International Transport Forum

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BETTER ROAD SAFETY DATA FOR BETTER SAFETY OUTCOMES

Lyon, 27-28 September 2022

New mobility and road safety

28 September 2022

Typology of risky situations involving a Personal Mobility Device in Île-de-France

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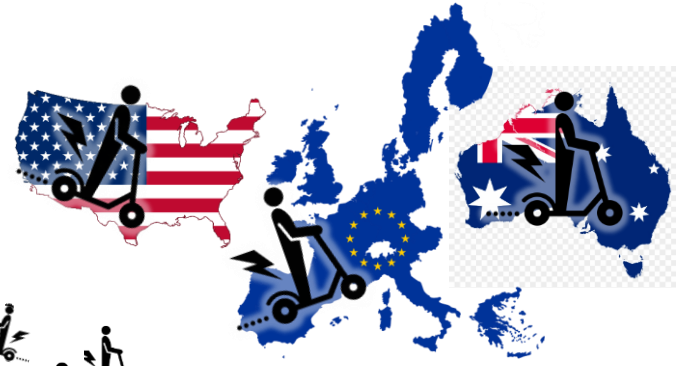
GOUVERNEMENT
Liberté
Égalité
Fraternité

SÉCURITÉ ROUTIÈRE VIVRE, ENSEMBLE

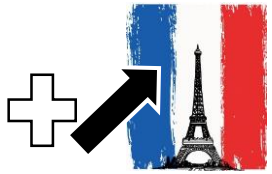
Increase in ePMD trips and crashes

ePMD (in France)

E-scooter mobility in the US, Europe, Asia, Oceania, etc.



Shared e-scooter trips in Paris, since 2018



e-scooter crashes in Paris in 2019 (Hennocq, 2020)

ePMD crashes in France between 2019 and 2020 (+ 40%)

Hennocq, Q., Schouman, T., Khonsari, R. H., Sigaux, N., Descroix, V., Bertolus, C., & Foy, J.-P. (2020). Evaluation of Electric Scooter Head and Neck Injuries in Paris, 2017-2019. *JAMA Network Open*, *3*(11). https://doi.org/10.1001/jamanetworkopen.2020.26698

