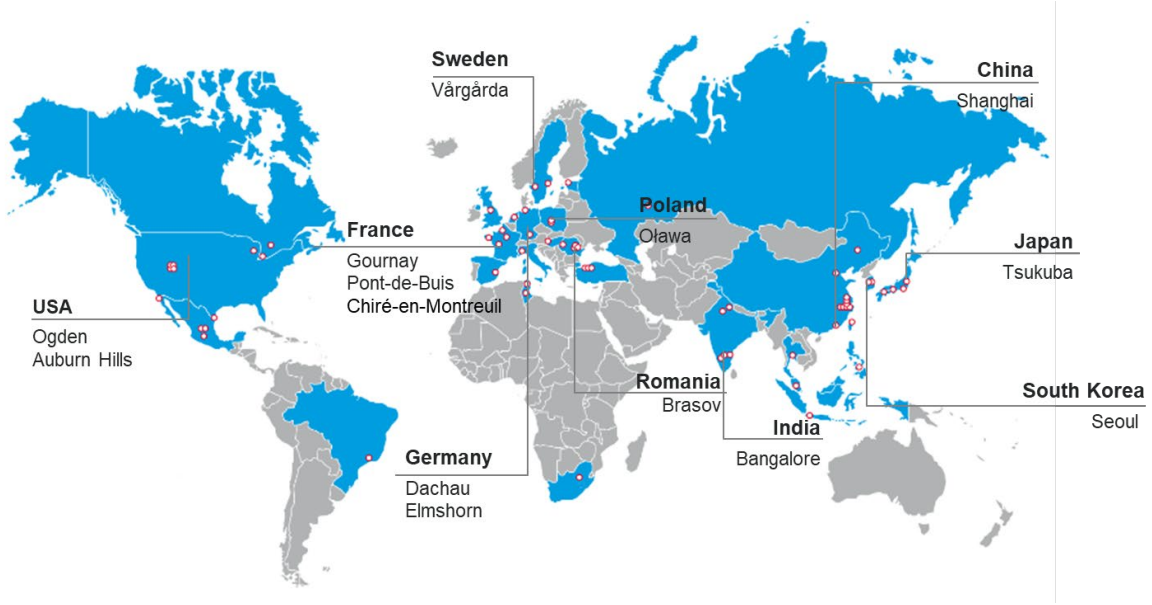
Powered Two-Wheelers (> 25 km/h) in China

Bo Sui

Self introduction



I am a traffic safety research engineer based in Autoliv China since 2012

My research interests are two-wheeler traffic safety analyses in China

Publications on PTWs include:

Sui, B., Lubbe, N., & Bärgman, J. (2021). Evaluating automated emergency braking performance in simulated car-to-two-wheeler crashes in China: A comparison between C-NCAP tests and in-depth crash data (Accident Analysis and Prevention: in press).

Sui, B., Lubbe, N., & Bärgman, J. (2019). A clustering approach to developing car-to-two-wheeler test scenarios for the assessment of Automated Emergency Braking in China using in-depth Chinese crash data. Accident Analysis and Prevention, 132, 105242. https://doi.org/10.1016/j.aap.2019.07.018

Sui, B., Zhou, S., Zhao, X., & Lubbe, N. (2017). An overview of car-to-two-wheeler accidents in China: Guidance for AEB assessment. In: Proceedings of the 25th International Technical Conference on the Enhanced Safety of Vehicles (ESV).

Fredriksson, R., & Sui, B. (2015). Fatal Powered Two-Wheeler (PTW) crashes in Germany: an in-depth study of the events, injuries and injury sources. In: Proceedings of the 2015 International Research Council On the Biomechanics of Impact Conference (IRCOBI). Sep. 9-11, Lyon, France.

