, training, and incident data to DOT so we can better monitor the company's performance and compliance with these new protocols.

To date, we believe Revel is making a good faith effort to abide by the terms of the interim agreement, and we are seeing some encouraging results. The Revel crash rate in September was 50 percent lower than in June, when the rate peaked at about three crashes per 10,000 trips. The crash rate for first time users has also declined and helmet use has significantly increased among Revel riders.

However, despite these positive trends, on September 29th, a Revel rider collided with a pedestrian at Broadway and 60th Street and the pedestrian ultimately succumbed to her injuries. NYPD's investigation into the crash is ongoing, and DOT and NYPD continue to closely monitor Revel's operations and implementation of its safety measures.

Revel's service has several benefits to the City: its vehicles are zero-emission, it is convenient, particularly for trips not well served by transit, and it may reduce traffic by shifting trips away from for-hire vehicles. But there is no escaping the fact that moped share is in a different risk category than bike share.

Since starting operations over seven years ago, Citi Bike has had two fatalities, or a rate of 0.02 fatalities per million trips. By comparison, Revel has had four fatalities, or a rate of 1.38 fatalities per million trips. Both the interim agreement and formal regulation aim to close this safety gap, but Revel's heavier, faster, and less familiar vehicles will probably always present a higher risk profile.

So in addition to requiring Revel to adhere to new safety protocols, DOT is currently working on a rulemaking to create a formal permit process for shared moped systems. We expect to publish our proposed rule by the end of 2020, and implement the rule by early 2021. We look forward to getting the Council's input, as well as input from the industry and other stakeholders and as part of the public process.

Conclusion

In conclusion, I want to thank you Chair Rodriguez and the entire Council for your continued partnership. We are in a time of unprecedented uncertainty and fiscal challenge, but are also witnessing an exciting re-imagining of our streets. We know that new micromobility options, including both e-scooter and electric moped share, could help achieve the City's transportation, equity and sustainability goals. However, we must also grapple with the complex policy and operational questions these systems raise. Thank you for the opportunity to testify and I would be happy to answer any questions.

NYLPI
JUSTICE THROUGH COMMUNITY POWER

Testimony of Christopher Schuyler, Senior Staff Attorney
New York Lawyers for the Public Interest, Disability Justice Program
To the New York City Council, Committee on Transportation:
Oversight Hearing on Shared Mopeds and E-scooters; Consideration of Int. No. 2061
(October 27, 2020)

Shared mopeds and e-scooters (hereinafter referred to synonymously as "shared mopeds") are an innovative solution to the "last mile" problem – the challenge for commuters of getting to and from the bus or subway.[1] At this nascent stage for this emerging technology, people with disabilities cannot be left without a ride, as they so often are.[2] Not only do disability laws require accessible travel options for people with disabilities, it's also just good business; people with disabilities want to use shared mopeds and thus provide a ready market.[3] The Committee on Transportation must mandate that shared moped companies provide accessible options for people with disabilities. Int. No. 2061, which would "require the Department of Transportation to establish procedures by which shared moped organizations may apply for approval to operate shared moped fleets,"[4] should be amended to include language encouraging the Department of Transportation to provide accessible transportation options.

Transportation equity

Until recently, e-bike programs such as Citi Bike led the charge on "micromobility."[5] Now, shared mopeds, which are "dockless" and thus remove the need for the user to "dock

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[5] https://www.dictionary.com/e/tech-science/micromobility/.

a bike or scooter at a specific fixed location," are carving out their place.[6] By serving as another solution to the last mile problem, shared mopeds can help address the transportation equity issues impacting marginalized groups, including people with disabilities, who often live the farthest from public transportation options,[7] and live below the poverty level at rates disproportionate to those without disabilities, especially in New York City.[8] As city programs in San Francisco and Chicago have already acknowledged, shared moped accessibility must be prioritized to combat long-standing transportation inequities.[9]

Market demand and user safety

Not only would making shared mopeds accessible help achieve transportation equity, it would also satisfy a market demand and encourage safe usage in doing so. A recent survey, conducted by a leading shared moped company, learned that people with disabilities use shared mopeds ***even if*** accessible options are not provided – putting themselves at great risk.[10] The survey collected information from 18,000 users and learned that 8% of their total users self-identify as people with disabilities.[11] And considering 15% of the general population have disabilities, that 8% figure is likely on the low end.[12] Clearly, there is market demand for accessible products, and providing them would allow people with disabilities to more safely enjoy shared mopeds.

Accessible shared mopeds

Several shared moped companies currently produce accessible shared mopeds, with features that include seats, wider standing platforms, larger wheels, a third wheel, and the list goes on.[13]

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[6] *See* Committee Report at 8, https://legistar.council.nyc.gov/LegislationDetail.aspx?ID=4624902&GUID=DE68AB78-4014-4FBD-9A97-A332C7B643C9&Options=&Search=.

[7] "Service Denied: Accessibility and the New York City Subway System," Office of the New York City Comptroller Scott M. Stringer, 2-3 (July 2018), https://comptroller.nyc.gov/wpcontent/uploads/documents/Service_Denied_072018.pdf.

[8] https://www.osc.state.ny.us/files/reports/osdc/pdf/report-7-2020.pdf ("34 percent of working-age people with disabilities live in poverty in New York City, a higher share than in the nation (26 percent) and New York State (30 percent), and more than twice the share for those without disabilities in New York City (14 percent).").

[9] https://www.sfmta.com/blog/adaptive-scooters-people-disabilities; https://chi.streetsblog.org/2020/06/12/behold-the-new-citywide-scooter-pilot-rules-9-companies-enter-3-companies-leave/ ("the pilot will also look at 'whether scooters can be a safe and effective mobility option for the long-term in Chicago and in particular whether scooters can improve mobility for communities that face disproportionate transportation, health and economic barriers.'").

[10] https://www.fastcompany.com/90450211/e-scooters-are-leaving-pfeople-with-disabilities-behind-lime-wants-to-fix-that.

[11] *Id.*

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Other accessibility requirements

Shared moped companies must also develop features for people with disabilities who share the road. For example, Chicago required that shared mopeds emit "low sounds to alert visually impaired people to their presence."[14] Shared moped companies must also develop app interfaces that are accessible, as San Francisco and Chicago have insisted upon.[15]

Need to encourage innovation

While currently available accessible shared mopeds meet the needs of some people with disabilities, others are left out. Some groups, including the Blind/visually impaired and people who use wheelchairs, have been all but ignored.[16] Because the technology, with its potential for innovative solutions, is so new and unexplored, the Committee of Transportation and Int. No. 2061 should encourage dialogue between developers and people with disabilities, as was done in San Francisco and elsewhere.[17] Input from community stakeholders would assist shared moped companies when designing products for people with disabilities. Continued innovation is essential; in order to meet the needs of a wider swath of people with disabilities, products will need to be developed which do not yet exist.[18]

Sidewalk accessibility

Shared mopeds are "dockless," a feature that gives them market advantage over e-bikes. That very same feature, however, can cause and has caused issues for people with disabilities.[19] Unlike e-bikes, which must be returned to a central fixed location – the dock –

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debuts-a-scooter-for-people-with-disabilities.jpg; https://www.sfmta.com/sites/default/files/imce-images/2020/spin_adaptive_scooter.jpg; https://images.fastcompany.net/image/upload/w_596,c_limit,q_auto:best,f_auto/wp-cms/uploads/2019/12/4-90446514-segway-is-back-with-a-24mph-people-mover-straight-out-of-wall-e.jpg.

[14] https://chi.streetsblog.org/2020/08/26/seated-e-scooters-are-coming-to-chicago-to-provide-an-option-for-people-with-disabilities/.

[15] *Id.;* https://www.sfmta.com/blog/new-permit-and-pilot-program-san-franciscos-scooters.

[16] https://www.fastcompany.com/90450211/e-scooters-are-leaving-people-with-disabilities-behind-lime-wants-to-fix-that. *See also* https://www.govtech.com/fs/transportation/Companies-Launch-Accessible-E-Scooters-for-Disabled-Users.html ("For 40,000 blind and visually impaired people, none of us can enjoy the benefits, only the hazards.").

[17] https://www.sfmta.com/blog/adaptive-scooters-people-disabilities ("permittees were instructed to develop vehicles and corresponding services that are based on input from people with disabilities."). *See also* https://www.govtech.com/fs/transportation/Companies-Launch-Accessible-E-Scooters-for-Disabled-Users.html ("I think the only way you can get our population represented is for any tech company to come and test with our participants, so they can see for themselves all the variables.").

[18] https://www.fastcompany.com/90446514/segway-is-back-with-a-people-mover-straight-out-of-wall-e.

[19] https://www.metro-magazine.com/10112338/e-scooter-video-depicts-how-sidewalk-use-impacts-people-with-disabilities; https://www.latimes.com/california/story/2019-09-27/disability-scooters-sidewalks-wheelchair-mobility.

shared mopeds can be left anywhere. While they should be parked near the curb, out of the path of travel and away from buildings and transit stops, and leaving enough space for people using mobility devices to get by,[20] users often fall short of the ideal. Improper parking can cause dangerous obstructions for people with disabilities – and frankly any pedestrian rushing to and fro and momentarily losing sight of unsuspecting barriers. Those who continue to be excluded from full enjoyment of shared mopeds, clearly should not also face additional accessibility barriers because of them.[21]

Recommendations

We urge the Committee on Transportation to amend Int. No. 2061, insisting that the Department of Transportation strongly encourage that shared moped companies:

- Design and supply accessible shared mopeds;
- Design ancillary accessibility features which improve the experience users with disabilities, such as ADA-compliant app interfaces;
- Design features for people with disabilities sharing the road, such as devices which emit warning sounds;
- Design a plan for addressing issues of sidewalk accessibility caused by dockless shared mopeds; and
- Seek input from the disability community to advance innovation of accessible shared mopeds.

Thank you for the opportunity to discuss the importance of providing accessible shared mopeds for people with disabilities. It has been 30 years since the passage of the ADA – and countless more years since city and state non-discrimination laws have gone into effect – and still people with disabilities are frequently ignored by emerging technologies. Now, before this technology has taken root, New York City can choose to lead the way in including people with disabilities.

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[20] https://www.metro-magazine.com/10112338/e-scooter-video-depicts-how-sidewalk-use-impacts-people-with-disabilities.
[21] https://www.govtech.com/fs/transportation/Companies-Launch-Accessible-E-Scooters-for-Disabled-Users.html.

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About New York Lawyers for the Public Interest

For over 40 years, NYLPI has been a leading civil rights and legal services advocate for New Yorkers marginalized by race, poverty, disability, and immigration status. Through our community lawyering model, we bridge the gap between traditional civil legal services and civil rights, building strength and capacity for both individual solutions and long-term impact. Our work integrates the power of individual representation, impact litigation, organizing, and policy campaigns. Guided by the priorities of our communities, we strive to achieve equality of opportunity and self-determination for people with disabilities, create equal access to health care, ensure immigrant opportunity, secure environmental justice for low-income communities of color, and strengthen local nonprofits.

NYLPI's Disability Justice Program

NYLPI has a long history of advocating for New Yorkers with disabilities. NYLPI's Disability Justice Program has long fought for equal access to public transportation for persons with disabilities, and is a founding member of the Access-A-Ride Reform Group (AARRG!). Recent court successes include a landmark suit which resulted in improved access to paratransit services for people with disabilities who are limited English proficient. NYLPI, serving as amici curiae, also recently supported a New York Supreme Court case before the Appellate Division advocating for continued elevator installations throughout the subway system, in order to improve system accessibility for people with disabilities.

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[13] https://www.fastcompany.com/90450211/e-scooters-are-leaving-people-with-disabilities-behind-lime-wants-to-fix-that. *See also* https://www.sfmta.com/blog/adaptive-scooters-people-disabilities. For photos of accessible shared mopeds, *see* https://images.fastcompany.net/image/upload/w_596,c_limit,q_auto:best,f_auto/wp-cms/uploads/2020/01/i-1-90450211-lime-debuts-a-scooter-for-people-with-disabilities.jpg; https://www.sfmta.com/sites/default/files/imce-images/2020/spin_adaptive_scooter.jpg; https://images.fastcompany.net/image/upload/w_596,c_limit,q_auto:best,f_auto/wp-cms/uploads/2019/12/4-90446514-segway-is-back-with-a-24mph-people-mover-straight-out-of-wall-e.jpg.

[14] https://chi.streetsblog.org/2020/08/26/seated-e-scooters-are-coming-to-chicago-to-provide-an-option-for-people-with-disabilities/.

[15] *Id.;* https://www.sfmta.com/blog/new-permit-and-pilot-program-san-franciscos-scooters.

[16] https://www.fastcompany.com/90450211/e-scooters-are-leaving-people-with-disabilities-behind-lime-wants-to-fix-that. *See also* https://www.govtech.com/fs/transportation/Companies-Launch-Accessible-E-Scooters-for-Disabled-Users.html ("For 40,000 blind and visually impaired people, none of us can enjoy the benefits, only the hazards.").

[17] https://www.sfmta.com/blog/adaptive-scooters-people-disabilities ("permittees were instructed to develop vehicles and corresponding services that are based on input from people with disabilities."). *See also* https://www.govtech.com/fs/transportation/Companies-Launch-Accessible-E-Scooters-for-Disabled-Users.html ("I think the only way you can get our population represented is for any tech company to come and test with our participants, so they can see for themselves all the variables.").

[18] https://www.fastcompany.com/90446514/segway-is-back-with-a-people-mover-straight-out-of-wall-e.

Shared mopeds are "dockless," a feature that gives them market advantage over e-bikes. That very same feature, however, can cause and has caused issues for people with disabilities.[19] Unlike e-bikes, which must be returned to a central fixed location – the dock – shared mopeds can be left anywhere. While they should be parked near the curb, out of the path of travel and away from buildings and transit stops, and leaving enough space for people using mobility devices to get by, [20] users often fall short of the ideal. Improper parking can cause dangerous obstructions for people with disabilities – and frankly any pedestrian rushing to and fro and momentarily losing sight of unsuspecting barriers. Those who continue to be excluded from full enjoyment of shared mopeds, clearly should not also face additional accessibility barriers because of them.[21]

Recommendations

We urge the Committee on Transportation to amend Int. No~~.~~ 2061, ~~insisting~~mandating that the Department of Transportation establish procedures which strongly encourage ~~that~~and incentivize shared moped companies to:

- Design and supply accessible shared mopeds;
- Design ancillary accessibility features which improve the experience users with disabilities, such as ADA-compliant app interfaces;
- Design features for people with disabilities sharing the road, such as devices which emit warning sounds;
- Design a plan for addressing issues of sidewalk accessibility caused by dockless shared mopeds; and
- Seek input from the disability community to advance innovation of accessible shared mopeds.

Thank you for the opportunity to discuss the importance of providing accessible shared mopeds for people with disabilities. It has been 30 years since the passage of the ADA – and countless more years since city and state non-discrimination laws have gone into effect – and still people with disabilities are frequently ignored by emerging technologies. Now, before this technology has taken root, New York City can choose to lead the way in including people with disabilities.

[19] https://www.metro-magazine.com/10112338/e-scooter-video-depicts-how-sidewalk-use-impacts-people-with-disabilities; https://www.latimes.com/california/story/2019-09-27/disability-scooters-sidewalks-wheelchair-mobility.
[20] https://www.metro-magazine.com/10112338/e-scooter-video-depicts-how-sidewalk-use-impacts-people-with-disabilities.
[21] https://www.govtech.com/fs/transportation/Companies-Launch-Accessible-E-Scooters-for-Disabled-Users.html.