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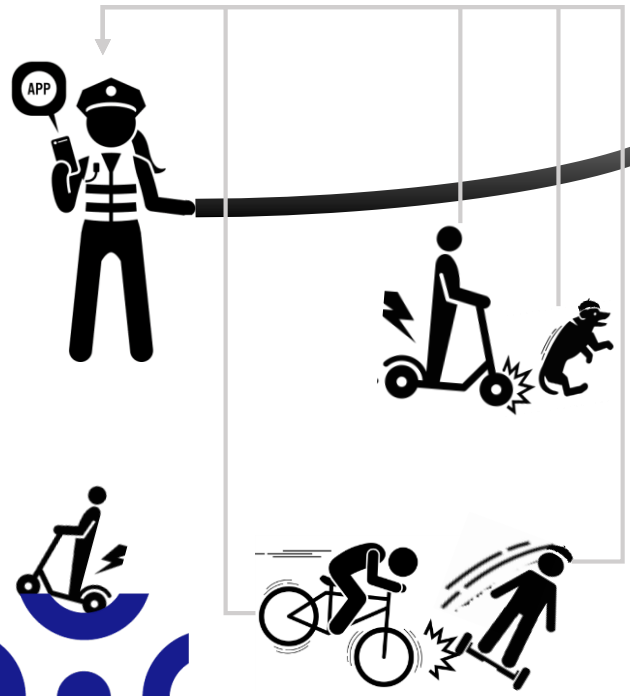
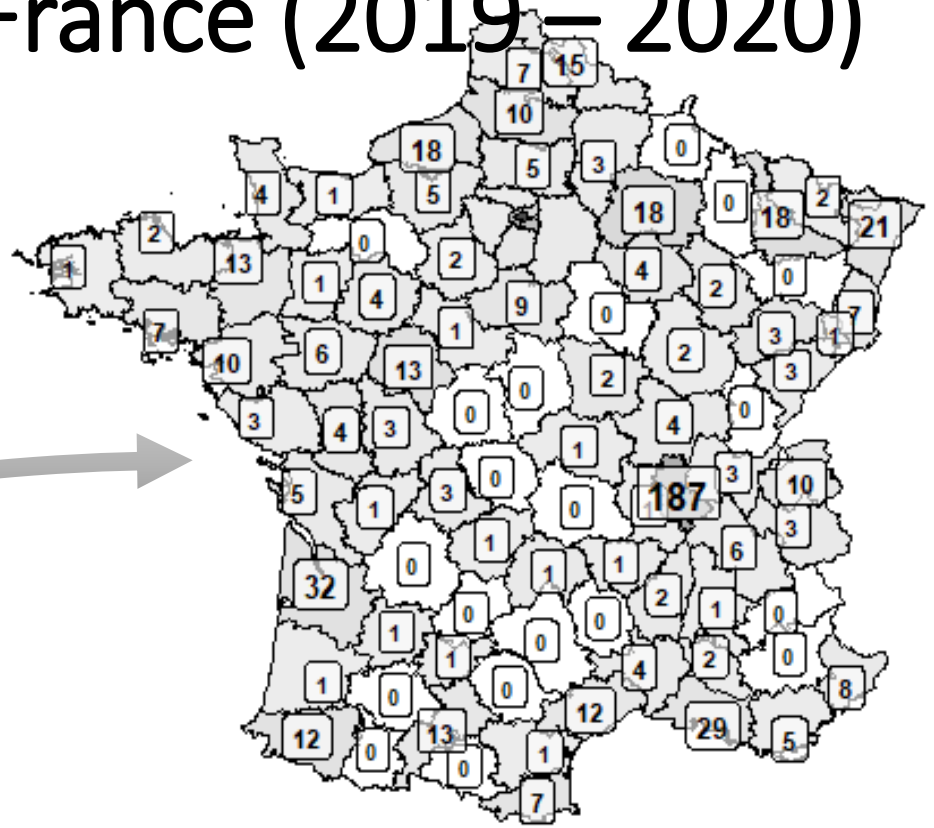
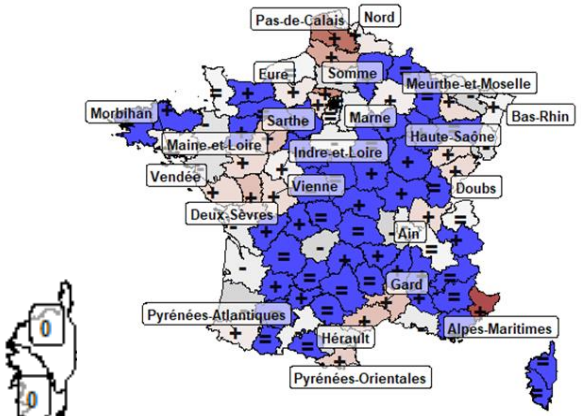
EPMD crashes in France (2019 – 2020)

ePMD crashes are recorded by the French police (2019 – 2020)







Île-de-France
Paris region ➔

61% of ePMD crashes

97% of ePMD crashes reported in Paris region

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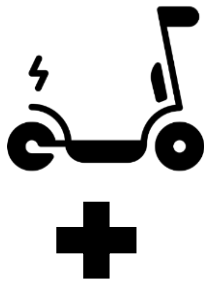
EPMD crashes in France (2019 – 2020)

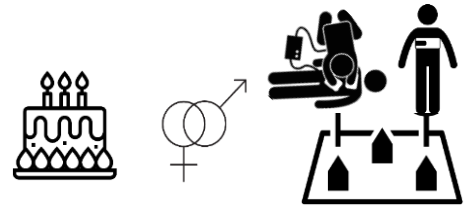
Crash between vehicles	**1 102**
Involving **only** the ePMD users	221
Struck pedestrians	**175**
Crash between vehicles + pedestrian hit	15



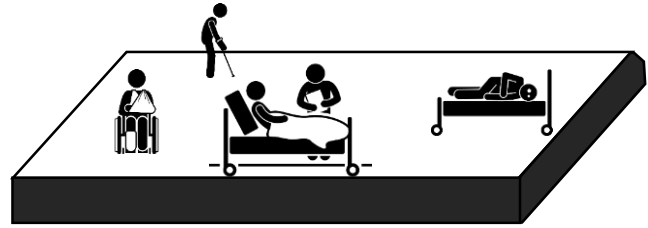
Users involved

Types of EPMd crashes ?