Contents

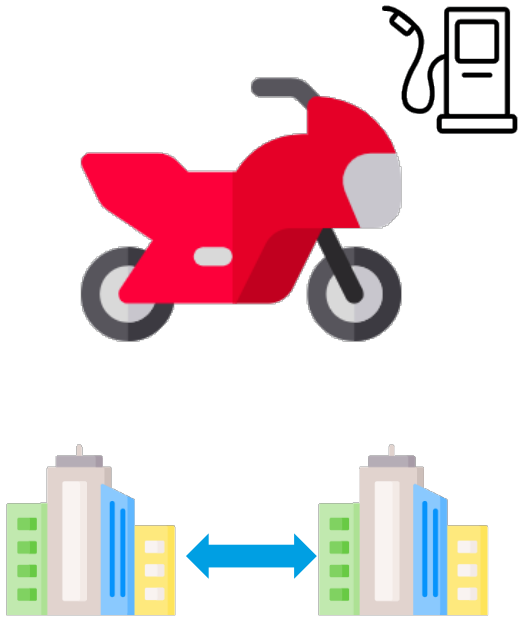
- Regional facts and figures
- Motorcycle use
- Motorcycle safety situation in China
- Areas of attention, among others:
  - Licensing and helmet use
  - Road infrastructure situation and challenges
  - Safety technology, vehicle aspects and local/regional vehicle requirements

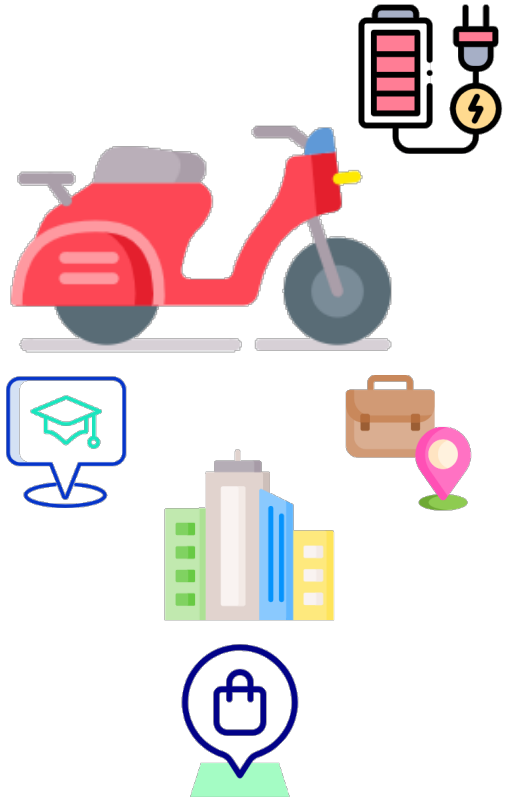
China

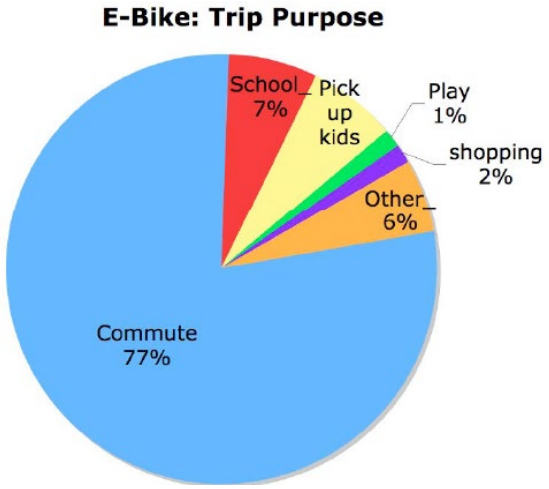
- Covers an area of over 9 million km², ~20 times of the Sweden
- 23 provinces, 5 autonomous regions, 4 municipality directly under the central government, 2 special administrative regions
- Over 1.4 billion of people (18% of the global population) in 2019, 61% living in urban area and 39% in rural area. 17% 0-14 years old, 71% 15~64 years old, and 13% >65 years old.
- Nominal GDP totaling approximately US$ 14.3 trillion as of 2019 and over US$ 10,000 per person (one fifth of the Swedish).