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About New York Lawyers for the Public Interest

For over 40 years, NYLPI has been a leading civil rights and legal services advocate for New Yorkers marginalized by race, poverty, disability, and immigration status. Through our community lawyering model, we bridge the gap between traditional civil legal services and civil rights, building strength and capacity for both individual solutions and long-term impact. Our work integrates the power of individual representation, impact litigation, organizing, and policy campaigns. Guided by the priorities of our communities, we strive to achieve equality of opportunity and self-determination for people with disabilities, create equal access to health care, ensure immigrant opportunity, secure environmental justice for low-income communities of color, and strengthen local nonprofits.

NYLPI's Disability Justice Program

NYLPI has a long history of advocating for New Yorkers with disabilities. NYLPI's Disability Justice Program has long fought for equal access to public transportation for persons with disabilities, and is a founding member of the Access-A-Ride Reform Group (AARRG!). Recent court successes include a landmark suit which resulted in improved access to paratransit services for people with disabilities who are limited English proficient. NYLPI, serving as amici curiae, also recently supported a New York Supreme Court case before the Appellate Division advocating for continued elevator installations throughout the subway system, in order to improve system accessibility for people with disabilities.

October 27, 2020

The Honorable Ydanis Rodriguez
Chairperson, Committee on Transportation
250 Broadway, Suite 1763
New York, New York 10007

Dear Chairperson Rodriguez:

Thank you for convening today's hearing on micromobility in New York City.

Founded in 2016, Spin partners with cities, campuses, military bases, community groups, and businesses to provide micromobility services to get you where you need to go. Our mission is to "give people the freedom to move."

Ford Motor Company acquired Spin in 2018. Ford's support for Spin allows us to create and sustain high quality and compliant shared e-scooter programs in the United States, the United Kingdom, and Germany.

We want the NYC scooter pilot program to work for the residents of this great city and given our experience in the micromobility sector we have some suggestions on how that can be achieved.

We believe that the program should be limited to a max of four vendors. The city should cap the number of scooters to 2,000 max per operator. Vendors should offset the costs of administering the program through fees such as a one-time permit fee and per-trip fee assessment.

NYC DOT should select vendors with a track record of compliance with city regulations - companies whose permits have been suspended or revoked for non-compliance should not be allowed to operate here. Companies should be incentivized to deploy new technology and operational approaches to reduce dangerous scooter riding and poor scooter parking.

Will Burns
Head of Government Partnerships,
US East

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The e-scooter pilot should also complement the city's efforts to enhance equity. NYC DOT should:

- Require deployments in underserved communities;

- Require reduced fare for low-income residents: at least 50% off for low and moderate-income residents and payment options for the unbanked and those without smartphones;

- Require companies to offer adaptive scooter devices;

- Require lock-to tech that requires scooters to be affixed to bike racks, poles, or other infrastructure;

- Require new riders to pass, with an 80% score or higher, an in-app safety quiz before taking their first ride;

- Require a W-2 workforce with living wages and benefits.

Spin is committed to operating a safe e-scooter program in New York. We will provide scooter demonstrations to educate riders about how to ride scooters safely and appropriately. At these demonstrations, Spin will provide free helmets to our participants and anyone can request a free helmet through our website. Spin also provides a 30% discount toward the purchase of a foldable helmet, which reduces the barriers to folks using a helmet with them when they choose to take a trip.

Due to the pandemic and challenges it created around in-person safety education, we have digitized the rider education curriculum on our website so that riders can access safety information without having to attend a scooter demo.

All riders receive instruction through the app on appropriate scooter riding and parking. Our scooters also have stickers with the rules of the road on them. In San Francisco, we have required users who do not ride or park appropriately to take a safety quiz in order to reactivate their account.

We have recently introduced a new navigation feature that helps riders take advantage of existing infrastructure, creating a safer and more efficient ride. This new feature will allow riders to enter a destination and see the fastest route, utilizing bike lanes where possible.

Will Burns
Head of Government Partnerships, US East

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Our scooters are designed to be used on bike lanes rather than as a street vehicle like a moped. Our top speed is 15 MPH, our scooter weighs 45 pounds where a shared moped weighs 200 pounds and has a top speed of 30 MPH. E-scooters are much more similar to e-bikes offered by Citibike than mopeds.

Our W-2 workforce provides us with a high-quality operations team that can maintain and repair our fleet to ensure a safe riding experience. We have also adjusted our cleaning protocol and provided PPE to our operations team in response to COVID-19.

Thank you Chairperson Rodriguez for the opportunity to share our ideas for creating a great e-scooter pilot program in New York City.

Sincerely,

William D. Burns

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Long Island City Partnership

Statement from
Elizabeth Lusskin, President, Long Island City Partnership
on
Revel

October 30, 2020

Dear Chairman Rodriguez and Members of the Transportation Committee:

My name is Elizabeth Lusskin and I am the President of the Long Island City Partnership (LICP). On behalf of the LICP I would like to express our full support for Revel's electric moped-sharing service, which provides an affordable and green transportation alternative that is essential to our community in LIC during the current COVID-19 pandemic and beyond.

Our mission is to advocate for economic development that benefits LIC's industrial, commercial, cultural, and residential sectors. The goal is to attract new businesses to LIC, retain those already here, welcome new residents and visitors, and promote a vibrant and authentic mixed-use community. The LIC Partnership operates the LIC Business Improvement District (LIC BID) and the LIC Industrial Business Zone (LIC IBZ), among other programs.

Alternative and cost-efficient modes of transportation are very important to a community, especially during the COVID-19 pandemic when the need for a safe and affordable way to get around has become more essential than ever. Revel has been instrumental in providing mobility solution to those with few other options and to those that need it most. Their service helps alleviate the impact of MTA's overnight service cut, and we have many businesses that operate 24/7. Their commitment to supporting local communities shows through their programs including providing frontline workers (health care workers, restaurants and teachers) with free ride credits and offering a 40% discount to New York City residents living in NYCHA housing or those eligible for local, state, or federal assistance.

Ravel has shown their long-term commitment to the community through their engagement with us as well as other local community stakeholders in our area. As a community organization, we see the need for this type of transportation in our area, and recognize how diligent they have been in creating a safe and reliable service for our community.

For these reasons, LICP supports Revel's electric moped-sharing service. Thank you for your time.

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Long Island City, NY 11101

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www.licqns.com

Statement regarding new MOPED law

FYI:

I would like to share my support of individual transit options, especially those who use green sustainable technology. During Covid, having transit options that are not in enclosed vehicles is a great tool to combat the spread of the virus, and should be encouraged. And these individual transit modes will be critical in meeting our goals of a safe, green NYC.

I would also like to say that REVEL has acted responsibly during their recent issues with accidents and injuries. They voluntarily shut down immediately after the second incident, and to my knowledge have been working closely with the community and DOT to come up with new procedures to safely operate. They reached out to me for such input during one of their community roundtables, which is encouraging.

Their new regulations since their restart have seemed to be effective. I have not seen a helmet less rider since then.

I also understand that DOT will be codifying new regulations, using community input, in the near future.

Given this, my only concern is over-regulation, making the business environment challenging. Please make sure that current regulations aren't sufficient before creating a an additional level of regulation.

Regards

Richard Khuzami
President
Old Astoria Neighborhood Association
www.oana-ny.org
917 701 6023

CATHOLIC CHARITIES
ARCHDIOCESE OF NEW YORK
100 YEARS
PROVIDING HELP CREATING HOPE

Tuesday, October 27th, 2020

Subject: Hearing on Increasing Mopeds and E-scooters Road Protections

Dear members of the New York City Council:

First, we would like to commend the City Council and Ydanis Rodriguez, Chair of the Transportation committee for hosting this important hearing. We would like to use this opportunity to share our experience working with REVEL to bring resources to residents of the South Bronx. As the social services provider for the Betances Houses in the South Bronx, we established a partnership with REVEL to offer transportation alternatives to our residents, many of whom are essential workers and have utilized this service to get to their jobs, especially during the COVID-19 pandemic.

As a community partner, we invited REVEL to participate in our events to educate our residents and the community at large so they could learn about their services and special programs for essential workers. In general, their service was well received by the community, generated great interest, and was dependable when public transit was suspended during overnight hours. Furthermore, we applaud REVEL's efforts to train more people on how to use the equipment and to increase safety for riders and pedestrians. We also value their initiative to set special rates for individuals who receive public benefits. With transportation costs going up in New York City, this

discount program are very helpful for individuals and families that are trying to stretch their limited resources.

We hope to continue our partnership with REVEL and trust that private organizations, government and the non-profit sector can work together to offer innovative transportation alternative to all new Yorkers.

Paola M. Martinez

Director Social Services

Catholic Charities - Betances Houses

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WHITE FOX SCOOTERS, INC.

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Committee on Transportation
The New York City Council
250 Broadway
New York, New York 10007

Tuesday October 27, 2020

Chairman Rodriguez and members of the Transportation Committee,

On behalf of White Fox Scooters – **the first fully dock-to-dock e-scooter solution in the United States** - Matthew Thornburg and Siddharth Saxena submit this written testimony in support of a shared e-scooter pilot program for the city of New York.

I. Benefits of a Pilot Program

A. Overview

From California, Florida and Chicago, to right across the Hudson River in New Jersey, states all across the country have initiated e-scooter pilot programs. The resultant data of such programs have been invaluable towards their decision making as they strive to enhance mobility and accessibility in their respective cities. For example, after an initial pilot, Chicago is now conducting another e-scooter pilot program with additional features, including a requirement that scooters must be locked to a stationary object after a ride has ended.[1] In Santa Monica, low-income programs were available to riders but were underutilized due to underinvestment in outreach and onboarding.[2] Now, the city requires companies to actively address those barriers that are preventing a more diverse user base. Examples such as these show that different concerns and issues may apply to different cities. Therefore, by conducting an e-scooter pilot program, New York can better understand how an e-scooter solution would fit into its goals, as well as how to meet the particular needs and wants of its citizens.

B. Testing and Improvement

New York can only know if e-scooters are a viable option if they are properly vetted through a pilot program. Such a program is an ideal first step because it allows the city to test the solution and confront real data to decide whether this is a good option for New Yorkers. Moreover, a pilot program not only tests the solution itself, but the unique attributes of each vendor too.

[1] Schaffer, City of Chicago Releases E-Scooter Pilot Evaluation (January 29, 2020), available at: https://www.nrdc.org/experts/stefan-schaffer/city-chicago-releases-e-scooter-pilot-evaluation
[2] City of Santa Monica, Shared Mobility Pilot Program Report (2019), available at: https://www.smgov.net/uploadedFiles/Departments/PCD/Transportation/SantaMonicaSharedMobilityEvaluation_Final_110419.pdf

Importantly, not only would a pilot program allow the e-scooter solution to be tested, but it would also provide the city with points of improvement to any micromobility program that may be adopted in the future. In conversations White Fox Scooters has had with other local governments that have implemented e-scooter pilot programs, they have reported a massive increase in their knowledge of e-scooters and their future approaches to micromobility. For example, we recently spoke with local governments who found that much of their problems stemmed from rides occurring too late and in certain areas. Additionally, while there will naturally be initial growing pains, a pilot program illuminates these exact types of insights that will lead to improvement. For example, if the same issues were found in New York City, White Fox Scooters can easily geofence its scooters to prevent operation in certain areas, as well as prevent scooter use between certain hours.

Finally, a pilot program is merely temporary. A pilot program will unlock data, insights, real citizen feedback, and points for improvement, while at the same time preserve the city's flexibility on this important issue.

II. Safety

A. Helmets

White Fox Scooters' mission is not only to provide an efficient and sustainable e-scooter mobility solution, but also to make sure that our solution is the safest. **Thus, in addition to remodeling our docking stations in response to COVID-19, we have also updated our docking stations to include a secure locker from which riders may take and use a helmet free-of-charge.** The docking station will include a repository in which helmets may be placed when a ride is completed, which would also clearly differentiate used helmets to our operations team so that they can be sanitized.

B. COVID-19

In addition to our efforts to prevent harm or injury to riders and pedestrians, we have also completely overhauled our e-scooter infrastructure in response to the COVID-19 pandemic. **Specifically, our scooters have been outfitted with self-sanitizing handlebar grips and our docking stations have been upgraded to include sanitary wipes for riders to disinfect both their hands and the scooter before and after each ride.**

Additionally, the importance of social distancing and socially distant forms of transportation are at a premium right now and will probably remain useful – if not necessary – for the foreseeable future. At the same time, automobiles – whether individually owned or as part of a ride-share service – seem like a logical choice for socially distant transportation. However, it is crucial that we provide other alternatives so as not to increase automobile traffic and accentuate the associated health and environmental risks caused by pollution. Please refer to Section IV, subsection A, for further information

C. E-scooters vs. Other Vehicles

With respect to the scooters themselves, most e-scooters currently available are innately limited to a maximum speed of around 15 mph. In fact, they have even been found to travel at even slower average speeds, based on data we have collected.[3] Specifically, on a three-mile trip, the average speed was just about 11.2 mph. On the other hand, most e-bikes can actually travel at speeds of over 20 mph. This has often times resulted in speed limit restrictions. In the same vein, most e-scooters weigh around 30 to 40lbs, whereas most e-bikes weigh around 50-60lbs. It is therefore important to note that an e-scooter pilot program for the city would only be allowing vehicles that are generally smaller and slower than vehicles already allowed (e.g. e-bikes) and those vehicles that may be allowed soon (e.g. shared mopeds).

III. Equitable Mobility

A. Extending the Reach of Transportation

Because e-scooters can be easily implemented, operators can efficiently and immediately extend transportation options to currently underserved communities. E-scooters can help serve the needs of residents in transit deserts where, according to one study, almost seven percent of New Yorkers live[4], the majority of whom are minority or lower income populations. These populations have been disproportionately underserved by public transit and rideshare services, as can be viewed in communities such as East Flatbush, Flatlands, Canarsi, Mill Basin, Marine Park, and Gerritsen Beach where, in some cases, three or more miles must be travelled in order to access a single subway line. **Importantly, because White Fox Scooters uses docking stations, we can make sure that scooters are consistently rebalanced and placed in communities that need additional transportation the most.** And, with costs of implementation borne by the vendors themselves, additional transportation can quickly and effectively be brought to a wide range of communities.

B. A Socially Distant Alternative

E-scooters are an obvious solution when it comes to providing socially distant forms of transportation given that they are ridden individually and outside. Since not every New Yorker has the opportunity to work from home, many of which include those from lower-income populations whose jobs require presence in their workplaces,[5] an e-scooter pilot program would increase the number of transportation options while also providing a COVID-19-safe mode to workers with currently fewer options.

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[3] White Fox Scooters, Beta Testing Data (finding that during approximately three-mile trips, scooters reached an average speed of only 11.2 mph).

[4] Junfeng Jiao, Transit Deserts in Major US Cities: Lessons from 51 Cities (funded by the U.S. Dep't of Transportation, University Transportation Center) (Feb. 7, 2018) available at: https://sites.utexas.edu/cm2/2018/02/19/dr-junfeng-jiao-presents-research-on-us-transit-deserts/ and https://www.smithsonianmag.com/innovation/dozens-us-cities-have-transit-deserts-where-people-get-stranded-180968463/.

