

## Supplementary files

# E-scooters' impact on accessibility for people with visual impairment or impaired mobility in urban areas in Norway

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## Files contained in the document:

File 1: Translated questionnaire, Norwegian Association of Disabled

File 2: Translated questionnaire, Norwegian Association of the Blind and Partially Sighted

File 3: Table describing the variables included in the analyses

## **File 1**

- 1 Translated questionnaire, members of the Norwegian Association of Disabled**

# **Survey Norwegian Association of Disabled**

<b>experience</b>	<b>6 Have you ever traveled in areas with e-scooters?</b>
Yes	<input type="radio"/> 1
No	<input type="radio"/> 2
Don't know	<input type="radio"/> 3
Do not want to answer	<input type="radio"/> 4

<b>travel</b>	<b>7 How do you travel in urban areas? Select all that apply</b>
Walk without aids	<input type="checkbox"/> 1
Use walking aids (cane, crutches, etc.)	<input type="checkbox"/> 2
Rollator	<input type="checkbox"/> 3
Electric wheelchair	<input type="checkbox"/> 4
Manual wheelchair	<input type="checkbox"/> 5
Use a special bicycle for the disabled	<input type="checkbox"/> 6
♦ <b>exclusive:yes</b>	<input type="radio"/> 7
Don't want to answer	
♦ <b>exclusive:yes</b>	<input type="radio"/> 8
Not relevant	

<b>travel_most_often</b>	<b>8 How do you travel most often in urban areas?</b>
♦ <b>filter:</b> \travel.a=#2:6	
♦ <b>range:</b> (\travel)	
Walk without aids	<input type="radio"/> 1
Use walking aids (cane, crutches, etc.)	<input type="radio"/> 2
Rollator	<input type="radio"/> 3
Electric wheelchair	<input type="radio"/> 4
Manual wheelchair	<input type="radio"/> 5
Use a special bicycle for the disabled	<input type="radio"/> 6
Don't want to answer	<input type="radio"/> 7
Not relevant	<input type="radio"/> 8

<b>conditions</b>	<b>9 Do you have conditions that make it extra important to avoid falling?</b>
Yes	<input type="radio"/> 1
No	<input type="radio"/> 2
Do not want to answer	<input type="radio"/> 3

different_obstacles	10 When you travel in urban areas, to what extent do you experience the following as obstacles?						
	Not at all 1	To a small extent 2	To some extent 3	To a large extent 4	To a very large extent 5	Do not want to answer / Not relevant 6	
♦ filter:\experience.a=1 parked e-scooters?	○	○	○	○	○	○	1
parked bikes?	○	○	○	○	○	○	2
Advertising signs on pavements?	○	○	○	○	○	○	3
stairs you need to climb?	○	○	○	○	○	○	4
high curbs?	○	○	○	○	○	○	5
large flower boxes, e.g. for terrorist protection?	○	○	○	○	○	○	6

ID:experience\_use  
filter:\experience.a=1

experience_off e	11 How often do you travel in areas with e-scooters in the summer?
Every day	<input type="radio"/> 1
4-6 days/week	<input type="radio"/> 2
1-3 days/week	<input type="radio"/> 3
1-3 days/month	<input type="radio"/> 4
Less often	<input type="radio"/> 5
Do not want to answer / Not relevant	<input type="radio"/> 6

used e-scooter	12 Have you ever used an e-scooter?
Yes	<input type="radio"/> 1
No	<input type="radio"/> 2
Do not want to answer	<input type="radio"/> 3

e- scooter_times	13 How many times have you used an e-scooter?
♦ filter:\ Used e-scooter=1	
1-5 times	<input type="radio"/> 1
6-10 times	<input type="radio"/> 2
11-20 times	<input type="radio"/> 3
21 times or more	<input type="radio"/> 4
Do not want to answer	<input type="radio"/> 5

easier_travel	14 Do e-scooters make it easier for you to travel around?
♦ filter:\ Used e-scooter.a=1	
No	<input type="radio"/> 1
Yes, a little	<input type="radio"/> 2
Yes, to some extent	<input type="radio"/> 3
Yes, a lot	<input type="radio"/> 4
Don't know	<input type="radio"/> 5
Do not want to answer	<input type="radio"/> 6