Source: China Statistical Yearbook (2020)

PTW (> 25 km/h) usage in China





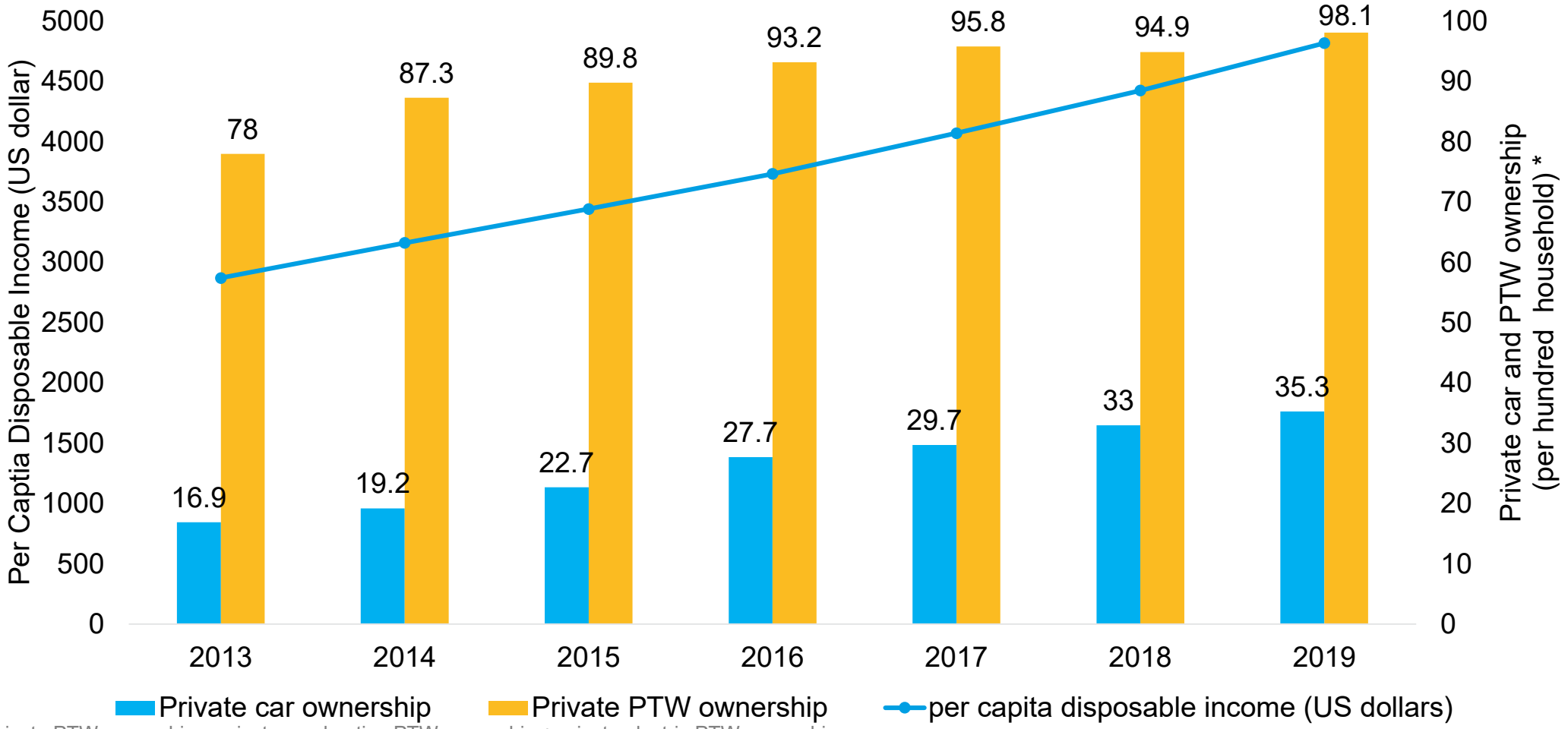


Weinert X.W (2017)

90 million ownership **300 million ownership**

https://finance.sina.cn/stock/relnews/us/2020-08-01/detail-iivhvpwx8599914.d.html?vt=4&cid=76524&node_id=76524
https://baijiahao.baidu.com/s?id=1674053073779921431&wfr=spider&for=pc
Weinert X.W. (2017). The rise of electric two-wheelers in China: Factors for their success and implications for the future.