[5] Gould and Shierholz, Not everybody can work from home, Economic Policy Institute (March 19, 2020) available at: https://www.epi.org/blog/black-and-hispanic-workers-are-much-less-likely-to-be-able-to-work-from-home/

C. Organization and Clutter Reduction

An important part of achieving our goal of providing equitable mobility means that we take great efforts to avoid cluttering public rights-of-way and reduce any potential externalities. Ultimately, any mobility solution has to work for everyone, not just its users. **Our model for parking and locking scooters at docking stations allows streets and sidewalks to remain safe, easy to use, and navigable – which would be especially important for disabled pedestrians – and at the same time unlocks the many benefits of shared and sustainable micromobility.**

IV. Sustainability

A. The Health of New Yorkers and Sustainability Generally

Air pollution is one of the most serious environmental threats to urban populations.[6] A study released by the city stated that air pollution in New York City, over a period of just a few months, caused more than 400 premature deaths, 850 hospitalizations and 4,500 emergency department visits – all from asthma.[7] Of course, e-scooters would not immediately solve the problem of air pollution, but they are a step in the right direction. The electricity required to charge an e-scooter battery results in 0.3 pounds of carbon emission for every 28 miles, while a single passenger car emits 18.90 pounds of carbon over the same distance. Put differently, an e-scooter results in only 1.6% of the carbon emissions when compared to a car. Furthermore, in a report detailing the results of their e-scooter pilot program, the city of Santa Monica, California found that nearly half (49%) of shared mobility trips replaced trips that would have otherwise been made by car, whether it be a single-passenger drive or via ride-hailing. Thus, in addition to increasing opportunities to socially distance, e-scooters can be another tool in the city's kit when it comes to combatting climate change and increasing sustainability.

B. White Fox Scooters and Sustainability

Each vendor will approach various problems differently, and White Fox Scooters is no exception. Part of our mission is to reduce environmental impact, and our docking stations help achieve that mission in a number of ways, including the following:

1) Our docking stations further reduce vehicle miles travelled by our operations team because they only need to reach the docking stations in order to rebalance our scooters, as opposed to any place a rider may have left their scooter under a dockless model.

2) Because we use docking stations, our scooters remain organized, upright and are less prone to theft and vandalization. The useful life of our individual scooters is thereby

[6] Cohen AJ, Anderson HR, Ostra B, Dev Pandey K, Krzyzanowski M, Kunzli N, Guschmidt K, Pope A, Romieu I, Samet JM, Smith K. 2005. The Global Burden of Disease due to Outdoor Air Pollution. *Journal of Toxicology and Environmental Health, Part A*. 68: 1-7.

[7] Air Pollution and the Health of New Yorkers: The Impact of Fine Particles and Ozone, 25, available at: https://www1.nyc.gov/assets/doh/downloads/pdf/eode/eode-air-quality-impact.pdf

increased, which in turn reduces our environmental impact because each scooter can remain in operation for a longer period of time.

3) In some jurisdictions, e-scooters have been found in nearby bodies of water, whether it be due to scooters falling over, vandalization, theft, or otherwise.[8] However, when a scooter is locked at one of our thoughtfully placed docking stations, that risk to the environment and urban landscape is reduced dramatically.

4) Lastly, White Fox has already pledged to donate a portion of its proceeds to plant trees in the areas it serves in order to truly achieve a CO2 offset.

V. Conclusion

Ultimately, it is the goal of White Fox Scooters to improve mobility, safety, and sustainability across all cities, including in our home – the greater New York City area. We would like to express our complete support of an e-scooter pilot program in New York City. However, beyond that, we do believe that our dock-to-dock, station-based approach to e-scooter micromobility is best positioned to achieve those goals and respond to the COVID-19 pandemic. It is our sincere hope that we can begin to serve the citizens of New York through the upcoming pilot program. White Fox Scooters sincerely thanks you for the opportunity to testify this week, and we urge you to contact us if you have any further questions, inquiries, or requests that we could be of service to.

Respectfully,

Siddharth Saxena
Founder & CEO

Matthew Thornburg
Chief Strategy Officer

[8] *See, e.g.*, https://slate.com/technology/2018/12/electric-scooter-bird-lime-lakes-rivers-environment-vandalism.html and https://www.thedrive.com/news/28754/over-50-lime-and-bird-e-scooters-retrieved-from-bottom-of-river-in-washington-state.

The Unique Wheels Device

Device Features

Integrated Smart Helmet
Foam Seat
14-inch Wheels
LED lights
Bluetooth Speaker
Adjustable kick-stand
Speedometer
Footpegs
Front and rear independent dual actuated braking system

Identification

Every device features:
Company name
Logo
24/7 customer service phone number Website
Email address
Unique vehicle identifier

Vehicle Specifications

Wheels devices are:
39.9 inches tall
21.1 inches wide
49.2 inches long
Weigh 40 lbs.

Devices feature LED lights for increased visibility and a headlight which shines up to 500'

Wheels devices are one of the first to market with swappable battery technology. Our swappable battery model allows us to source new types of batteries, if needed, while still using our current device models

WHEELS

“When I first saw Revel come into my community in Dyckman I was beyond excited. Subway service in my neighborhood is not the most reliable due to construction, and now there’s no overnight service at all due to COVID-19. It’s been difficult to find reliable and affordable alternatives, but having access to Revel has made commuting these last couple of months so much easier. I started off by taking a lesson with Revel in Manhattan and it was wonderful! I really enjoyed my time with the instructors and left feeling very comfortable. I’m really glad to have companies like Revel - they seem to truly care about their users and have changed the way we’re able to get around during these times. ”
- Ashley Ferreira

October 27, 2020

Good morning Chairman Rodriguez and Members of the Transportation Committee,

My name is Curtis Archer and I live in West Harlem off of 143rd Street, near Broadway. As a resident of Harlem and upper Manhattan for over 40 years, I know well that we need transportation options, other than cars, in this neighborhood. E-scooters and other forms of micro-mobility offer residents in my community options to travel seamlessly to work or to carry out chores/duties they might otherwise miss without it.

One such option is the Revel electric scooter. Revel has become a part of the fabric of the upper Manhattan community. I believe that they are a vital community player who believes in working hand in hand with community by actively engaging community stakeholders. They do this by admitting and trying to resolve issues when they arise. They try to see all of their users adhere to the rules-of-the-road and operate their vehicles safely.

As I mentioned earlier, they (Revel) provides a much needed transportation alternative in NYC by providing a green and affordable option - including the Revel Access Program which offers a 40% discount to NY residents living in NYCHA or eligible for local, state, or federal assistance. It's a real benefit for folks in my community.

Certainly we've seen during the pandemic that they are committed to "essential workers" in NY which is why they have launched programs to provide health care workers, restaurants, and now teachers with free ride credits to help the city return to normal.

I believe Revel is an essential service that we should all rally around and support. I ask that you Members of the Council strongly consider providing your support for their continued availability in my community.

Sincere regards,

Curtis L. Archer

WHEELS

October 26, 2020

Dear Honorable Committee on Transportation,

As the City of New York responsibly re-opens in the wake of COVID-19, the City's residents and visitors have an emerging need for sustainable forms of socially distant transportation, especially given the challenges of public transportation and car ride-sharing. Wheels is in a unique position to provide that to the City, with what we and experts believe to be the safest, cleanest, and most accessible service in the micromobility industry.

Recommendations for the NYC DOT RFP:

Require a Seated Scooter Option: Having just received the top score in September for the highly competitive Seattle Free-Floating Shared Scooter Pilot Program, Wheels humbly requests that the Committee on Transportation consider adopting one of Seattle's widely praised requirements into the upcoming NYC DOT RFP. Seattle selected the highest-ranking applications in three categories: a standing scooter company, a seated scooter company, and a company that offers both bikes and scooters. This ensured that Seattle provided riders with a seated device, which is safer and more accessible than that of traditional stand-up scooters.

Require Helmets: It has been over 50 years since the United States first required cars to be manufactured with seat belts. This is now such an obvious safety requirement that no one even thinks about it. Car companies don't send car owners seat belts suggesting the driver and passengers bring it with them every time they ride in a car. A car comes with seat belts, period. We believe the same logic certainly applies to helmets for a scooter or bike that shares the road with cars. Simply stated, a micromobility device is only complete if it includes a helmet.

We strongly believe that having an integrated helmet is the right solution, and any micromobility device without one is incomplete, as it is lacking the most important safety system a micromobility device can have. Our blog post, including photos and video of the Wheels Helmet can be found here.

Why Wheels is the Safest, Most Accessible, and Most Sustainable Device on the Market

Safety: Wheels was born out of a desire to make micromobility safer, and accessible to a diversity of ages, sizes and economically disadvantaged communities. Every action that drives our company forward is built on the safety concerns of our community. Our 'safety first' strategy led us to forego using the traditional stand-up scooter in favor of a completely different form factor – one with much bigger wheels, a lower center of gravity, and a seat for more points of contact with the rider. The Wheels device delivers these safety benefits while still being the size

of a traditional scooter. This is important because larger devices are much more likely to create congestion, interfere with pedestrians, and introduce a range of other problems. The Wheels device delivers the best of both worlds: significantly increased safety and a size that is proven.

In the past year, Wheels has rolled out new safety features that are unique to us. First off, we have started rolling out a smart helmet system that is directly integrated into the device – the first such system being introduced on the market. Using the app, riders can unlock the helmet from the device and peel off a new biodegradable headliner for every use. (There is a tab on the outside of the helmet that a rider pulls in order to get a fresh headliner; the rider never has to touch the part of the headliner that was used by another rider.) Because the helmet is connected to the device's sensors and other electronics, we have numerous options to encourage helmet use by our riders and we provide discounts that encourage and reward use.

At Wheels, we believe that riding with a helmet is absolutely critical as approximately half of all injuries on micromobility devices are head injuries, and yet about 99% of riders have been found to not wear helmets. Secondly, 100% of Wheels devices are now equipped with tip-detection technology to help ensure that they are properly staged, including being upright. This has helped us ensure sidewalks are safe and accessible for people of all ages and abilities.

The data has proven out the safety benefits of our device. As reflected in the attached report, Exponent, a leading third-party safety consultant, recently compared our injury rates to the rest of the micromobility industry, and it found that Wheels' injury rates are exponentially lower than those reported for scooters and bicycles:

Wheels' Injury Rate	Comparison to Other Micromobility Devices
1 injury for every 74,577 miles ridden	4 times better than bicycles; 3 to 66 times better than other scooters
24.99 injuries for every 1 million trips taken	5 times better than bicycles; 8 to 26 times better than other scooters
0.12 injuries for every 1,000 hours of riding	2 to 5 times better than bicycles; 9 to 19 times better than other scooters

Cleanliness: In line with our commitment to safety, Wheels is uniquely situated to address the challenges of the COVID-19 pandemic.

We recently announced a partnership with NanoSeptic, the leader in self-sanitizing surfaces, on a first-of-its-kind offering in the shared transportation space. Through this partnership, we are rolling out custom-made NanoSeptic surfaces on our

handlebars and brake levers so that our riders only touch self-cleaning surfaces. NanoSeptic surfaces contain mineral nanocrystals that are powered by visible light to continuously break down any organic contaminants at the microsocopic level without the use of poisons, traditional heavy metals or dangerous chemicals.

This adds to the many other steps we've taken to elevate our sanitation measures:

- Our 24-hour field operations team is regularly sanitizing Wheels bikes at hub locations. As part of this process, our team runs a UV wand over our bikes to break down the virus's genetic material.
- All work areas at Wheels' warehouses are separated by at least 6 feet, and there are hand washing and sanitizing stations located at each entrance and throughout our facilities.
- Work areas and tools are sanitized before and after each shift in accordance with the strict sanitization procedures we have implemented.
- All inbound and outbound devices at our warehouse are sanitized, with all Wheels bikes being sprayed with a disinfectant and wiped down with a microfiber towel.
- All of our warehouses are equipped with UV wands, which are being used on all bikes and work surfaces in the warehouse.
- All of our team members wear PPE, including masks and gloves.

Accessibility: In order for micromobility to help cities responsibly re-open, devices not only have to be safe and clean, they have to be capable of being comfortably ridden by *everyone*. With the need to reduce the burden on public transportation in favor of transportation modes that promote social distancing, this has never been more important.

Wheels is uniquely situated to appeal to everyone. Our seated design provides increased comfort for those who do not have the physical capability of standing up on a scooter or pedaling a bicycle. And our device is lightweight (only 40 lbs.), has a low step-through for easier access and operation, and does not require users to pedal or stand and balance. Because of these differences, Wheels attracts a particularly broad demographic, with half of our riders being women and one-third being over the age of 35.

To demonstrate the clear accessibility benefits of the Wheels form factor, we recently asked Exponent to conduct a comparative analysis of a Wheels bike, a common stand-up scooter, and a pedal bike. As indicated in the attached report, riders of a wide variety of weights and ages prefer the Wheels bike. It is easier to mount and dismount than a pedal bike. It is more stable to ride than the other devices. It is easier to start up from an orthopedic perspective than the other devices. And our riders have less fatigue because of the ability to sit down and remain stable.

Sustainability

Due to our swappable battery technology and the modular design of our device, we believe that Wheels is the most sustainable option in the micromobility industry. Wheels avoids the typical

WHEELS

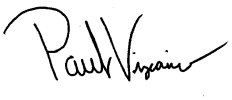
"juicer" model where scooters are thrown in people's trucks, charged overnight at their homes, and then brought back out in trucks to be re-deployed. The use of swappable batteries instead enables our devices to receive new, charged batteries without ever having to be removed from the field, resulting in a much more efficient operations model and lower carbon footprint.

Additionally, because we purposefully chose not buy a traditional off-the-shelf scooter like other companies and because our device instead uses a unique modular design that allows parts to be easily swapped in and out, the life span of our vehicles is unusually long. Indeed, we are confident that our devices will easily last at least 2,000-3,000 miles on average (likely more than 3 years), and likely far more. This dramatically lowers vehicle churn and waste, and significantly improves sustainability. We know the City of New York has a commitment to sustainability, and so does Wheels.

In addition to these updates, Wheels provides so much more than most traditional stand-up scooters, including our robust equity offerings and our use of swappable batteries, which results in a much more sustainable and efficient operations model.

We are eager and excited by the potential opportunity to work with and serve the great City of New York in the upcoming pilot program. Please do not hesitate to reach out with any thoughts or questions you may have

Sincerely,



Paul Vizcaino
Chief Development Officer/Founding Member

Ride Safe with Wheels

First and foremost, Wheels encourages safety by having what we believe is the safest device in the industry, including first-of-its-kind safety features like our integrated helmet system, 14 inch wheels, a low center of gravity, and Bluetooth speakers to enable hands-free navigation.

The data demonstrates Wheels' safety benefits. Wheels recently hired Exponent, a leading engineering and consulting firm that studies safety to go through the many independent studies that have been done across the micromobility industry to measure injury rates. We asked Exponent to then compare those findings to our own injury data. Exponent found that Wheels' injury rates were exponentially lower than those reported for other types of micromobility devices, including both bicycles and traditional stand-up scooters. Specifically, here's what Exponent found:

Wheels' Injury Rate	Comparison to Other Micromobility Devices
1 injury for every 74,577 miles ridden	4 times better than bicycles; 3 to 66 times better than scooters
24.99 injuries for every 1 million trips taken	5 times better than bicycles; 8 to 26 times better than scooters
0.12 injuries for every 1,000 hours of riding	2 to 5 times better than bicycles; 9 to 19 times better than scooters

Notably, with one exception, all of the studies that Wheels was compared against rely entirely on hospital emergency room visits for their injury reporting, which means they leave out a large number of other injuries. In contrast, Wheels' injury data is based on every single injury reported to the company through all of our various channels, including through our app, calls or texts to our 24/7 support number, or to our support email, even though only a small fraction involved an emergency room visit. The only other injury rate report that we know of that is not limited to emergency room visits is Bird's, which stated that its riders had 1 injury for every 26,882 miles ridden – an injury rate that is nearly 3 times higher than Wheels'.