ID:interaction\_obstacle

safe	15 How safe do you feel when interacting with						
	Very unsafe	Unsafe	Neither	Safe	Very safe	Do not want to answer / Not relevant	
	1	2	3	4	5	6	
♦ filter:\experience.a=1 e-scooter riders?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
bicyclists?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2

obstacle_often	16 How often do you find that parked e-scooters are in your way...						
	Never / very rarely	Rarely	Sometimes	Often	Very often / Always	Do not want to answer / Not relevant	
	1	2	3	4	5	6	
♦ filter:\experience.a=1 ... at the entrance to a building?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
... on pavement?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2
... at a pedestrian crossing?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3
... in a HC parking lot?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4
... by a wheelchair ramp?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5

experienced_yes_no	17 Have you ever experienced...				
	Yes	No	Do not want to answer	Not relevant	
	1	2	3	4	
♦ filter:\experience.a=1 ... to fall over a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
... to be forced into the roadway by a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2
... that you had to turn around because the road ahead was completely blocked by a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3

experienced_yes_no	17 Have you ever experienced...				
... to almost be hit by an e-scooter rider?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4
... to be hit by an e-scooter rider?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5

experienced_times	18 How many times have you experienced...					
♦ filter:\experienced_yesno.a.1=1 \ experienced_yesno.a.2=1 \ experienced_yesno.a.3=1 \ experienced_yesno.a.4=1 \ experienced_yesno.a.5=1						
	Once 1	2-3 times 2	4-5 times 3	More than 5 times 4	Do not want to answer 5	
♦ filter:\ experienced_yesno.a.1=1 ... to fall over a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
♦ filter:\ experienced_yesno.a.2=1 ... to be forced into the roadway by a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2
♦ filter:\ experienced_yesno.a.3=1 ... that you had to turn around because the road ahead was completely blocked by a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3
♦ filter:\ experienced_yesno.a.4=1 ... to almost be hit by an e-scooter rider?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4
♦ filter:\ experienced_yesno.a.5=1 ... to be hit by an e-scooter rider?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5

experienced_injury	19 Have you been injured...			
♦ filter:\ experienced_yesno.a.1=1 \ experienced_yesno.a.4=1 \ experienced_yesno.a.5=1				
	Yes 1	No 2	Do not want to answer 3	
♦ filter:\ experienced_yesno.a.1=1 ... in a fall over a parked e-scooter?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
♦ filter:\ experienced_yesno.a.4=1 ... in a near collision with an e-scooter rider?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2
♦ filter:\ experienced_yesno.a.5=1 ... in a collision with an e-scooter rider?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3

injury_treatment	20 Have you needed treatment by healthcare personnel after an injury you have received...		
♦ filter:\ experienced_injury.a.1=1 \ experienced_injury.a.2=1 \ experienced_injury.a.3=1			
	Yes	No	Do not want to answer

injury_treatment	20 Have you needed treatment by healthcare personnel after an injury you have received...			
	1	2	3	
♦ filter:\ experienced_injury.a.1=1 ... in a fall over a parked e-scooter?	○	○	○	1
♦ filter:\ experienced_injury.a.2=1 ... in a near collision with an e-scooter rider?	○	○	○	2
♦ filter:\ experienced_injury.a.3=1 ... in a collision with an e-scooter rider?	○	○	○	3



**ID:** behavior change

filter:\experience.a=1

<b>more_time</b>	<b>21 Do e-scooters make you spend more time when traveling in an urban area?</b>
No	<input type="radio"/> 1
Yes, rarely	<input type="radio"/> 2
Yes, sometimes	<input type="radio"/> 3
Yes, often	<input type="radio"/> 4
Do not want to answer	<input type="radio"/> 5