Nearly every household has a PTW
Car ownership has increased substantially



*: private PTW ownership = private combustion PTW ownership + private electric PTW ownership

Source: China Statistical Yearbook (2020)

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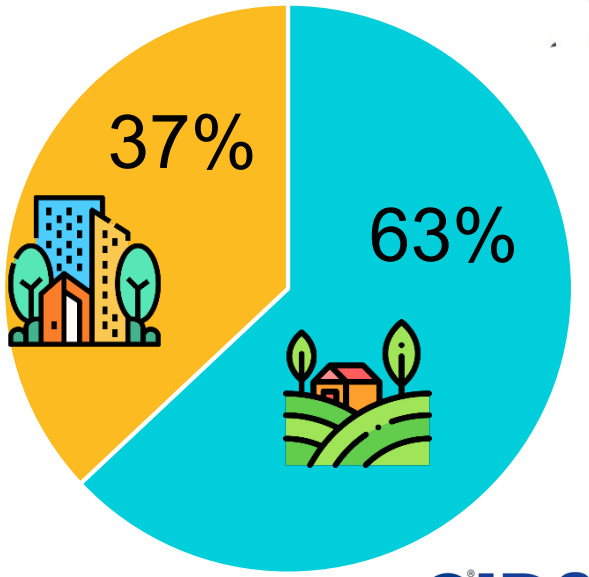
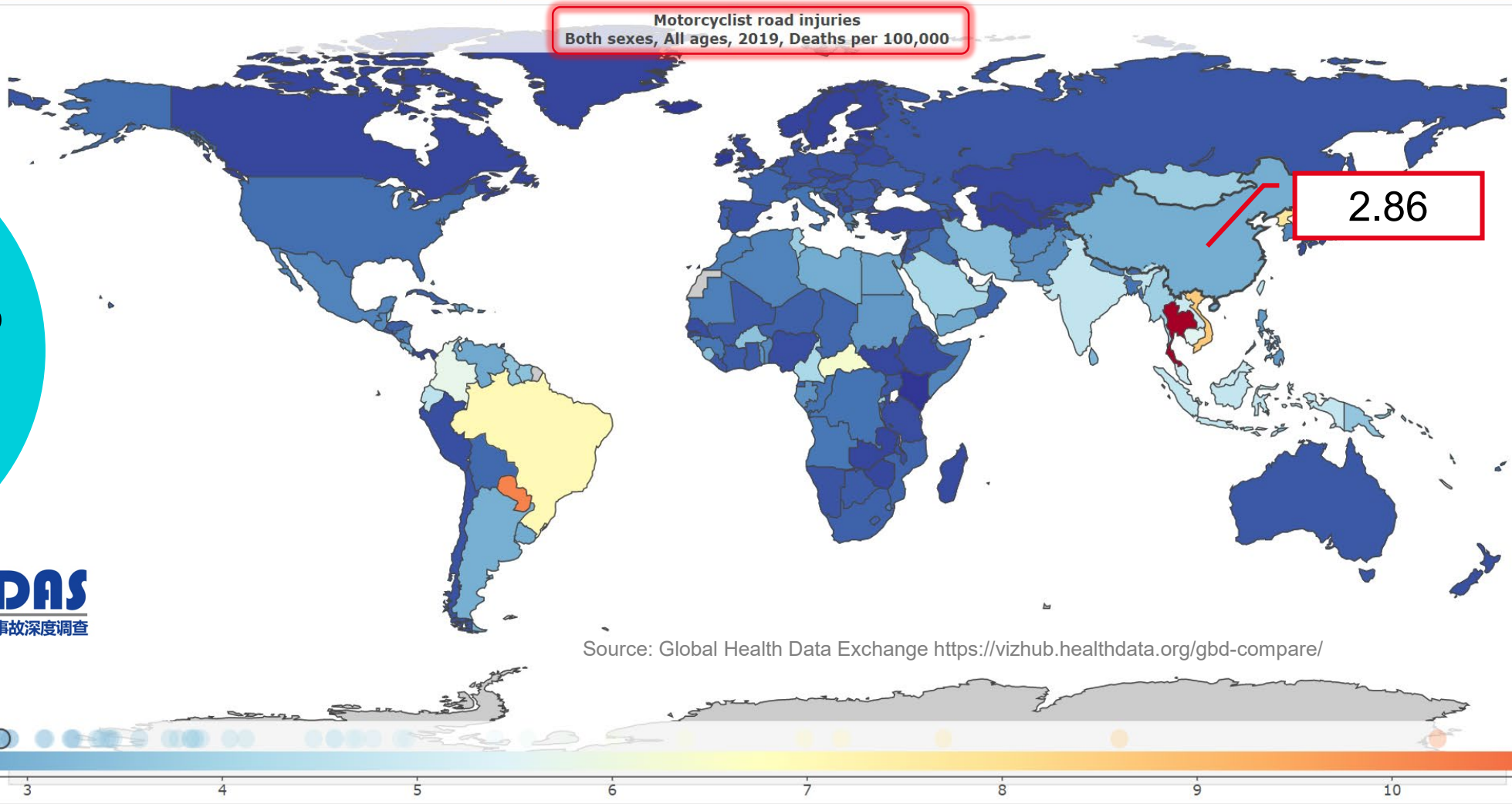
GBD Compare | Viz Hub