A complete version of Exponent's report is attached.

The Unique Wheels Device

Device Features

Integrated Smart Helmet
Foam Seat
14-inch Wheels
LED lights
Bluetooth Speaker
Adjustable kick-stand
Speedometer
Footpegs
Front and rear independent dual actuated braking system

Identification

Every device features:
Company name
Logo
24/7 customer service phone number Website
Email address
Unique vehicle identifier

Vehicle Specifications

Wheels devices are:
39.9 inches tall
21.1 inches wide
49.2 inches long
Weigh 40 lbs.

Devices feature LED lights for increased visibility and a headlight which shines up to 500'

Wheels devices are one of the first to market with swappable battery technology. Our swappable battery model allows us to source new types of batteries, if needed, while still using our current device models

WHEELS

Injury Data Analysis Comparing Wheels and other Micro-Mobility Devices

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Heather Watson, Ph.D.

March 3, 2020

Scope

- Exponent was retained by Wheels to research and study micro-mobility usage and injuries.
- The study comprised a qualitative and quantitative investigation of injury rates and types of injury of various micro-mobility modes and devices, and making a comparison to the Wheels device.
- The appendices to this report contain supporting information:
  - A) Literature Review of Usage and User Behavior
  - B) Literature Review of injury Types and Incidents
  - C) Trends in NEISS Injury Patient Demographics

Wheels Data

- Wheels provided injury data and ride metrics from all markets in which Wheels operates from September 2018 to January 2020.
- Injury Data: Wheels reported three groups based on level of confirmation of the incident that Wheels performed. All 3 were combined to provide the most conservative estimate:
  - Group 1: Subject provides statement, no further contact
  - Group 2: Subject provides statement, additional contact
  - Group 3: Subject provides statement, dropped contact
- Exposure Data: Wheels provided the number of rides, total distance traveled, unique riders, and total traveling hours by month from September 2018 to January 2020.
- Exponent calculated the injury rate for the various exposures:
  - Injury Rate Per Million Trips: 25 injuries per 1 Million trips
  - Injury Rate Per Million Miles Traveled: 13.4 injuries per 1 Million miles
  - Injury Rate Per 1,000 Hours: 0.12 injuries per 1,000 hours

Wheels Data (cont'd)

- The Wheels data is dependent on consumers voluntarily reporting injuries and this may result in injuries not being reported and/or injuries being incorrectly being attributed to Wheels device usage.
- The ride metrics were not broken down by market. The analysis disregards any differences between markets.
- It should be noted that the reporting methodologies for the NEISS data and the Wheels data are different. NEISS is a random sample of ER visits and the Wheels estimate is based on voluntary reporting of injuries. It is unknown how those differences will manifest.
- The analysis included different exposure periods and reporting methodologies. There was no accounting for seasonal effects, trends with increased usage, rider characteristics/demographics, user behaviors or other confounders that could affect the results.
    - The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older.

Comparison of Injury Rates Per Trips

- According to the references reviewed, Bicycles* have exhibited injury rates per million trips that are five times higher than Wheels devices; Scooters** have exhibited injury rates eight to 26 times higher.

Source	Years	Product	Injury Rate Per Mil. Trips	95% Lower/Upper Bound for Injury Rate		Ratio of Other modes to Wheels	95% Lower/Upper Bound for Ratio	
Wheels	2018-2020	Wheels	24.99	19.85	31.30	Reference	-	-
NEISS/NHTS	2017-2018	Bicycles*	120.66	120.45	120.87	4.83	3.88	6.08
NEISS/NACTO	2017-2018	Powered Scooters	301.30	298.05	304.57	12.06	9.68	15.18
Bekhit 2019	2018-2019	E-Scooters	641.67	604.11	681.03	25.67	20.44	32.59
APH 2018	2018	E-Scooters	202.97	179.37	228.91	8.12	6.30	10.55
Trivedi 2019	2018-2019	E-Scooters	199.77	166.44	238.04	7.99	5.99	10.72

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Comparison of Injury Rates by Miles Traveled

- According to the references reviewed, Bicycles* have exhibited injury rates per million miles traveled that are four times higher than Wheels devices; Scooters** have exhibited injury rates from three to 66 times higher.

Source	Years	Product	Injury Rate Per 1M Miles	95% Lower/Upper Bound for Injury Rate		Ratio of Other modes to Wheels	95% Lower/Upper Bound for Ratio	
Wheels	2018-2020	Wheels	13.41	10.65	16.69	Reference	-	-
NEISS/NHTS	2017-2018	Bicycles*	50.75	50.66	50.84	3.79	3.04	4.77
NEISS/NACTO	2017-2018	Powered Scooters	301.30	298.05	304.57	22.47	18.05	28.30
Bekhit 2019	2018-2019	E-Scooters	885.06	833.26	939.35	66.00	52.56	83.79
Bird Report	2017-2019	E-Scooters	37.2	27.59	48.68	2.77	1.91	3.99
APH 2018	2018	E-Scooters	213.21	188.43	240.47	15.90	12.34	20.67
Trivedi 2019	2018-2019	E-Scooters	151.15	125.93	180.10	11.27	8.44	15.11

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Comparison of Miles Traveled per Injury

- According to the references reviewed, Bicycles* have exhibited injury rates per mile traveled that are nearly four times higher than Wheels devices; Scooters** have exhibited injury rates from three to 66 times higher.

Source	Years	Product	1 injury per XX Miles	Injury Ratio of Other Modes to Wheels
Wheels	2018-2020	Wheels	1 injury per 74,577 miles	Reference
NEISS/NHTS	2017-2018	Bicycles*	1 injury per 19,703 miles	3.79
NEISS/NACTO	2017-2018	Powered Scooters	1 injury per 3,319 miles	22.47
Bekhit 2019	2018-2019	E-Scooters	1 injury per 1,130 miles	66.00
Bird Report	2017-2019	E-Scooters	1 injury per 26,882 miles	2.77
APH 2018	2018	E-Scooters	1 injury per 4,690 miles	15.90
Trivedi 2019	2018-2019	E-Scooters	1 injury per 6,616 miles	11.27

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Comparison of Injury Rates Per Travel Hours

- According to the references reviewed, Bicycles* have exhibited injury rates per travel hours that are two to five times higher than Wheels devices; Scooters** have exhibited injury rates from nine to 19 times higher.

Source	Years	Product	Injury rate per 1,000 Hours	Ratio of Other Modes To Wheels
Wheels	2018-2020	Wheels	0.12	Reference
NEISS/NHTS	2017-2018	Bicycles[x,*]	0.26	2.2
NEISS/NHTS	2017-2018	Bicycles[xx,*]	0.60	5.1
NEISS/NACTO	2017-2018	Powered Scooters[xxx]	2.26	19.3
APH and Austin Public Data	2018	E- Scooters[xxxx]	1.04	8.9

[x]Assuming an average of 28 minutes per ride. NACTO (2017).
[xx]Assuming an average of 12 minutes per ride. NACTO (2017)
[xxx]Assuming an average of 8 minutes per ride. Mathew (2019)
[xxxx]Assuming an average of 11.5 minutes per ride. Austin Public Health (2018).

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Conclusions

- According to the data reviewed, and the study limitations expressed on the next slide, the Wheels injury rates per trips, per miles traveled, or per riding hours are all less than bicycles, powered scooters, or e-scooters:
  - The injury rates per million trips for the other micro-mobility devices reviewed were 5 times to 26 times higher than for Wheels.
  - The injury rates per miles traveled for the micro-mobility devices reviewed ranged from three times to 66 times higher than for Wheels.
  - The injury rates per hours of travel for the other micro-mobility devices reviewed ranged from two times to 19 times higher than for Wheels.

Limitations

- The purpose of this report was to communicate Exponent's review of the identified micro-mobility usage and injury data.
- In the analysis, we have relied on information provided by Wheels Labs, Inc. We cannot verify the correctness of this input, and rely on Wheels Labs, Inc. for accuracy.
- The analysis included data sets using different exposure periods and reporting methodologies. There was no accounting for seasonal effects, trends with increased usage, rider characteristics, user behaviors or other confounders that could affect the results.
    - Rider age, especially, may impact the results since e-scooters (mostly rentals by micro-mobility companies), as well as the Wheels e-bike, are generally age restricted (18 years of age and older). Bicycles are generally not age restricted (except for the bicycles offered as rentals that generally have the same age restriction).
- The Wheels data is dependent on consumers voluntarily reporting injuries and this may result in injuries not being reported and/or injuries being incorrectly being attributed to Wheels device usage.
- The ride metrics were not broken down by market. The analysis disregards any differences between markets.

Limitations

- Reporting methodologies for the NEISS data and the Wheels data are different. NEISS is a random sample of ER visits and the Wheels estimate is based on voluntary reporting of injuries. It is unknown how those differences will manifest.
- The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.
- Although Exponent has exercised usual and customary care in the conduct of this analysis, the responsibility for use of this analysis in the design, manufacture, quality, or operation of the product remains fully with Wheels Labs, Inc.

Bibliography

- Austin Public Health, “Dockless Electric Scooter-Related Injuries Study.” (2018).
- Badeau, A. *et al.* "Emergency department visits for electric scooter-related injuries after introduction of an urban rental program." *The American journal of emergency medicine* (2019).
- Baschera, D., *et al.* “Comparison of the Incidence and Severity of Traumatic Brain Injury Caused by Electrical Bicycle and Bicycle Accidents—A Retrospective Cohort Study From a Swiss Level I Trauma Center.” *World Neurosurgery* 126 (2019): e1023-e1034.
- Beck, S., *et al.* “Emergency department impact following the introduction of an electric scooter sharing service.” *Emergency Medicine Australasia* (2019).
- Bekhit, M.N.Z., *et al.* “Regional healthcare costs and burden of injury associated with electric scooters.” *Injury* 51(2): 271-277 (2020).
- Blomberg, S.N.F., *et al.* “Injury from electric scooters in Copenhagen: A retrospective cohort study.” *BMJ Open* 9 (2019): e033988.
- BIRD Safety Report, “A look at e-scooter safety: examining risks, reviewing responsibilities and prioritizing prevention.” (2019).
- Capua, T. *et al.* "A comparison of manual versus electric bicycle injuries presenting to a pediatric emergency department." *Rambam Maimonides Medical Journal* 10.3 (2019).
- CB Insights, “How bikes and scooters are shaking up urban transport worldwide: The micromobility revolution.” (2019).
- DiMaggio, C.J., *et al.* “Injuries associated with electric-powered bikes and scooters: Analysis of U.S. consumer product data.” *BMJ* (2019).
- Dozza, M., Francesco Bianchi Piccinini, G., and Werneke, J. "Using naturalistic data to assess e-cyclist behavior." *Transportation Research Part F: Traffic Psychology and Behaviour* 41 (2016): 217-226.
- Fishman, E. "Bikeshare: A review of recent literature." *Transport Reviews* 36.1 (2016): 92-113.
- Forester, J. *Bicycle transportation: a handbook for cycling transportation engineers.* MIT Press (1994).

Bibliography

- Fyhri, A., *et al.* "Gender differences in accident risk with e-bikes – Survey data from Norway." *Accident Analysis and Prevention* 132 (2019): 105248.
- Garman, C.M.R., *et al.* "Capabilities and Limitations Related to Vehicle Dynamics and Operator Kinematics of Electric Scooter Micro-Mobility Modes." *SAE Technical Paper* 2020-01-0935 (2020).
- Gross, I., *et al.* "E-bike-related trauma in children and adults." *Journal of Emergency Medicine* 54(6): 793-798 (2018).
- Haworth N.L. and Schramm A. "Illegal and risky riding of electric scooters in Brisbane." *The Medical Journal of Australia.* 211(9): 412-413 (2019).
- Hertach, P., *et al.* "Characteristics of single-vehicle crashes with e-bikes in Switzerland." *Accident Analysis and Prevention* 117 (2018): 232-238.
- Langford, B.C., Chen, J., and Cherry, C. "Risky Riding: Naturalistic Methods for Comparing Safety Behavior from Conventional Bicycle Riders and Electric Bike Riders." *Accident Analysis & Prevention* 82 (2015): 220-226.
- Li, X., *et al.* "Orthopedic injury in electric bicycle related collisions." *Traffic Injury Prevention* 18(4): 437-440 (2017).
- Ma, C., *et al.* "Risk riding behaviors of urban e-bikes: A literature review." *International Journal of Environmental Research and Public Health* 16 (2019): 2308.
- Mathew, J.K., *et al.* "Analysis of e-scooter trips and their temporal usage patterns." *ITE Journal* (2019).
- Mayhew, L.J. and Bergin, C. "Impact of e-scooter injuries on emergency department imaging." *Journal of Medical Imaging and Radiation Oncology.* 63(4): 416-466 (2019).
- Namiri, N.K., *et al.* "Electric scooter injuries and hospital admissions in the United States, 2014-2018." *JAMA Surgery* (2020).

Bibliography

- National Association of City Transportation Officials. “Shared Micromobility in the U.S.: 2018.” (2019).
  - https://nacto.org/shared-micromobility-2018/
  - https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf
- Popovich, N. *et al.* "Experiences of electric bicycle users in the Sacramento, California area." *Travel Behaviour and Society* 1.2 (2014): 37-44.
- Portland Bureau of Transportation, “E-Scooter Findings Report.” (2018).
- Ruikang Y., Hui Z., Zhang, C., and Wang, Z. “Analysis of risk-taking behaviors of electric bicycle riders in response to pedestrian countdown signal devices.” Traffic Injury Prevention, 20:2 (2019): 82-188, doi: 10.1080/15389588.2018.1542138.
- Siman-Tov, M., *et al.* "A look at electric bike casualties: Do they differ from the mechanical bicycle?" *Journal of Transport & Health* 11 (2018): 176-182.
- Siman-Tov, M., *et al.* “The casualties from electric bike and motorized scooter road accidents.” *Traffic Injury Prevention* 18(3): 318-323 (2017).
- Schepers, J. P. *et al.* "The safety of electrically assisted bicycles compared to classic bicycles." *Accident Analysis & Prevention* 73 (2014): 174-180.
- Schleinitz, K., *et al.* “(E-)Cyclists running the red light – The influence of bicycle type and infrastructure characteristics on red light violations.” *Accident Analysis and Prevention* 122(2019): 99-107.
- Tenenbaum, S., *et al.* “Orthopaedic injuries among electric bicycle users.” *Injury* 48(10): 2140-2144 (2017).
- Todd, J., Zimmermann, J., Dunning, A., Krauss, K. “Behavior of electric scooter operators in naturalistic environments.” *SAE Technical Paper* 2019-01-1007 (2018).
- Trivedi, Bhavin *et al.* "Craniofacial Injuries Seen with the Introduction of Bike-Share Electric Scooters in an Urban Setting." *Journal of Oral and Maxillofacial Surgery* (2019).
- Trivedi, Tarak K. *et al.* "Injuries associated with standing electric scooter use." *JAMA Network Open* 2.1 (2019): e187381-e187381.
- Zmora, O., *et al.* “Pediatric electric bicycle injuries and comparison to other pediatric traffic injuries.” *Traffic Injury Prevention* 20(5): 540-543 (2019).