<b>why_moretime</b>	<b>22 Why do e-scooters make you spend more time?</b>
♦ <b>filter:</b> \more_time.a=2;3;4	
Write here:	Open

<b>avoid_street</b>	<b>23 Do you ever avoid streets or areas because of e-scooters?</b>
No	<input type="radio"/> 1
Yes, rarely	<input type="radio"/> 2
Yes, sometimes	<input type="radio"/> 3
Yes, often	<input type="radio"/> 4
Do not want to answer	<input type="radio"/> 5

<b>drop_trips</b>	<b>24 Do you ever drop trips in urban areas because of e-scooters?</b>
No	<input type="radio"/> 1
Yes, rarely	<input type="radio"/> 2
Yes, sometimes	<input type="radio"/> 3
Yes, often	<input type="radio"/> 4
Do not want to answer	<input type="radio"/> 5

<b>why_drotrips</b>	<b>25 Why do e-scooters make you drop trips in urban areas?</b>
♦ <b>filter:</b> \drop_trips.a=2;3;4	
Write here:	Open

ID:demographics

**age\_year** | 26 What year were you born?

◆ range:1910:2022;-

Year of birth (four digits)

1

**sex** | 27 Do you identify as a...

Man  1

Woman  2

Other  3

Do not want to answer  4

share_space	28 How do you think it works that...						
	Very bad	Bad	Neither	Good	Very good	Do not want to answer/ Not relevant	
	1	2	3	4	5	6	
♦ filter:\experience.a=1 ... e-scooter riders often share an area with pedestrians?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
... cyclists often share the area with pedestrians?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2

which_municipality	29 In which municipality or city do you most often encounter e-scooters?	
♦ filter:\experience.a=1		
Write here:	Open	

comments	30 Do you have any other comments about obstacles in urban areas or experiences with other road users?	
Write here:	Open	

## File 2

### 2 Translated questionnaire, members of the Norwegian Association of the Blind and Partially Sighted

Interview conducted over telephone. Response options in capital letters were available, but not presented with the question.

**1. Have you ever traveled in areas with e-scooters?**

- a. YES
- b. NO
- c. DON'T KNOW
- d. DO NOT WANT TO ANSWER

**2. Are you...**

- a. Visually impaired?
- b. Severely visually impaired?
- c. Blind?
- d. DO NOT WANT TO ANSWER

**3. Do you use**

YES: NO: DO NOT WANT TO ANSWER

- a. guide dog?
- b. White cane?

**4. Do you have underlying conditions that make it extra important to avoid falling?**

- a. YES
- b. NO

c. DO NOT WANT TO ANSWER

**5. When you walk on pavements where there are no tactile paving lines, how often do you follow the edge farthest from the road (along a ditch, wall, fence or similar)?**

- a. Very rare
- b. Rarely
- c. Occasionally
- d. Often
- e. Very often
- f. NOT RELEVANT / DO NOT WANT TO ANSWER

*IF Q1 a --> Q6 a.*

*IF Q1 b, c, or d --> Q6 b.*

**6. Introduction: The next questions are about when you travel around in urban areas without a companion. To what extent do you experience the following as obstacles?**

*Scale – Not at all, to a small extent, to some extent, to a large extent, to a very large extent. DO NOT WANT TO ANSWER / NOT APPLICABLE*

- a. Parked e-scooters?
- b. parked bicycles?
- c. advertising signs on pavements?
- d. Posts and bollards?