CIDAS 中国交通事故深度调查



Source: Global Health Data Exchange https://vizhub.healthdata.org/gbd-compare/

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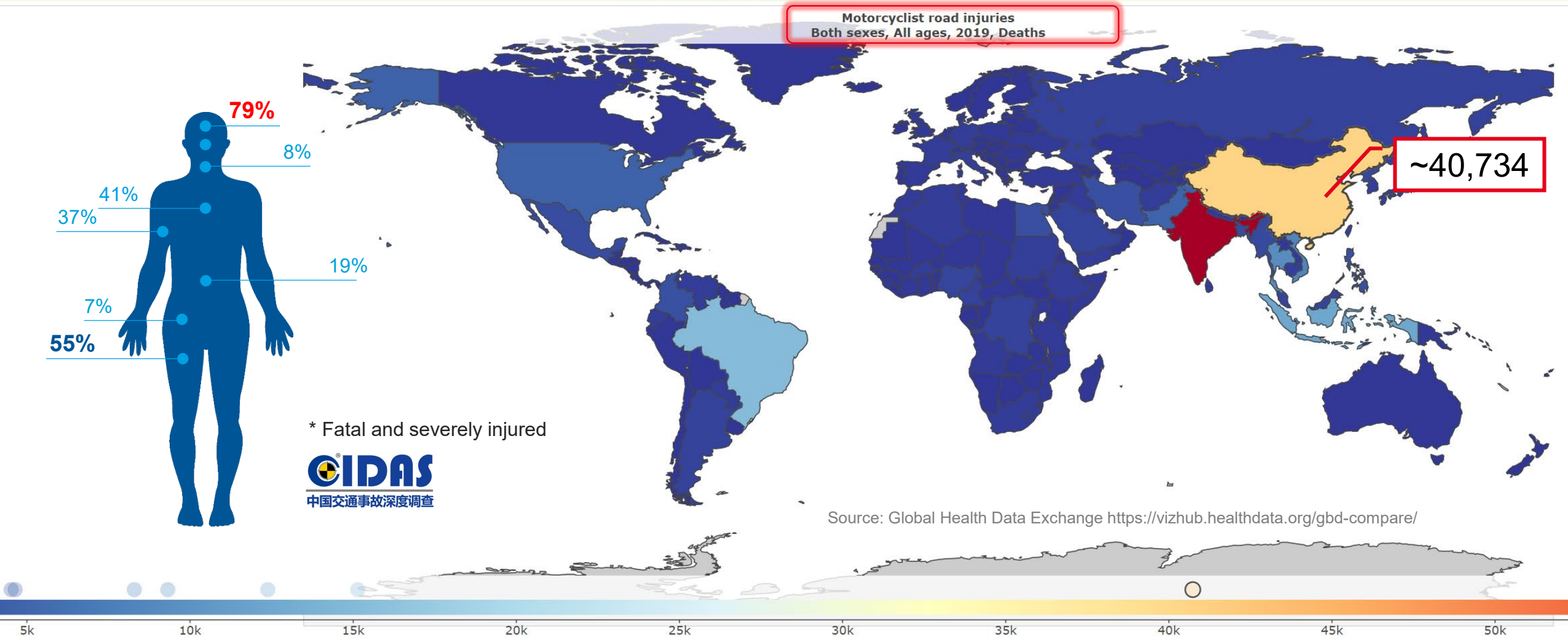
GBD Compare | Viz Hub