Accessibility and Comfortability Testing of Micro-Mobility Devices

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June 1, 2020

Scope

- Retained by Wheels to examine comfortability and accessibility of Wheels device in comparison to Bird e-scooter and Grid Bike bicycle
  - Quantitative and Qualitative testing was conducted with four participants of varying age and weight
- The Quantitative testing examined:
  - Device mounting and dismounting
  - Rider stability
  - Start-up Task: Ankle loading
- The Qualitative testing included participants' impressions of devices:
  - Comfort
  - Accessibility

Wheels

Subject #	Age	Height (in)	Weight (lbs.)
1	53	68	170
2	35	69	220
3	49	78	305
4	46	65	140

Bird

Grid Bike

Limitations

- The purpose of this report was to communicate Exponent's review of the accessibility and comfortability of the Wheels micro-mobility device.
- The study participants consisted of four people. The participants were selected for age (over 35 years) and to ensure weight category diversity. The selection process did not account for participant physical ability (e.g., strength, flexibility, etc.) or micro-mobility device riding skill. As a result, the observations are not meant to be fully representative of the overall public.
- Although Exponent has exercised usual and customary care in the conduct of this analysis, the responsibility for use of this analysis in the design, manufacture, quality, or operation of the product remains fully with Wheels Labs, Inc.

Observations Summary

The following observations apply*:

- Quantitative Testing:
  - Mount/Dismount: Compared to the Grid bike, the Wheels device has less of an orthopedic demand during the mounting and dismounting task.
  - Rider Stability: The Wheels device was the most stable overall. The Wheels device requires less rider control to remain stable during the ride than do the other devices.
  - Start-up Task: The Wheels device has less of an orthopedic requirement during start up, compared to the Grid and the Bird devices.
- Quantitative Testing:
  - Step-through height on Wheels device preferred by user that chose to step through.
  - Less self-reported fatigue experienced on Wheels device during extended ride.
  - Ability to sit down and remain stable on the Wheels device noted as a potential benefit for longer rides.

* The observations are not meant to be representative of the overall public due to sample size and diversity.

Mount and Dismount Task

Observations: Mount and Dismount Task

The following observations apply*:

- Step Through
  - Hip flexion angle and knee height were lower for the Wheels device compared to Grid.
  - Compared to the Grid bike, the Wheels device has less of an orthopedic demand during the mounting and dismounting task.
- Swing Over
  - Hip extension and abduction angles were lower for the Wheels device compared to Grid.
  - Compared to the Grid bike, the Wheels device has less of an orthopedic demand during the mounting and dismounting task.

* The observations are not meant to be representative of the overall public due to sample size and diversity.

Rider Stability

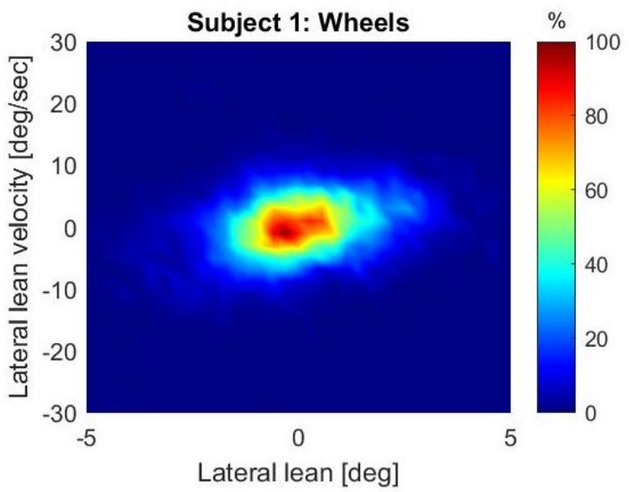
Stability Calculations

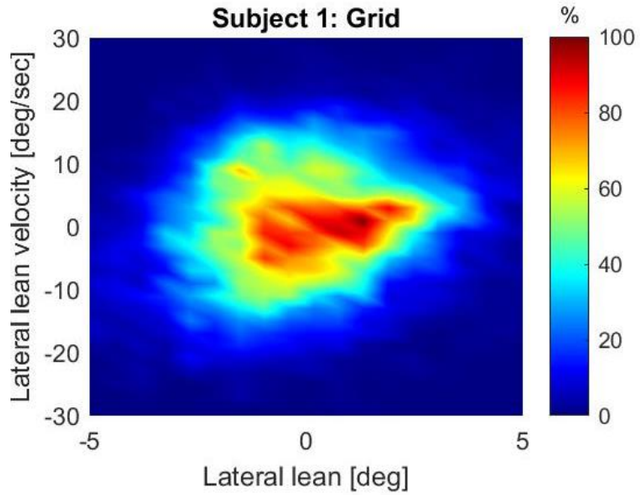
- Task: Riders were asked to ride each device following a curved path with a constant radius for approximately 5 minutes.
- Lateral lean and lateral lean velocity are both metrics that have strong ties to a person's stability: these metrics are estimates of how much a person's center of mass is moving and at what speed it is moving, respectively.
- Less movement in the lateral direction is associated with greater stability.
- Lower velocities of movement in the lateral direction are associated with greater stability.

The larger the distribution, the more excursion the participant had on the device

Forward Lean Angle Direction

Lateral Lean Angle Direction

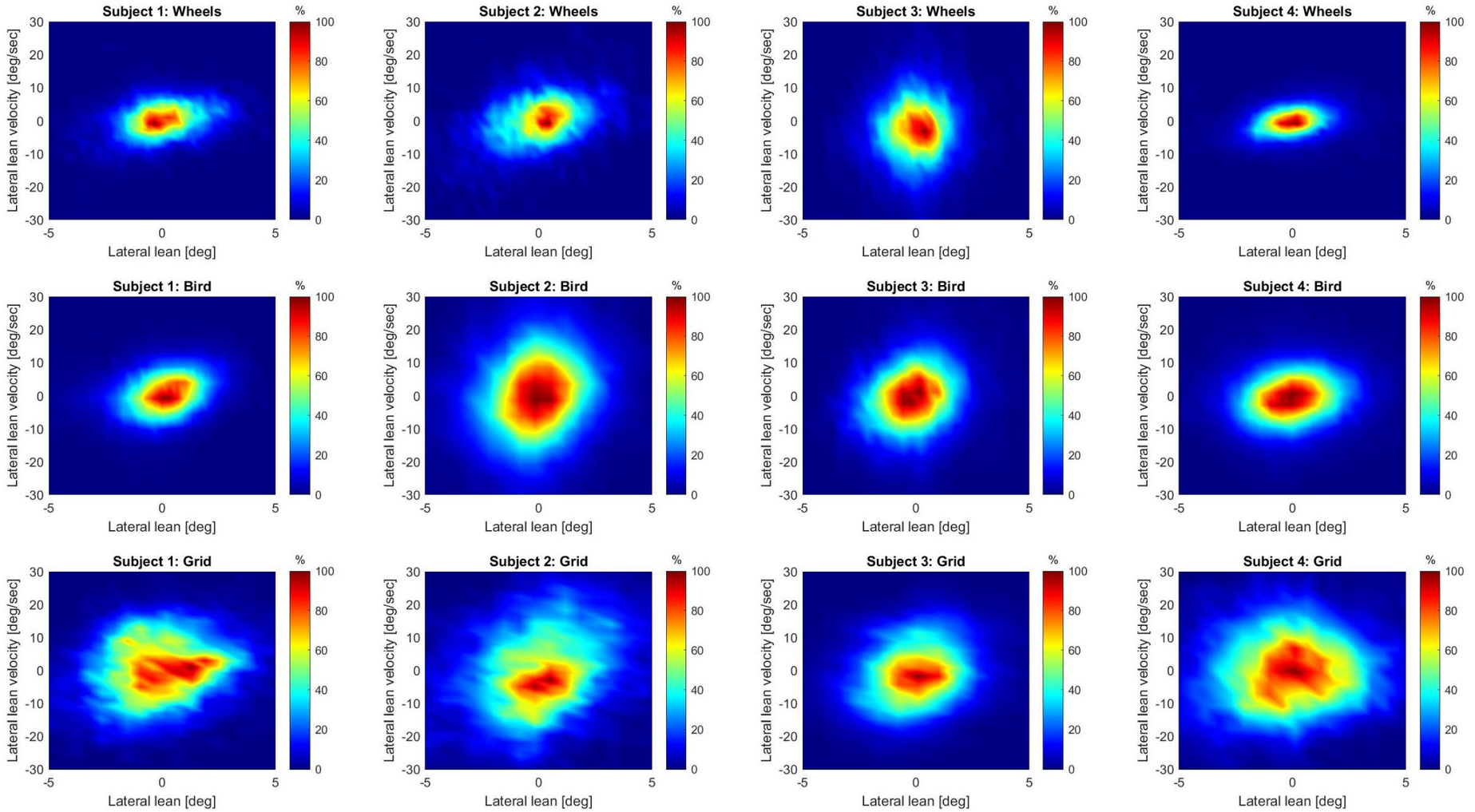




Stability Calculations

- Overall, the participants showed lower lateral lean angle and lean angle velocity while riding the Wheels device, compared to Grid bicycle and Bird scooter.

Trunk lean angle in lateral direction and trunk lean angle velocity



Observations: Rider Stability

For the participant population studied*, the following observations apply:

- Overall, riders were most stable on the Wheels device, compared to the Grid and the Bird devices.
- The Wheels device requires less rider control to remain stable during the ride than do the other devices.

* The observations are not meant to be representative of the overall public due to sample size and diversity.

Start-up Task: Ankle Loading

Tibia Shock During Start-Up

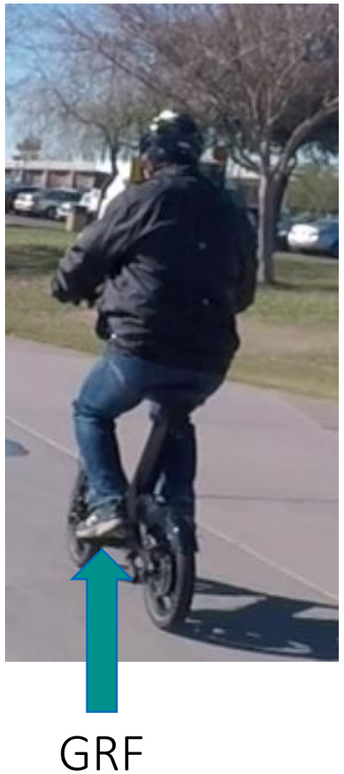
- Task: Riders were asked to initiate riding the devices and forces at the tibia were calculated
- The shock to the tibia is transmitted through ground reaction forces (GRF) at the foot, ground or foot pedal interface
- Tibia shock is the highest during the start-up task for each device

Start Up Requirements

Bird: Push off

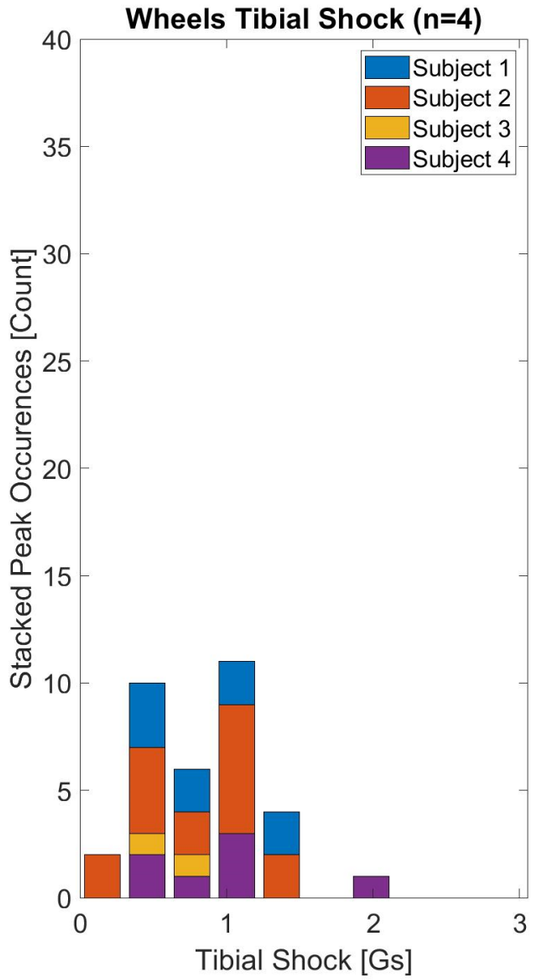
Grid: Pedal

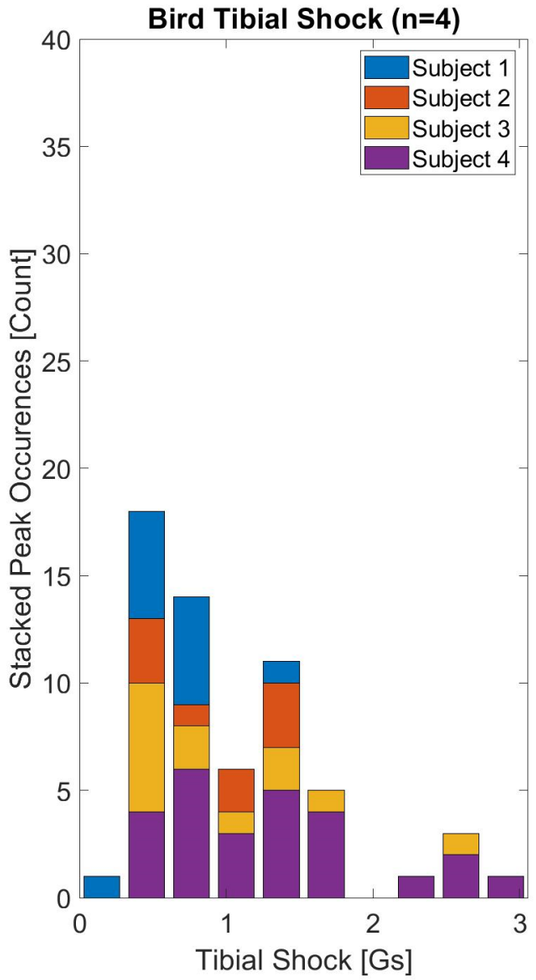
Wheels: Seated

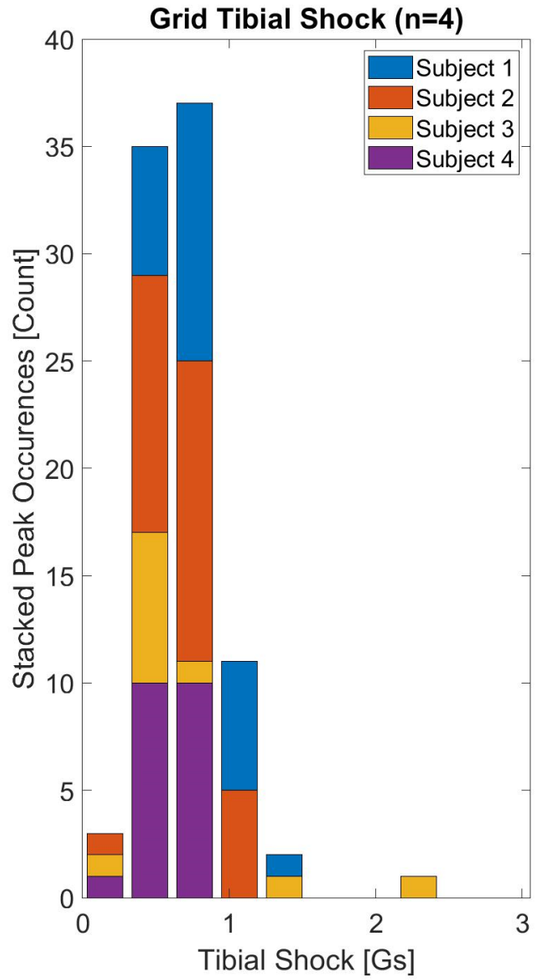


Tibia Shock During Start-Up: Comparison

- The peak tibia shock during start-up was measured (units of G is used as a proxy for ground reaction forces in a clinical setting). For comparison, walking is 0.2 - 1.0 G
- **Wheels**: Least amount of tibia shock events. Tibia shock was lower than Bird.
- **Bird**: Highest tibia shock
- **Grid**: Most frequent tibia shock







Observations: Start-up Task – Ankle Loading

For the participant population studied*, the following observations apply:

- The Wheels device has fewer tibia loading events during the start up, compared to the Grid and the Bird devices.
- The Wheels device had lower tibia loading forces, compared to the Bird device.
- The Wheels device has less of an orthopedic requirement during start up, compared to the Grid and the Bird devices.