French police record some features (e.g., age, gender, location, injuries)



Only the most serious crashes are recorded by the police

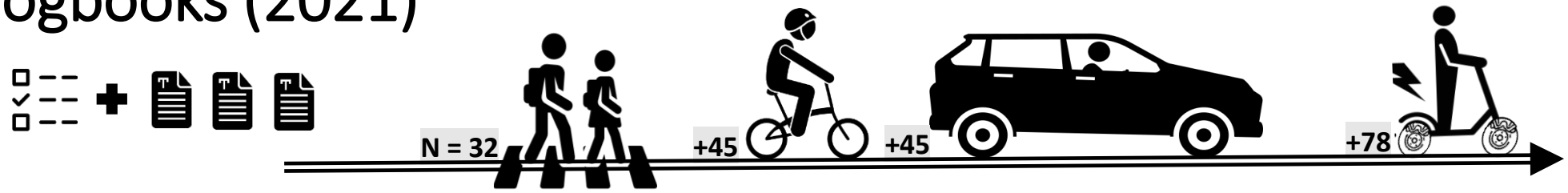


Factors of ePMD crashes are not well understood

What factors lead to ePMD risky situations ?

Survey by logbooks (2021)

Subcontracted



Initial

Logbooks (2,204 completed)

Final

1 2 3 4 5 6 7 8 9 10 11 12

Commuting daily in Paris region

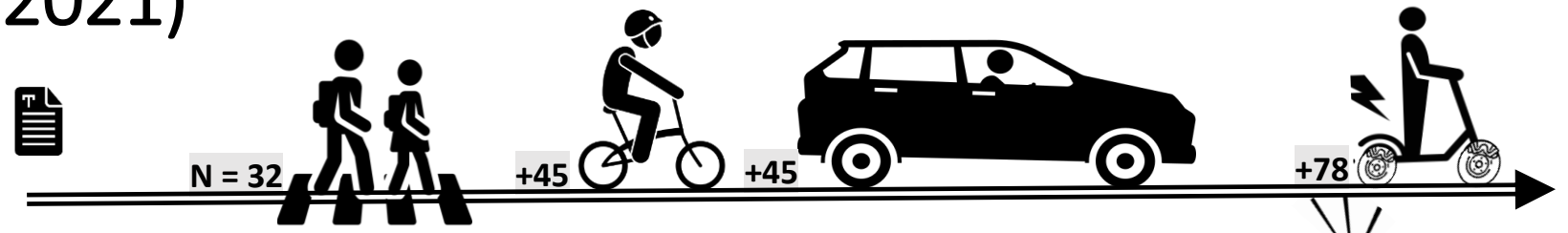
N = 200

Inventory of risky situations during travel **involving a PMD (one month)**

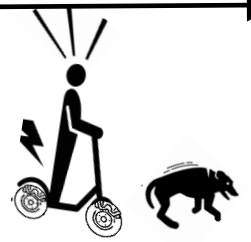
236 RISKY SITUATIONS

MCQs + **Texts to describe the situations** (written on smartphone or computer)

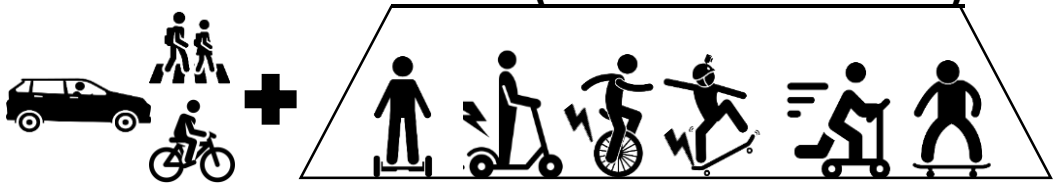
Survey by logbooks (2021)