* Fatal and severely injured

CIDAS 中国交通事故深度调查



Source: Global Health Data Exchange https://vizhub.healthdata.org/gbd-compare/

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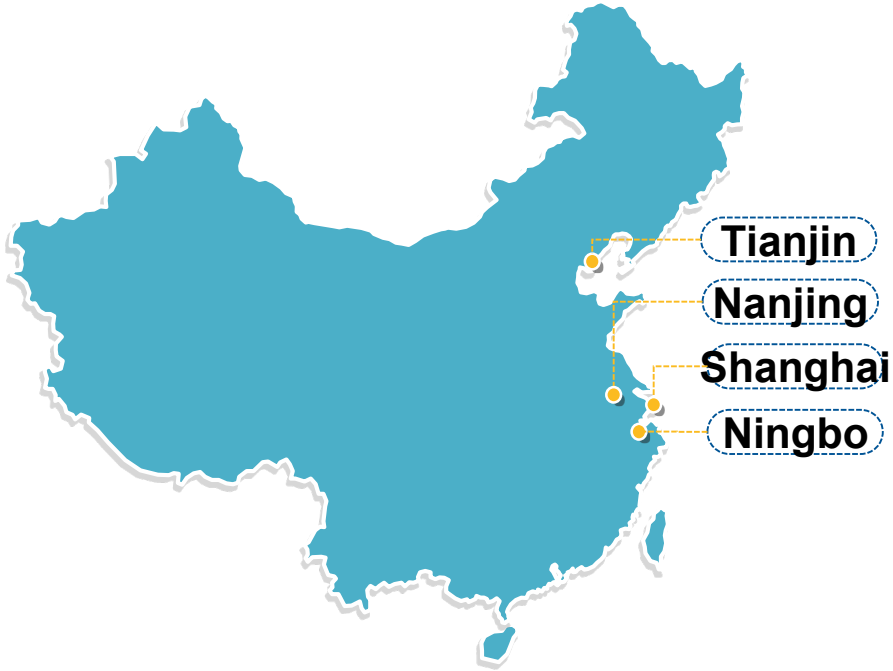
Helmet usage in China

Estimated 20% helmet usage (WHO, 2018)



Inappropriate road use by PTW riders

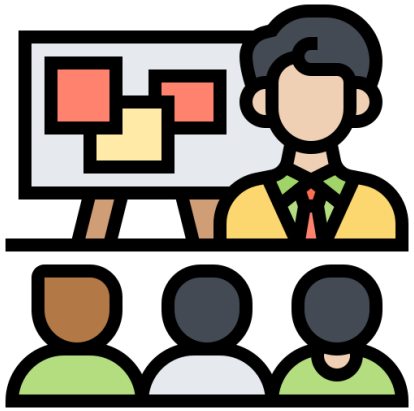
- By law all PTWs > 25 km/h ride on the road (main carriage way)
- In practice: “human-powered bicycles, E-bikes, and motorbikes all share the same cycling space” Gu et al. (2021)

Road scene from Shanghai on road usage by PTW riders

Gu et al. (2021). The two-wheeled renaissance in China—an empirical review of bicycle, E-bike, and motorbike development, International Journal of Sustainable Transportation, 15:4, 239-258

