IMPACT OF CONNECTED AND AUTONOMOUS VEHICLE IMPLEMENTATION ON PUBLIC HEALTH: A SYSTEMATIC REVIEW AND CONCEPTUAL MODEL

Soheil Sohrabi and Haneen Khreis
Problem Statement

- Dawn of Connected and Automated Vehicles (CAVs)

Source: Bob Al-Greer/Mashable
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- Dawn of Connected and Automated Vehicles (CAVs)
- Regulations and policies
- Identifying impacts of CAVs
- CAVs & Public Health

Source: www.tasc.ie/opengovtoolkit
CAVs & Public Health Literature

23 publications are found as of January 2019:

• Regulations and policies

• CAVs implementation impact on public health:
  ✓ Improving safety
  ✓ Environmental
  ✓ Aging populations
  ✓ Psychological stress
  ✓ Physical activity
  ✓ Labor market disruption

• Public awareness
1. Less congestion, less emission
2. Less congestion, less heat
3. Less congestion, less stress
4. Less congestion, less noise
5. Smoother traffic flow, less contamination
6. Less congestion, less GHG
7. More comfort, shift to car, more VMT, more emission
8. Shift to car, more VMT, more noise
9. Shift to car, more VMT, more heat
10. Shift to car, more VMT, more GHG
11. Shift to car, more VMT, less PA
12. Eliminating driver error and equipping with sensor, less crashes
13. More comfort, city sprawl, more VMT, more emission
14. City sprawl, more VMT, more Noise
15. City sprawl, more VMT, more Heat
16. City sprawl, more VMT, more GHG
17. City sprawl, less access
18. City sprawl, less social inclusion
19. City sprawl, more community severance
20. Improving transportation equity, more access
21. Improving transportation equity, mobility independence
22. Improving transportation equity, social inclusion
23. More CAVs infrastructure, more EMF
24. Less transportation infrastructure, less heat
Transportation Risk Factors Health Outcome

- Noise
- Air Pollution, Heat
- Physical Activity, Stress, Heat, Noise, Air Pollution, Green Space
- Contamination
- Physical Activity
- Physical Activity, Heat, Noise
- Air Pollution, EMF
- Stress, Physical Activity, Noise, Contamination, Green Space, Social Exclusion
- Air Pollution, Heat, Contamination
- Air Pollution, Heat
- Crashes
- Physical Activity
Conclusion:
- CAVs implementation impacts on public health identified through 24 pathways
- CAVs can negatively impact public health through 13 pathways
- Supporting policies are required to govern:
  - City sprawling (TDM)
  - CAVs ownership (shared ownership)
  - Ridesharing and public transit (TDM)
  - Job loss (smoother transition)
  - CAVs infrastructure
  - Electric motors

Future Work:
- Quantifying the burden of disease of CAVs implementation for policy evaluation
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Thank You!

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