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Qualitative Testing

Qualitative Testing Summary

- Participants were asked for their impressions of various aspects of Accessibility and Comfortability of the devices in parallel with Quantitative data collection*.
- Accessibility components:
  - Ease of mount
  - Ease of dismount
  - Reach of feet (bikes)
  - Foot placement space (scooter)
  - Pedal/peg position (bikes)
  - Handlebar position
  - Seat height (bikes)
  - Seat width
  - Weight of device
- Comfortability components:
  - Support/stability of the device
  - Maneuverability
  - Posture
  - Hand and foot placement
  - Leg positioning
  - Rate of acceleration
  - Rate of deceleration
  - Arm positioning

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Qualitative Testing Summary

- Participants provided their responses via Likert scales and open-ended questions regarding their impressions of the devices.
- The results of the qualitative testing summarize general impressions and comments offered by participants*.
- The comments relate to issues of design, fatigue while riding, and ease of mounting and dismounting the devices.
  - Some highlighted comments are included in the boxes to the right and for mount/dismount and Comfortability in the following slides.

Wheels

- Step-through height preferred over Grid device

- Overall rated "accessible"

Grid Bike

- Step-through height noted as less accessible than Wheels

- Handlebars intrude in step-through

Bird

- Limited placement for feet/narrow

- Handlebars too low for some

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Qualitative Testing*: Mounting/Dismounting

- Grid Bike comments from participants
  - Leg pass-through noted as “too high”
  - Frame shape provides less room to move
    - Handlebars can be in the way
- Wheels device comments from participants
  - One tester stated there was a :“[c]lear way in-and-out”
  - Frame design provides more space
  - Design allowed for various mounting techniques
    - Step through and swing over

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Qualitative Testing*: Comfortability

- Extended rides
  - Participants rode each device for 15-20 minutes
  - Completed a series of questions on fatigue and comfort following the ride
- Grid Bike
  - Experienced most perceived fatigue by all
- Wheels device
  - Experienced little to no fatigue
  - Overall, participants preferred Wheels for longer rides
    - Unlike Bird device, able to sit down and remain stable on Wheels
      - Good acceleration
      - Stable posture

* Testing results are not meant to be representative of the overall public due to sample size and diversity.

Observations: Qualitative Testing

The following observations apply*:

- Step-through height on Wheels device preferred (by user who chose to step through).
- Less self-reported fatigue experienced on Wheels device during extended ride.
- Ability to sit down and remain stable on the Wheels device noted as a potential benefit for longer rides.

* The observations are not meant to be representative of the overall public due to sample size and diversity.

Testimony of Maurice Henderson, Senior Director, Government Partnerships

Bird Rides Inc.

New York City Council

Committee on Transportation

Oversight: Shared Mopeds and Shared E-scooters

10/27/20

Thank you, Chairman Rodriguez and members of the Committee, for hosting today's hearing. My name is Maurice Henderson and I am the Senior Director of Government Partnerships for Bird. Since pioneering the shared e-scooter industry three years ago, we've helped to replace tens of millions of car trips with rides on our zero-emission scooters, and we've partnered with this Council to ensure a bespoke e-scooter sharing framework is developed and deployed that meets the unique and diverse needs of New York City, its residents and its transportation ecosystem.

Bird firmly believes that e-scooters will help to make New York's streets less congested, moving the City towards its ambitious 30-year sustainability goals that include 80% of trips on sustainable modes and 80% fewer GHG emissions by 2050.

Equity

We also believe e-scooters will make cities more equitable. At Bird, equity means providing a transportation alternative that meets the needs of differently abled individuals, that provides economic access and opportunity, and that integrates with and complements the entire community - not just individuals who ride scooters. Bird offers both the latest adaptive vehicles and operational models that are sensitive to the needs of people with disabilities.

As this country seeks to address the issue of centuries of racial and economic inequality, Bird is tremendously proud of the role we play in improving transit equity and is committed to doing even more. We recognize that transportation costs are a hardship for many. To help combat this, we have created **Bird Access**, which provides unlimited 30 min rides at $5 per month for recipients of public assistance. We have also created **Bird Community Pricing** which is

broader, and provides rides to all those eligible at 50% of the cost. Eligible participants include seniors, veterans, employees of pre-approved community-based organizations (CBOs), non-profits, students w/ Pell Grants, and public school teachers. In San Francisco, where Bird offers community pricing through our subsidiary Scoot, we have more low income enrollees than any other operator.

Safety in the Industry

We also believe e-scooters will make NYC streets *safer*.

These beliefs aren't just wishful thinking; they're rooted in a clear and growing body of data. Studies from US cities and organizations like the OECD International Transportation Forum illustrate that shared micromobility is safe and poses no more risks than other modes of transportation. In fact, these studies reveal that the greatest impact we can have on improving traffic safety is by reducing automobile use altogether—including by encouraging use of shared micromobility.[1]

Vehicle Safety

As a transportation company, Bird has long recognized our responsibility to ensure that our vehicles, technology and operations are all centered around safety. Our in-depth research has enabled us to custom engineer the safest, most durable and most technologically sophisticated e-scooters on the road today, developing technologies and resources that improve the security of our riders.

The Bird Two, for example, combines advanced hardware like dual disk brakes, integrated weatherproof batteries, a steel-reinforced aluminum frame, 10" semi-solid tubeless wheels and enhanced lighting with a state-of-the-art vehicle diagnostic system designed to ensure that each scooter is in perfect working order. These vehicles feature over 200 different, individually programmable sensory inputs performing millions of fault checks per day. For example, position sensors in our brake handles are used to determine when a brake cable is too loose and in need of adjustment before it becomes a safety risk. We are the *only operator* capable of providing this level of critical, real-time vehicle diagnostics, which are already being used in our exclusive micromobility partnership in nearby Yonkers--the first and only e-scooter shared pilot in New York State.

Bird's team of former aerospace and automotive engineers has initiated, and continues to lead, ongoing vehicle safety standards development, working with groups like the Society of Automotive Engineers, ASTM International and the International Electrotechnical Commission. A proven track record of vehicle safety innovation and industry leadership on the development

[1] As the OECD International Transport Forum found, "A trip by car or by motorcycle in a dense urban area is much more likely to result in the death of a road user – this includes pedestrians – than a [micromobility trip]. A modal shift from motor vehicles towards [micromobility] can thus make a city safer."

of safety standards should be a prerequisite for service providers chosen to operate New York's shared e-scooter program.

Partnering with Cities and Researchers for Safe Infrastructure

Of course, vehicle design and innovation are only part of the solution. Bird is committed to working with communities to take a 360-degree approach to micromobility safety, which is why we led the industry in publishing our comprehensive safety report: *A Look at e-Scooter Safety: Examining Risks, Reviewing Responsibilities and Prioritizing Prevention*. We've also convened a number of workshops globally with medical professionals, researchers, city agency representatives and advocates over the last 2 years, most recently at RAND's headquarters in Santa Monica to advise on safety policies.

These ongoing efforts strive to address each dimension of micromobility safety, from urban infrastructure to operations and rider education. We know, for example, that the most important thing we can do to protect vulnerable road users like pedestrians, cyclists and scooter riders is to separate them from cars. That's why Bird responsibly provides our city partners with aggregate data and insights that help inform critical infrastructure improvements. We also activate our riders to voice their support for such initiatives in alignment with city priorities at key community forums and legislative hearings. Such actions and information have been directly involved in the construction of new protected bike lanes in cities like Atlanta, Santa Monica, and Tel Aviv.

Some operators unfortunately have pushed back against responsible data sharing with cities. *We consider a collaborative approach to data sharing to be an essential component of shared vehicle programs, including shared e-scooters, bikes, mopeds and TNCs or ridehail vehicles.*

Safe Operations

Safety is infused into our operations as well. Bird continues to invest heavily in intensive rider education and training. This includes conducting in-person training workshops in more than 140 cities worldwide, but in a COVID-world it also means creatively using our software to remotely encourage and enable safe riding behavior. For example, Bird was the first, and remains the only, major shared e-scooter operator to offer a "warm up" mode, an option to soften acceleration for inexperienced riders. We also pioneered the "helmet selfie" feature, a rider incentive for wearing helmets which has since been adopted by other operators. We're launching Helmet Selfie in Yonkers this Wednesday. Such innovations, too, should be table stakes and **required** of shared e-scooter operators chosen to serve NYC.

During the last three years, cities around the world have found that the more trips taken by bikes and scooters and the fewer by car, the safer our streets can be for everyone. We are grateful for the collaboration and ongoing dialogue with the Council these past 2 plus years on how best to bring our world-class vehicles to NYC, and hope for a long partnership to help the city meet its

goals of 80% of trips to be taken by sustainable mode while making our streets safer for all road users.

Thank you for your time and consideration.

##

Accessibility and Comfortability Testing of Micro-Mobility Devices

Project Manager:
Jeffrey Wishart, Ph.D.
jwishart@exponent.com

Contributors:
Tina Garman, Ph.D.
Ben Lester, Ph.D.

June 1, 2020

Scope

- Retained by Wheels to examine comfortability and accessibility of Wheels device in comparison to Bird e-scooter and Grid Bike bicycle
  - Quantitative and Qualitative testing was conducted with four participants of varying age and weight
- The Quantitative testing examined:
  - Device mounting and dismounting
  - Rider stability
  - Start-up Task: Ankle loading
- The Qualitative testing included participants' impressions of devices:
  - Comfort
  - Accessibility

Wheels

Subject #	Age	Height (in)	Weight (lbs.)
1	53	68	170
2	35	69	220
3	49	78	305
4	46	65	140

Bird

Grid Bike

Limitations

- The purpose of this report was to communicate Exponent's review of the accessibility and comfortability of the Wheels micro-mobility device.
- The study participants consisted of four people. The participants were selected for age (over 35 years) and to ensure weight category diversity. The selection process did not account for participant physical ability (e.g., strength, flexibility, etc.) or micro-mobility device riding skill. As a result, the observations are not meant to be fully representative of the overall public.
- Although Exponent has exercised usual and customary care in the conduct of this analysis, the responsibility for use of this analysis in the design, manufacture, quality, or operation of the product remains fully with Wheels Labs, Inc.

Observations Summary

The following observations apply*:

- Quantitative Testing:
  - Mount/Dismount: Compared to the Grid bike, the Wheels device has less of an orthopedic demand during the mounting and dismounting task.
  - Rider Stability: The Wheels device was the most stable overall. The Wheels device requires less rider control to remain stable during the ride than do the other devices.
  - Start-up Task: The Wheels device has less of an orthopedic requirement during start up, compared to the Grid and the Bird devices.
- Quantitative Testing:
  - Step-through height on Wheels device preferred by user that chose to step through.
  - Less self-reported fatigue experienced on Wheels device during extended ride.
  - Ability to sit down and remain stable on the Wheels device noted as a potential benefit for longer rides.

* The observations are not meant to be representative of the overall public due to sample size and diversity.

Mount and Dismount Task

Observations: Mount and Dismount Task

The following observations apply*:

- Step Through
  - Hip flexion angle and knee height were lower for the Wheels device compared to Grid.
  - Compared to the Grid bike, the Wheels device has less of an orthopedic demand during the mounting and dismounting task.
- Swing Over
  - Hip extension and abduction angles were lower for the Wheels device compared to Grid.
  - Compared to the Grid bike, the Wheels device has less of an orthopedic demand during the mounting and dismounting task.

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Rider Stability

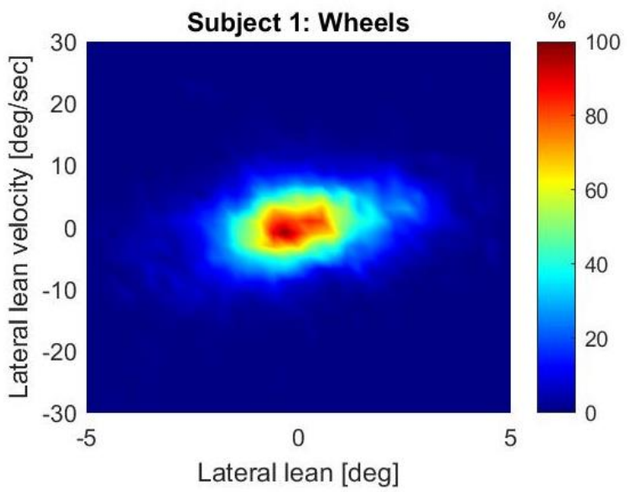
Stability Calculations

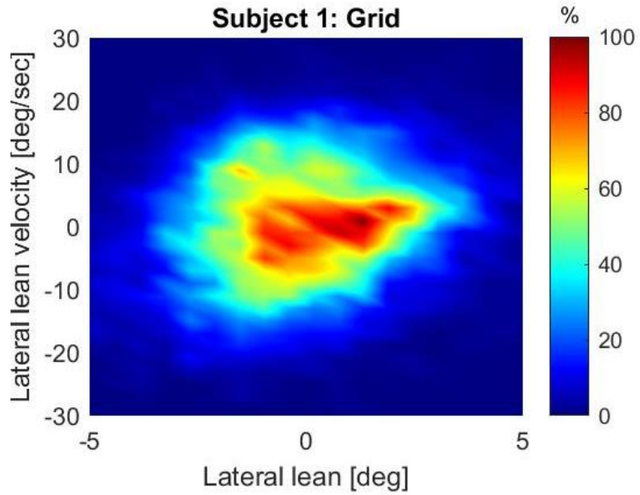
- Task: Riders were asked to ride each device following a curved path with a constant radius for approximately 5 minutes.
- Lateral lean and lateral lean velocity are both metrics that have strong ties to a person's stability: these metrics are estimates of how much a person's center of mass is moving and at what speed it is moving, respectively.
- Less movement in the lateral direction is associated with greater stability.
- Lower velocities of movement in the lateral direction are associated with greater stability.