Training and licensing

- E-level license for motorcycles & F-level for mopeds



Online study

Two written te

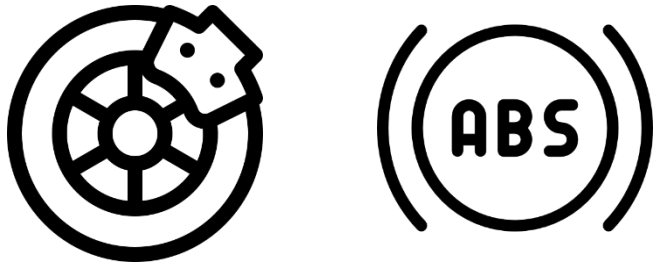
Two driving tests

Not challenging

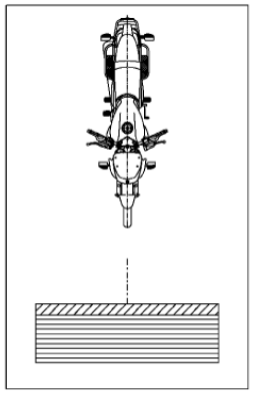
Completion

Safety technology, vehicle aspects and requirements

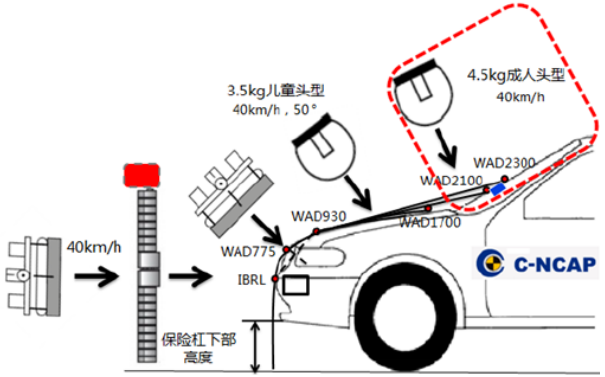
- National standard
  - GB 20073-2018



  - GB/T 33438-2016



- Consumer rating program: C-NCAP
  - Head-form and leg-form test (pedestrian ➔ two-wheeler rider)



  - Automated Emergency Braking for cars encountering two-wheelers

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Thank you!

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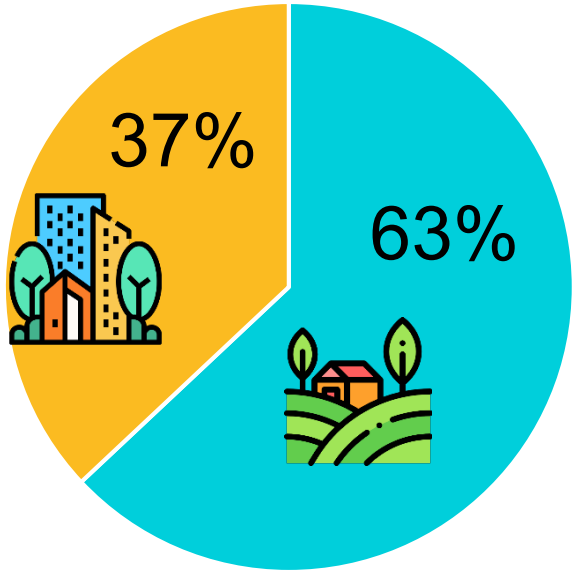
PTW traffic safety in China