*IF Q1 a --> Q7*

*IF Q1 b, c, or d --> Q9*

**7. How often do you travel in areas with e-scooters in the summer?**

- EVERY DAY
- 4-6 DAYS A WEEK
- 1-3 DAYS A WEEK
- 1-3 DAYS A MONTH
- RAREER
- NOT APPLICABLE
- DO NOT WANT TO ANSWER

**8. How safe do you feel when interacting with e-scooter riders?**

- a. Very unsafe
- b. Unsafe
- c. Neither or
- d. Safe
- e. Very safe
- f. DO NOT WANT TO ANSWER / NOT APPLICABLE

**9. How safe do you feel when interacting with cyclists?**

- a. Very unsafe
- b. Unsafe
- c. Neither or
- d. Safe
- e. Very safe
- f. DO NOT WANT TO ANSWER / NOT APPLICABLE

*IF Q1 a --> Q10*

*IF Q1 b, c, or d --> Q21*

**10. How often do you find that parked e-scooters are in your way...**

- a. Scale: *Never/very rarely, rarely, occasionally, often, very often/always. DO NOT WISH TO ANSWER / NOT APPLICABLE*
- a. ... At the entrance to a building?
- b. ... On the pavement?
- c. ... At a pedestrian crossing?
- d. ... On a lead line?
- e. ... At a bus stop?

**11. Are there any typical areas or places where parked e-scooters are more of a hindrance than others?**

- a. Open field

**12. Have you ever ...**

*YES; NO; DO NOT WANT TO ANSWER*

- a. ... fallen over a parked e-scooter?
- b. ... almost got hit by an e-scooter rider?
- c. ... been hit by an e-scooter rider?

*IF Q3 a. YES --> Q12 d.*

*IF Q3 a. NO/Do not wish to answer --> Q13*

- d. ... experienced that your guide dog was almost hit by an e-scooter rider?
- e. ... experienced that your guide dog was hit by an e-scooter rider?

*Sub-questions 12 d. and e. are estimated to be relevant for very few respondents. Probably around 5%. Then there is a subgroup of these who will have experienced it, and receive follow-up in 13 d. and e. If «yes» on Q12, follow-up on the matched question in Q13 (e.g. IF Q12 a. YES, then Q13 a., etc.)*

**13. How many times have you ...**

*ONCE; TWO-THREE TIMES; FOUR-FIVE TIMES; MORE THAN FIVE TIMES; DO NOT WANT TO ANSWER; NOT RELEVANT*

- a. ... fallen over a parked e-scooter?
- b. ... almost got hit by an e-scooter rider?
- c. ... been hit by an e-scooter rider?
- d. ... experienced that your guide dog was almost hit by an e-scooter rider?
- e. ... experienced that your guide dog was hit by an e-scooter rider?

*IF Q12 a --> Q14 a*

*IF Q12 b --> Q14 b*

*IF Q12 c --> Q14 c*

**14. Have you been injured...**

*YES; NO; DO NOT WANT TO ANSWER*

*Info for interviews: Minor injuries, such as bruises and scrapes, are also injuries*

- a. ... in a fall over a parked e-scooter?
- b. ... in a near collision with an e-scooter rider?
- c. ... in a collision with an e-scooter rider?

*If "YES" on Q14, follow-up on the matched question in Q15*

**15. Have you needed treatment by health personnel after an injury you have received...**

*YES; NO; DO NOT WANT TO ANSWER*

- a. ... in a fall over a parked e-scooter?
- b. ... in a near collision with an e-scooter rider?
- c. ... in a collision with an e-scooter rider?

**Behavior change due to e-scooters:**

**16. Do e-scooters make you spend more time when traveling in urban areas?**

- a. No
- b. Yes, rarely
- c. Yes, occasionally
- d. Yes, often

e. DO NOT WANT TO ANSWER

*IF Q16 a or e --> Q18*

*IF Q16 b, c or d --> Q17*

**17. Why do you spend more time?**

a. Open answer

**18. Do you ever avoid streets or areas because of e-scooters?**

a. No

b. Yes, rarely

c. Yes, occasionally

d. Yes, often

e. DO NOT WANT TO ANSWER

**19. Do you ever drop trips in urban areas because of e-scooters?**

a. No

b. Yes, rarely

c. Yes, occasionally

d. Yes, often

e. DO NOT WANT TO ANSWER

*IF Q19 a or e --> Q21*

*IF Q19 b, c or d --> Q20*

**20. Why do e-scooters make you drop trips in urban areas?**

a. Open answer

**21. What year were you born?**

a. Open answer

b. DO NOT WANT TO ANSWER

**22. Do you identify as a**

a. Man?

b. Woman?

c. Other?

d. DO NOT WANT TO ANSWER

*IF Q1 a --> Q23 a.*

*IF Q1 b, c, or d --> Q23 b.*

**23. How do you think it works that...**

*Scale: Very bad, bad, neither, good, very good. DO NOT WANT TO ANSWER*

a. ... e-scooter riders often share an area with pedestrians?

b. ... cyclists often share the area with pedestrians?