The larger the distribution, the more excursion the participant had on the device

Forward Lean Angle Direction

Lateral Lean Angle Direction

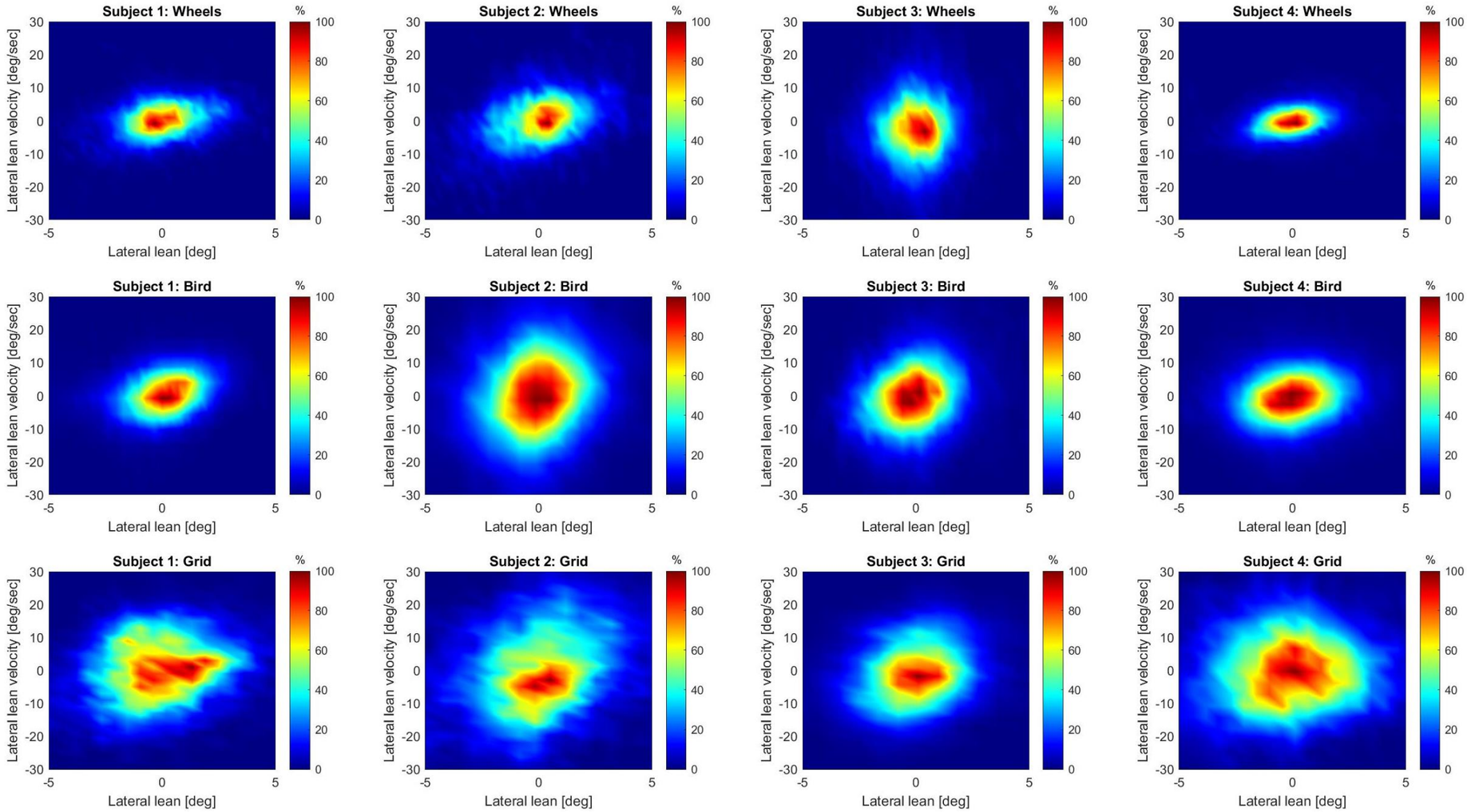




Stability Calculations

- Overall, the participants showed lower lateral lean angle and lean angle velocity while riding the Wheels device, compared to Grid bicycle and Bird scooter.

Trunk lean angle in lateral direction and trunk lean angle velocity



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For the participant population studied*, the following observations apply:

- Overall, riders were most stable on the Wheels device, compared to the Grid and the Bird devices.
- The Wheels device requires less rider control to remain stable during the ride than do the other devices.

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Start-up Task: Ankle Loading

Tibia Shock During Start-Up

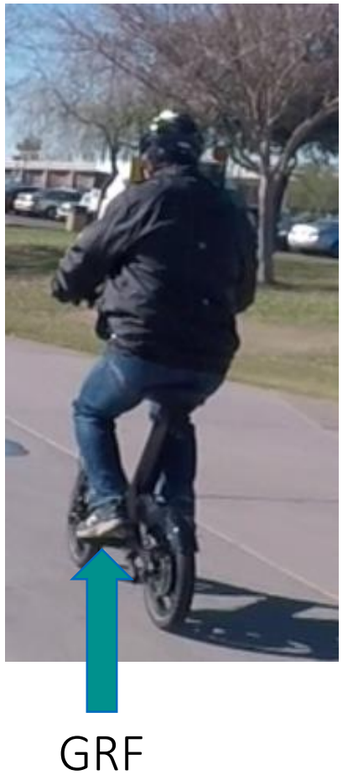
- Task: Riders were asked to initiate riding the devices and forces at the tibia were calculated
- The shock to the tibia is transmitted through ground reaction forces (GRF) at the foot, ground or foot pedal interface
- Tibia shock is the highest during the start-up task for each device

Start Up Requirements

Bird: Push off

Grid: Pedal

Wheels: Seated



Tibia Shock During Start-Up: Comparison

- The peak tibia shock during start-up was measured (units of G is used as a proxy for ground reaction forces in a clinical setting). For comparison, walking is 0.2 - 1.0 G
- **Wheels**: Least amount of tibia shock events. Tibia shock was lower than Bird.
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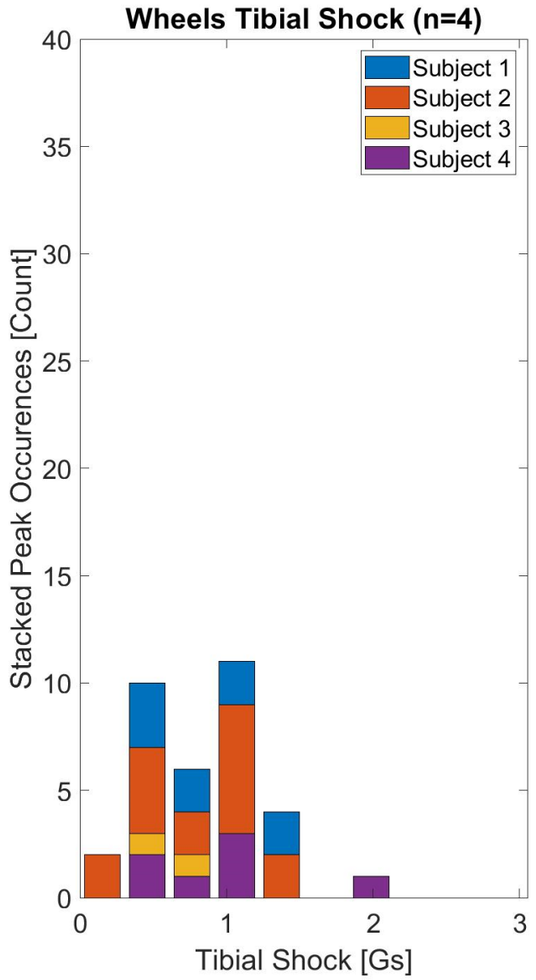

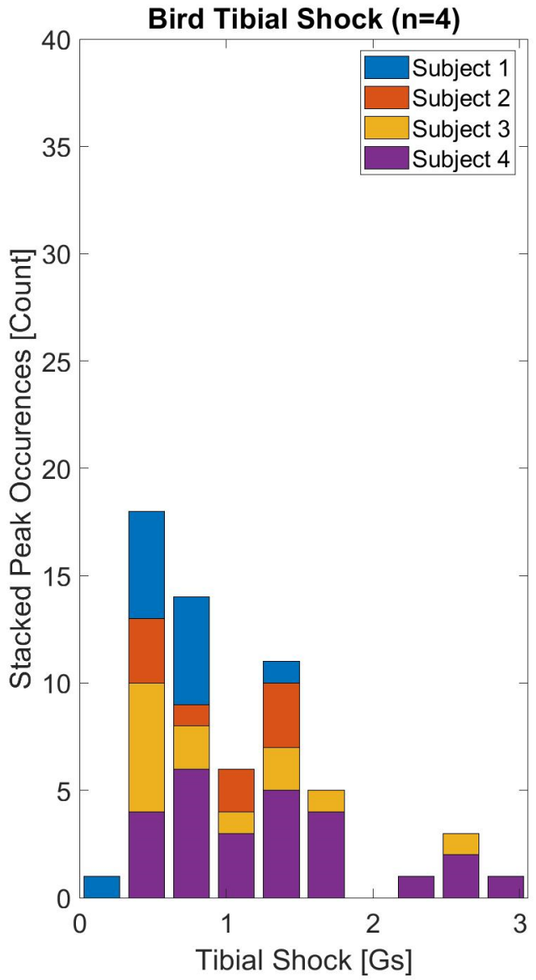

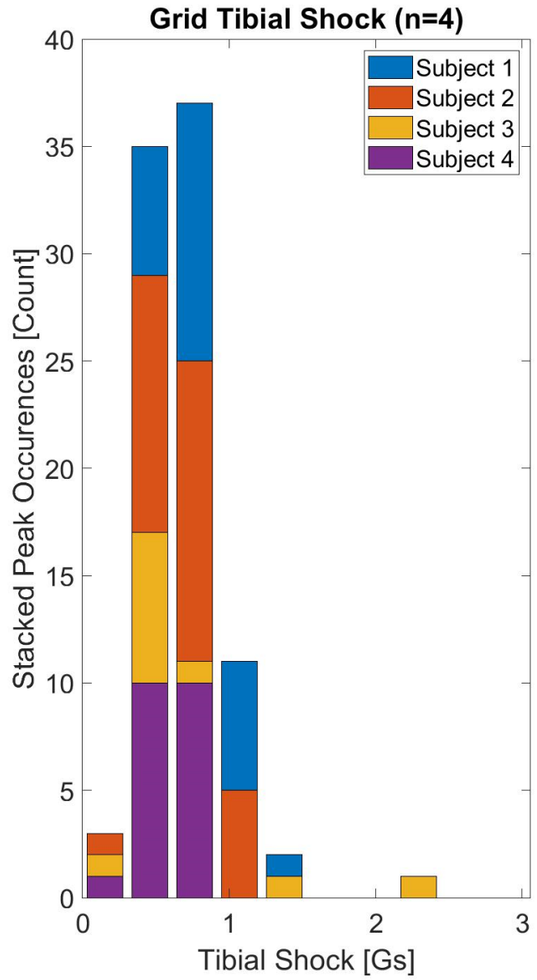

Observations: Start-up Task – Ankle Loading

For the participant population studied*, the following observations apply:

- The Wheels device has fewer tibia loading events during the start up, compared to the Grid and the Bird devices.
- The Wheels device had lower tibia loading forces, compared to the Bird device.
- The Wheels device has less of an orthopedic requirement during start up, compared to the Grid and the Bird devices.

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Qualitative Testing

Qualitative Testing Summary

- Participants were asked for their impressions of various aspects of Accessibility and Comfortability of the devices in parallel with Quantitative data collection*.
- Accessibility components:
  - Ease of mount
  - Ease of dismount
  - Reach of feet (bikes)
  - Foot placement space (scooter)
  - Pedal/peg position (bikes)
  - Handlebar position
  - Seat height (bikes)
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  - Weight of device
- Comfortability components:
  - Support/stability of the device
  - Maneuverability
  - Posture
  - Hand and foot placement
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  - Rate of acceleration
  - Rate of deceleration
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- Participants provided their responses via Likert scales and open-ended questions regarding their impressions of the devices.
- The results of the qualitative testing summarize general impressions and comments offered by participants*.
- The comments relate to issues of design, fatigue while riding, and ease of mounting and dismounting the devices.
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Qualitative Testing*: Mounting/Dismounting

- Grid Bike comments from participants
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  - Frame shape provides less room to move
    - Handlebars can be in the way
- Wheels device comments from participants
  - One tester stated there was a :“[c]lear way in-and-out”
  - Frame design provides more space
  - Design allowed for various mounting techniques
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- Extended rides
  - Participants rode each device for 15-20 minutes
  - Completed a series of questions on fatigue and comfort following the ride
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The following observations apply*:

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Injury Data Analysis Comparing Wheels and other Micro-Mobility Devices

Project Manager:
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Contributors:
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Heather Watson, Ph.D.

March 3, 2020

Scope

- Exponent was retained by Wheels to research and study micro-mobility usage and injuries.
- The study comprised a qualitative and quantitative investigation of injury rates and types of injury of various micro-mobility modes and devices, and making a comparison to the Wheels device.
- The appendices to this report contain supporting information:
  - A) Literature Review of Usage and User Behavior
  - B) Literature Review of injury Types and Incidents
  - C) Trends in NEISS Injury Patient Demographics

Wheels Data

- Wheels provided injury data and ride metrics from all markets in which Wheels operates from September 2018 to January 2020.
- Injury Data: Wheels reported three groups based on level of confirmation of the incident that Wheels performed. All 3 were combined to provide the most conservative estimate:
  - Group 1: Subject provides statement, no further contact
  - Group 2: Subject provides statement, additional contact
  - Group 3: Subject provides statement, dropped contact
- Exposure Data: Wheels provided the number of rides, total distance traveled, unique riders, and total traveling hours by month from September 2018 to January 2020.
- Exponent calculated the injury rate for the various exposures:
  - Injury Rate Per Million Trips: 25 injuries per 1 Million trips
  - Injury Rate Per Million Miles Traveled: 13.4 injuries per 1 Million miles
  - Injury Rate Per 1,000 Hours: 0.12 injuries per 1,000 hours

Wheels Data (cont'd)

- The Wheels data is dependent on consumers voluntarily reporting injuries and this may result in injuries not being reported and/or injuries being incorrectly being attributed to Wheels device usage.
- The ride metrics were not broken down by market. The analysis disregards any differences between markets.
- It should be noted that the reporting methodologies for the NEISS data and the Wheels data are different. NEISS is a random sample of ER visits and the Wheels estimate is based on voluntary reporting of injuries. It is unknown how those differences will manifest.
- The analysis included different exposure periods and reporting methodologies. There was no accounting for seasonal effects, trends with increased usage, rider characteristics/demographics, user behaviors or other confounders that could affect the results.
    - The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older.

Comparison of Injury Rates Per Trips

- According to the references reviewed, Bicycles* have exhibited injury rates per million trips that are five times higher than Wheels devices; Scooters** have exhibited injury rates eight to 26 times higher.

Source	Years	Product	Injury Rate Per Mil. Trips	95% Lower/Upper Bound for Injury Rate		Ratio of Other modes to Wheels	95% Lower/Upper Bound for Ratio	
Wheels	2018-2020	Wheels	24.99	19.85	31.30	Reference	-	-
NEISS/NHTS	2017-2018	Bicycles*	120.66	120.45	120.87	4.83	3.88	6.08
NEISS/NACTO	2017-2018	Powered Scooters	301.30	298.05	304.57	12.06	9.68	15.18
Bekhit 2019	2018-2019	E-Scooters	641.67	604.11	681.03	25.67	20.44	32.59
APH 2018	2018	E-Scooters	202.97	179.37	228.91	8.12	6.30	10.55
Trivedi 2019	2018-2019	E-Scooters	199.77	166.44	238.04	7.99	5.99	10.72

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Comparison of Injury Rates by Miles Traveled

- According to the references reviewed, Bicycles* have exhibited injury rates per million miles traveled that are four times higher than Wheels devices; Scooters** have exhibited injury rates from three to 66 times higher.