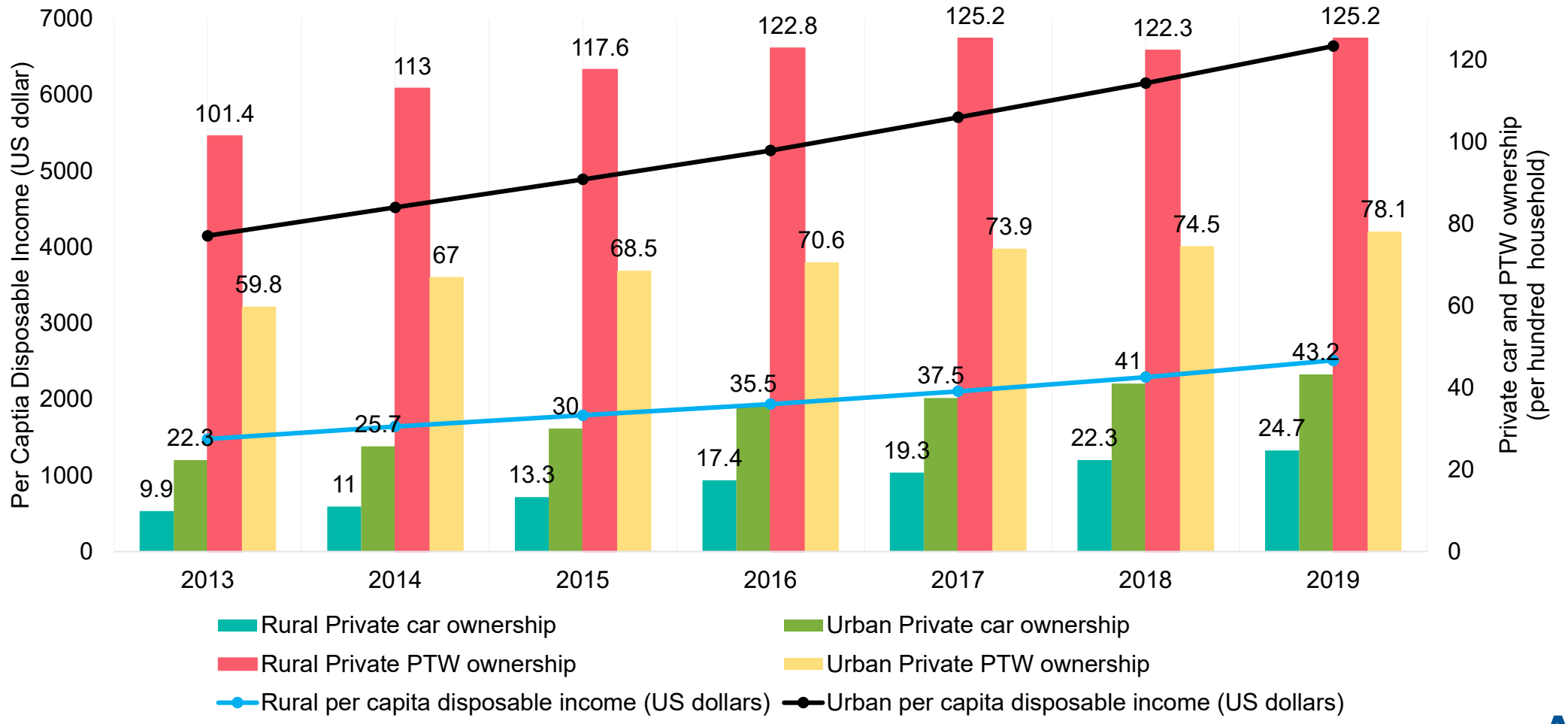
15,800 fatalities
Reported by country/area in 2013 (WHO)

3 times

46,876 fatalities
Estimated by The Global Health Data Exchange (GHDx)

Based on the China In-Depth Accident Study (CIDAS), 63% of PTW users' fatalities were on rural roads, 37% on urban roads.





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PTW safety regulation in China

Law of the Peoples Republic of China on Road Traffic Safety

	E-bike	Moped	Motorcycle
Regulation	GB17761-2018 Effective: 2019.04.15	GB 20073-2018 (Effective: 2018.07.01) GB/T 24158-2018 (Effective: 2019.04.01)	GB 20073-2018 (Effective: 2018.07.01) GB/T 24158-2018 (Effective: 2019.04.01)
Requirement	Weight <= 55 kg & Max. Speed <= 25 km/h & Motor power <= 400 W & Battery voltage <= 48 V &	Weight > 55 kg (optional) 25km/h < speed <= 50 km/h Engine capacity <= 50 mL or 400 W < Motor power <= 4 kW	Weight >55 kg (optional) Max. Speed > 50 km/h Engine volume > 50 mL or Motor power > 4 kW
Type	Non-motor vehicle	Motor vehicle	
Helmet usage (GB811-2010)	Required since 2021 in some districts	Required	Required
Motorcycle driver license	No requirement	F	E
Insurance	No requirement	Required	Required
Extra load (passenger)	A child below 12 years (some districts)	None	An adult
Road	Bicycle lane	Road (main carriageway and designated lanes)	Road (main carriageway with speed limit >= 80 km/h and restrictions in some cities)

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