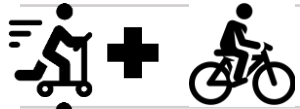


- E-scooter users identify **all risky situations** in which they are involved



- Pedestrians, cyclists and motorists identify situations **that involve a PMD (even non-motorized)**



Complete at least one logbook		Report a situation → n situations	Final survey
	78	**59 → 159**	55
	32	**15 → 23**	28
	45	**12 → 16**	36
	45	**16 → 38**	37

Creation of variables from texts

Reading texts

236 RISKY SITUATIONS

Building dozens of lexicons

e.g., from lexicon of respondent's risky behaviours ↓

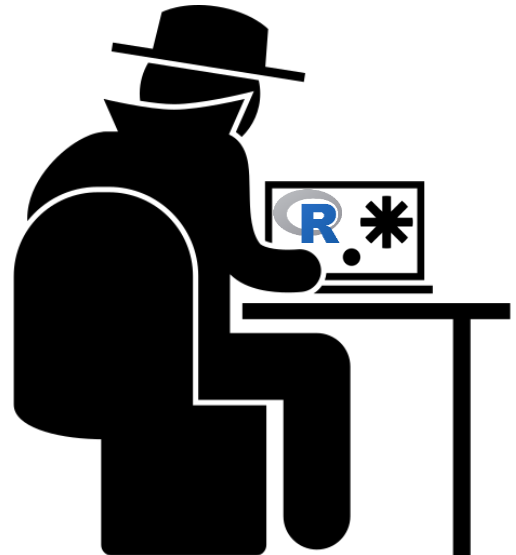
```
commise_par_le_repondant = c("mon père à quitté la trottinette",
                             "la fatigue de la soiree \\(alcool",

                             "j'étai.? au téléphone",
                           "moi je metais mal arreter, jetais dans son angle mort",
                           "jai pas vu un stop et je suis passee .ans le voir",
                           "je suis oblige de rouler sur un sens interdit",
                           "il a fallu que je contourne et roule a contre sens sur plusieur metres",
                           "je n ai pas respecte la reglementation",
      "la voie cyclable etait occupee par des gravats mobligeant a en sortir au dernier moment et couper la trajectoire dun vehicule",
                           "je roulais a contre sens",
                           "ma faute je naurais pas du utiliser la trotinette a ce moment",
                           "ceci est de ma faute car je ne devais pas etre la",
```

Is the respondent involved in the situation ?
(not based on a lexicon)

Identification of topics within the texts

Lexicon-based binary variables
(presence / absence of a topic)

Texts & regex



Types of risky situations involving an ePMD

Texts explaining risky situations

- **Infrastructure**
  - Obstacle or under construction
  - Slippery
  - Imperfect
  - Very crowded
  - Narrow
  - Poorly illuminated
  - In descent
- **PMD involved**
  - Malfunction
  - Silence
- **Respondent's behaviour**
  - Excessive speed
  - Inattentive
  - Other risky behaviors
- **Behaviour of other road users**
  - Crossing the respondent's trajectory
  - Using a prohibited lane
  - Not respecting safety distances
  - Obstructing passage
  - Excessive speed
  - Inattentive
  - Obstructing passage, in a safe manner
  - Other risky behaviors (e.g., talking on the phone while driving)

Several topics coexist in 26% of e-scooter risky situations

e.g., both risky behaviors and infrastructure issues

Types of risky situations (**e-scooter respondents**)

Only e-scooter user (n = 65)

41% of risky situations involve only the e-scooter user (do not involve other users)

Texts generally refer to the infrastructure (78%)

- Imperfect (32%)
- Obstacles (29%)
- Slippery (21%)

77 % of these situations

+ respondent's risked behaviour (32%)

+ e-scooter malfunction (17%)