Source	Years	Product	Injury Rate Per 1M Miles	95% Lower/Upper Bound for Injury Rate		Ratio of Other modes to Wheels	95% Lower/Upper Bound for Ratio	
Wheels	2018-2020	Wheels	13.41	10.65	16.69	Reference	-	-
NEISS/NHTS	2017-2018	Bicycles*	50.75	50.66	50.84	3.79	3.04	4.77
NEISS/NACTO	2017-2018	Powered Scooters	301.30	298.05	304.57	22.47	18.05	28.30
Bekhit 2019	2018-2019	E-Scooters	885.06	833.26	939.35	66.00	52.56	83.79
Bird Report	2017-2019	E-Scooters	37.2	27.59	48.68	2.77	1.91	3.99
APH 2018	2018	E-Scooters	213.21	188.43	240.47	15.90	12.34	20.67
Trivedi 2019	2018-2019	E-Scooters	151.15	125.93	180.10	11.27	8.44	15.11

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Comparison of Miles Traveled per Injury

- According to the references reviewed, Bicycles* have exhibited injury rates per mile traveled that are nearly four times higher than Wheels devices; Scooters** have exhibited injury rates from three to 66 times higher.

Source	Years	Product	1 injury per XX Miles	Injury Ratio of Other Modes to Wheels
Wheels	2018-2020	Wheels	1 injury per 74,577 miles	Reference
NEISS/NHTS	2017-2018	Bicycles*	1 injury per 19,703 miles	3.79
NEISS/NACTO	2017-2018	Powered Scooters	1 injury per 3,319 miles	22.47
Bekhit 2019	2018-2019	E-Scooters	1 injury per 1,130 miles	66.00
Bird Report	2017-2019	E-Scooters	1 injury per 26,882 miles	2.77
APH 2018	2018	E-Scooters	1 injury per 4,690 miles	15.90
Trivedi 2019	2018-2019	E-Scooters	1 injury per 6,616 miles	11.27

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Comparison of Injury Rates Per Travel Hours

- According to the references reviewed, Bicycles* have exhibited injury rates per travel hours that are two to five times higher than Wheels devices; Scooters** have exhibited injury rates from nine to 19 times higher.

Source	Years	Product	Injury rate per 1,000 Hours	Ratio of Other Modes To Wheels
Wheels	2018-2020	Wheels	0.12	Reference
NEISS/NHTS	2017-2018	Bicycles[x,*]	0.26	2.2
NEISS/NHTS	2017-2018	Bicycles[xx,*]	0.60	5.1
NEISS/NACTO	2017-2018	Powered Scooters[xxx]	2.26	19.3
APH and Austin Public Data	2018	E- Scooters[xxxx]	1.04	8.9

[x]Assuming an average of 28 minutes per ride. NACTO (2017).
[xx]Assuming an average of 12 minutes per ride. NACTO (2017)
[xxx]Assuming an average of 8 minutes per ride. Mathew (2019)
[xxxx]Assuming an average of 11.5 minutes per ride. Austin Public Health (2018).

*The rider age distribution of the data sources may be different, with most powered scooters and the Wheels e-bike being restricted to 18 years of age and older with no such restriction on bicycle ridership.
**The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.

Conclusions

- According to the data reviewed, and the study limitations expressed on the next slide, the Wheels injury rates per trips, per miles traveled, or per riding hours are all less than bicycles, powered scooters, or e-scooters:
  - The injury rates per million trips for the other micro-mobility devices reviewed were 5 times to 26 times higher than for Wheels.
  - The injury rates per miles traveled for the micro-mobility devices reviewed ranged from three times to 66 times higher than for Wheels.
  - The injury rates per hours of travel for the other micro-mobility devices reviewed ranged from two times to 19 times higher than for Wheels.

Limitations

- The purpose of this report was to communicate Exponent's review of the identified micro-mobility usage and injury data.
- In the analysis, we have relied on information provided by Wheels Labs, Inc. We cannot verify the correctness of this input, and rely on Wheels Labs, Inc. for accuracy.
- The analysis included data sets using different exposure periods and reporting methodologies. There was no accounting for seasonal effects, trends with increased usage, rider characteristics, user behaviors or other confounders that could affect the results.
    - Rider age, especially, may impact the results since e-scooters (mostly rentals by micro-mobility companies), as well as the Wheels e-bike, are generally age restricted (18 years of age and older). Bicycles are generally not age restricted (except for the bicycles offered as rentals that generally have the same age restriction).
- The Wheels data is dependent on consumers voluntarily reporting injuries and this may result in injuries not being reported and/or injuries being incorrectly being attributed to Wheels device usage.
- The ride metrics were not broken down by market. The analysis disregards any differences between markets.

Limitations

- Reporting methodologies for the NEISS data and the Wheels data are different. NEISS is a random sample of ER visits and the Wheels estimate is based on voluntary reporting of injuries. It is unknown how those differences will manifest.
- The NEISS database does not allow for separation between gasoline-fueled and e-scooters. The other sources includes e-scooters only.
- Although Exponent has exercised usual and customary care in the conduct of this analysis, the responsibility for use of this analysis in the design, manufacture, quality, or operation of the product remains fully with Wheels Labs, Inc.

Bibliography

- Austin Public Health, “Dockless Electric Scooter-Related Injuries Study.” (2018).
- Badeau, A. *et al.* "Emergency department visits for electric scooter-related injuries after introduction of an urban rental program." *The American journal of emergency medicine* (2019).
- Baschera, D., *et al.* “Comparison of the Incidence and Severity of Traumatic Brain Injury Caused by Electrical Bicycle and Bicycle Accidents—A Retrospective Cohort Study From a Swiss Level I Trauma Center.” *World Neurosurgery* 126 (2019): e1023-e1034.
- Beck, S., *et al.* “Emergency department impact following the introduction of an electric scooter sharing service.” *Emergency Medicine Australasia* (2019).
- Bekhit, M.N.Z., *et al.* “Regional healthcare costs and burden of injury associated with electric scooters.” *Injury* 51(2): 271-277 (2020).
- Blomberg, S.N.F., *et al.* “Injury from electric scooters in Copenhagen: A retrospective cohort study.” *BMJ Open* 9 (2019): e033988.
- BIRD Safety Report, “A look at e-scooter safety: examining risks, reviewing responsibilities and prioritizing prevention.” (2019).
- Capua, T. *et al.* "A comparison of manual versus electric bicycle injuries presenting to a pediatric emergency department." *Rambam Maimonides Medical Journal* 10.3 (2019).
- CB Insights, “How bikes and scooters are shaking up urban transport worldwide: The micromobility revolution.” (2019).
- DiMaggio, C.J., *et al.* “Injuries associated with electric-powered bikes and scooters: Analysis of U.S. consumer product data.” *BMJ* (2019).
- Dozza, M., Francesco Bianchi Piccinini, G., and Werneke, J. "Using naturalistic data to assess e-cyclist behavior." *Transportation Research Part F: Traffic Psychology and Behaviour* 41 (2016): 217-226.
- Fishman, E. "Bikeshare: A review of recent literature." *Transport Reviews* 36.1 (2016): 92-113.
- Forester, J. *Bicycle transportation: a handbook for cycling transportation engineers.* MIT Press (1994).

Bibliography

- Fyhri, A., *et al.* "Gender differences in accident risk with e-bikes – Survey data from Norway." *Accident Analysis and Prevention* 132 (2019): 105248.
- Garman, C.M.R., *et al.* "Capabilities and Limitations Related to Vehicle Dynamics and Operator Kinematics of Electric Scooter Micro-Mobility Modes." *SAE Technical Paper* 2020-01-0935 (2020).
- Gross, I., *et al.* "E-bike-related trauma in children and adults." *Journal of Emergency Medicine* 54(6): 793-798 (2018).
- Haworth N.L. and Schramm A. "Illegal and risky riding of electric scooters in Brisbane." *The Medical Journal of Australia.* 211(9): 412-413 (2019).
- Hertach, P., *et al.* "Characteristics of single-vehicle crashes with e-bikes in Switzerland." *Accident Analysis and Prevention* 117 (2018): 232-238.
- Langford, B.C., Chen, J., and Cherry, C. "Risky Riding: Naturalistic Methods for Comparing Safety Behavior from Conventional Bicycle Riders and Electric Bike Riders." *Accident Analysis & Prevention* 82 (2015): 220-226.
- Li, X., *et al.* "Orthopedic injury in electric bicycle related collisions." *Traffic Injury Prevention* 18(4): 437-440 (2017).
- Ma, C., *et al.* "Risk riding behaviors of urban e-bikes: A literature review." *International Journal of Environmental Research and Public Health* 16 (2019): 2308.
- Mathew, J.K., *et al.* "Analysis of e-scooter trips and their temporal usage patterns." *ITE Journal* (2019).
- Mayhew, L.J. and Bergin, C. "Impact of e-scooter injuries on emergency department imaging." *Journal of Medical Imaging and Radiation Oncology.* 63(4): 416-466 (2019).
- Namiri, N.K., *et al.* "Electric scooter injuries and hospital admissions in the United States, 2014-2018." *JAMA Surgery* (2020).

Bibliography

- National Association of City Transportation Officials. “Shared Micromobility in the U.S.: 2018.” (2019).
  - https://nacto.org/shared-micromobility-2018/
  - https://nacto.org/wp-content/uploads/2019/04/NACTO_Shared-Micromobility-in-2018_Web.pdf
- Popovich, N. *et al.* "Experiences of electric bicycle users in the Sacramento, California area." *Travel Behaviour and Society* 1.2 (2014): 37-44.
- Portland Bureau of Transportation, “E-Scooter Findings Report.” (2018).
- Ruikang Y., Hui Z., Zhang, C., and Wang, Z. “Analysis of risk-taking behaviors of electric bicycle riders in response to pedestrian countdown signal devices.” Traffic Injury Prevention, 20:2 (2019): 82-188, doi: 10.1080/15389588.2018.1542138.
- Siman-Tov, M., *et al.* "A look at electric bike casualties: Do they differ from the mechanical bicycle?" *Journal of Transport & Health* 11 (2018): 176-182.
- Siman-Tov, M., *et al.* “The casualties from electric bike and motorized scooter road accidents.” *Traffic Injury Prevention* 18(3): 318-323 (2017).
- Schepers, J. P. *et al.* "The safety of electrically assisted bicycles compared to classic bicycles." *Accident Analysis & Prevention* 73 (2014): 174-180.
- Schleinitz, K., *et al.* “(E-)Cyclists running the red light – The influence of bicycle type and infrastructure characteristics on red light violations.” *Accident Analysis and Prevention* 122(2019): 99-107.
- Tenenbaum, S., *et al.* “Orthopaedic injuries among electric bicycle users.” *Injury* 48(10): 2140-2144 (2017).
- Todd, J., Zimmermann, J., Dunning, A., Krauss, K. “Behavior of electric scooter operators in naturalistic environments.” *SAE Technical Paper* 2019-01-1007 (2018).
- Trivedi, Bhavin *et al.* "Craniofacial Injuries Seen with the Introduction of Bike-Share Electric Scooters in an Urban Setting." *Journal of Oral and Maxillofacial Surgery* (2019).
- Trivedi, Tarak K. *et al.* "Injuries associated with standing electric scooter use." *JAMA Network Open* 2.1 (2019): e187381-e187381.
- Zmora, O., *et al.* “Pediatric electric bicycle injuries and comparison to other pediatric traffic injuries.” *Traffic Injury Prevention* 20(5): 540-543 (2019).

“I love teaching, but I was feeling anxious about returning back to the classroom. When I learned Revel was giving school staff a month of free-rides I was beyond excited. I had never ridden before but now I go everywhere on a Revel! It’s been a great way to get back to class but also a refreshing way to enjoy the city amidst the pandemic.” - Osvaldo Adames, Teacher at The Bronx School for Law, Government, and Justice

1024/2020

Revel was a great partner during the height of COVID in NYC. By providing their service at no cost to neighborhood restaurants, they allowed us to keep our staff employed and switch over to a delivery model ensuring we could survive the pandemic. We're grateful to companies like Revel that value their local community. We hope to see Revel continue to operate in NYC and continue to provide New Yorkers with trustworthy and affordable ways to get around.

Adam Sacks, Owner
Nortbert's Pizza
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Jamal Ostaing
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As an essential worker for the USPS, commuting has been challenging since the MTA reduced service during early morning hours. I live in Crown Heights and often work out of the postal station in Bushwick. I begin my shift at 4 a.m. when trains and buses are scarce, so my current commute consists of a combination of walking and rideshare. I recently signed up for Revel after hearing about it from a friend and am hoping to use the service as a more affordable and socially-distant way to commute, but because Revel's hours are restricted from midnight to five I can't currently Revel to work. It's really important that essential workers like myself have more commuting options, including during overnight hours, not less. Revel should be allowed to make its service available to people like me 24/7, especially during this pandemic.

Revel was a great partner during the height of COVID in NYC. By providing their service at no cost to neighborhood restaurants, they allowed us to keep our staff employed and switch over to a delivery model ensuring we could survive the pandemic. We're grateful to companies like Revel that value their local community. We hope to see Revel continue to operate in NYC and continue to provide New Yorkers with trustworthy and affordable ways to get around.

Lucien Arbor

Ride Safe with Wheels

First and foremost, Wheels encourages safety by having what we believe is the safest device in the industry, including first-of-its-kind safety features like our integrated helmet system, 14 inch wheels, a low center of gravity, and Bluetooth speakers to enable hands-free navigation.

The data demonstrates Wheels' safety benefits. Wheels recently hired Exponent, a leading engineering and consulting firm that studies safety to go through the many independent studies that have been done across the micromobility industry to measure injury rates. We asked Exponent to then compare those findings to our own injury data. Exponent found that Wheels' injury rates were exponentially lower than those reported for other types of micromobility devices, including both bicycles and traditional stand-up scooters. Specifically, here's what Exponent found:

Wheels' Injury Rate	Comparison to Other Micromobility Devices
1 injury for every 74,577 miles ridden	4 times better than bicycles; 3 to 66 times better than scooters
24.99 injuries for every 1 million trips taken	5 times better than bicycles; 8 to 26 times better than scooters
0.12 injuries for every 1,000 hours of riding	2 to 5 times better than bicycles; 9 to 19 times better than scooters

Notably, with one exception, all of the studies that Wheels was compared against rely entirely on hospital emergency room visits for their injury reporting, which means they leave out a large number of other injuries. In contrast, Wheels' injury data is based on every single injury reported to the company through all of our various channels, including through our app, calls or texts to our 24/7 support number, or to our support email, even though only a small fraction involved an emergency room visit. The only other injury rate report that we know of that is not limited to emergency room visits is Bird's, which stated that its riders had 1 injury for every 26,882 miles ridden – an injury rate that is nearly 3 times higher than Wheels'.

A complete version of Exponent's report is attached.

Testimony - Shared Mopeds Hearing

Back in April things were looking really bad for us as a business. We had to switch our business model to delivery and pick-up only. We feared having to let go of most of our staff and possibly close down. When Revel approached us and offered to provide their service at no cost it was a huge relief. We were able to increase the daily number of deliveries and provide our staff with a reliable and socially distant way to get to work.

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