*IF Q1 a --> Q24.*

*IF Q1 b, c, or d --> Q25.*

**24. In which municipality or city do you most often encounter e-scooters?**

a. Open field

**25. Do you have any other comments about obstacles in urban areas or experiences with other road users?**

a. Open field

# File 3

Table describing the variables included in the analyses

Variable	Question	Original coding	Coding in the analyses	Type of variable
Avoid areas/drop trips	Do you ever avoid streets or areas because of e-scooters?	"Yes, often" "Yes, occasionally" "Yes, rarely" "No"	At least one of the answers = "Yes, often" or "Yes, occasionally": "Yes"	Outcome
	Do you ever drop trips in urban areas because of e-scooters?	"Yes, often" "Yes, occasionally" "Yes, rarely" "No"	Otherwise: "No"	
Need more time traveling around	Do e-scooters make you spend more time when traveling in an urban area?	"Yes, often" "Yes, occasionally" "Yes, rarely" "No"	Answer "Yes, often" or "Yes, occasionally" = "Yes" Answer "Yes, rarely" or "No" = "No"	Outcome
Feeling unsafe because e-scooters	How safe do you feel when interacting with e-scooter riders?	"Very unsafe" "Unsafe" "Neither" "Safe" "Very safe"	"Very unsafe" or "Unsafe" = "Unsafe" "Neither", "Safe" or "Very safe" = "Safe"	Outcome and independent variable
Obstacle	When you travel around in urban areas, to what extent do you experience parked e-scooters as obstacles?	"To a very large extent" "To a large extent" "To some extent" "To a small extent" "Not at all"	"To a very large extent" or "To a large extent" = "To a large extent" "To some extent", "To a small extent" or "Not at all" = "To a small extent"	Independent variable
Obstruction on pavement	How often do you experience being hindered by parked e-scooters on the pavement?	"Very often/always" "Often" "Occasionally" "Rare" "Never/very rarely"	"Very often/always" or "Often" = "Often" "Occasionally", "Rarely" or "Never/very rarely" = "Rarely"	Outcome
Fallen over parked e-scooter	Have you ever fallen over a parked e-scooter?	«Yes» «No»	«Yes» «No»	Outcome
Position on pavement	When you walk on pavements where there are no tactile paving lines, how often do you follow the edge farthest from the road (along a ditch, wall, fence or similar)?	"Very often" "Often" "Occasionally" "Rarely" "Very rare"	Answer "Very often" or "Often" = "Often"; "Occasionally", "Rarely" or "Very rarely" = "Rarely"	Independent variable
Degree of vision		"Blind" "Severely visually impaired" "Visually impaired"	"Blind" "Severe visual impairment" "Moderate visual impairment" (reference)	Covariate



Mode of traveling	1) How do you most often travel in urban areas? 2) How do you travel in an urban area?	a) "Walks without aids" b) "Uses walking aids" c) "Walker" d) "Electric wheelchair" e) "Manual wheelchair" f) "Using a special bicycle for the disabled"	If answer to 1), use this. If no answer to 1), use answer to 2): a-c = "Walking" (reference) d-f = "Wheelchair"	Covariate
Gender		"Woman" "Man" "Other"	"Woman" "Man" (reference)	Covariate
Condition	Do you have conditions that make it extra important to avoid falling?	«Yes» «No»	«Yes» «No» (reference)	
Age			Continuous, years	Covariate