59% of risky situations involve several users

40 % 33 % 16 %

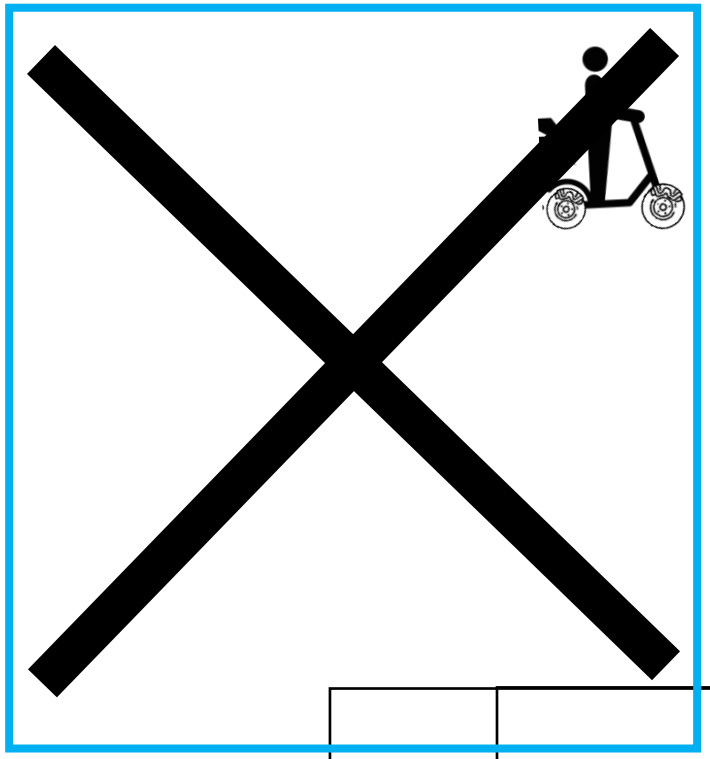
5 % 2 % 1 %

Several users (n = 94)

Texts generally refer to others' behavior (89%)

- **Crossing the respondent's path (45%)**
- Getting too close (17%)
- Driving / walk in a restricted lane (16%)
- Excessive speed (15%)

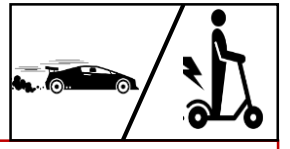
Types of risky situations (**motorists, cyclists and pedestrians**)



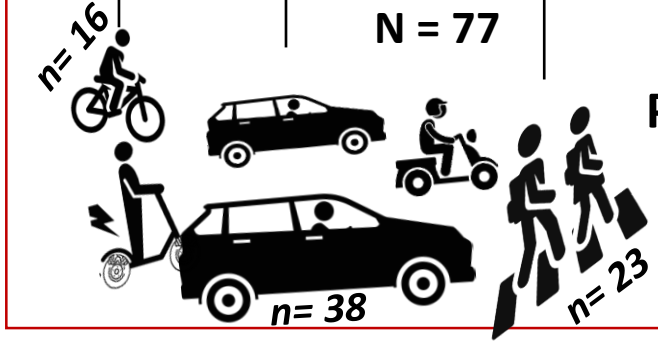
Excessive speed is the only notable difference with explanations of e-scooter respondents

(motorists, cyclists and pedestrians consider more that an ePMD is in excessive speed, in comparison with the explanations of e-scooters towards other users)

(40 % vs. 15%), X^2 (1) = 10,24; p < .002



N = 77



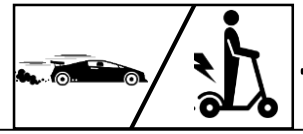
Risky situations involving a PMD are explained with risky behaviors of PMD users (97 %), similar than e-scooter users attribute to others road users

(cross the respondent's path, getting too close, riding in a prohibited lane, excessive speed…)

Conclusion

Main topics explaining risky situations

- **Infrastructure**
- **Vehicle characteristics**
- **Behaviors of others**
- **Respondents' behaviors**



- **The final survey confirms these results** (e.g., 40% of risky situations involve only the e-scooter respondent)
- **And many other results…** Several publications about ePMD crashes (one submitted, 3 in progress)

THANK YOU FOR YOUR ATTENTION

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