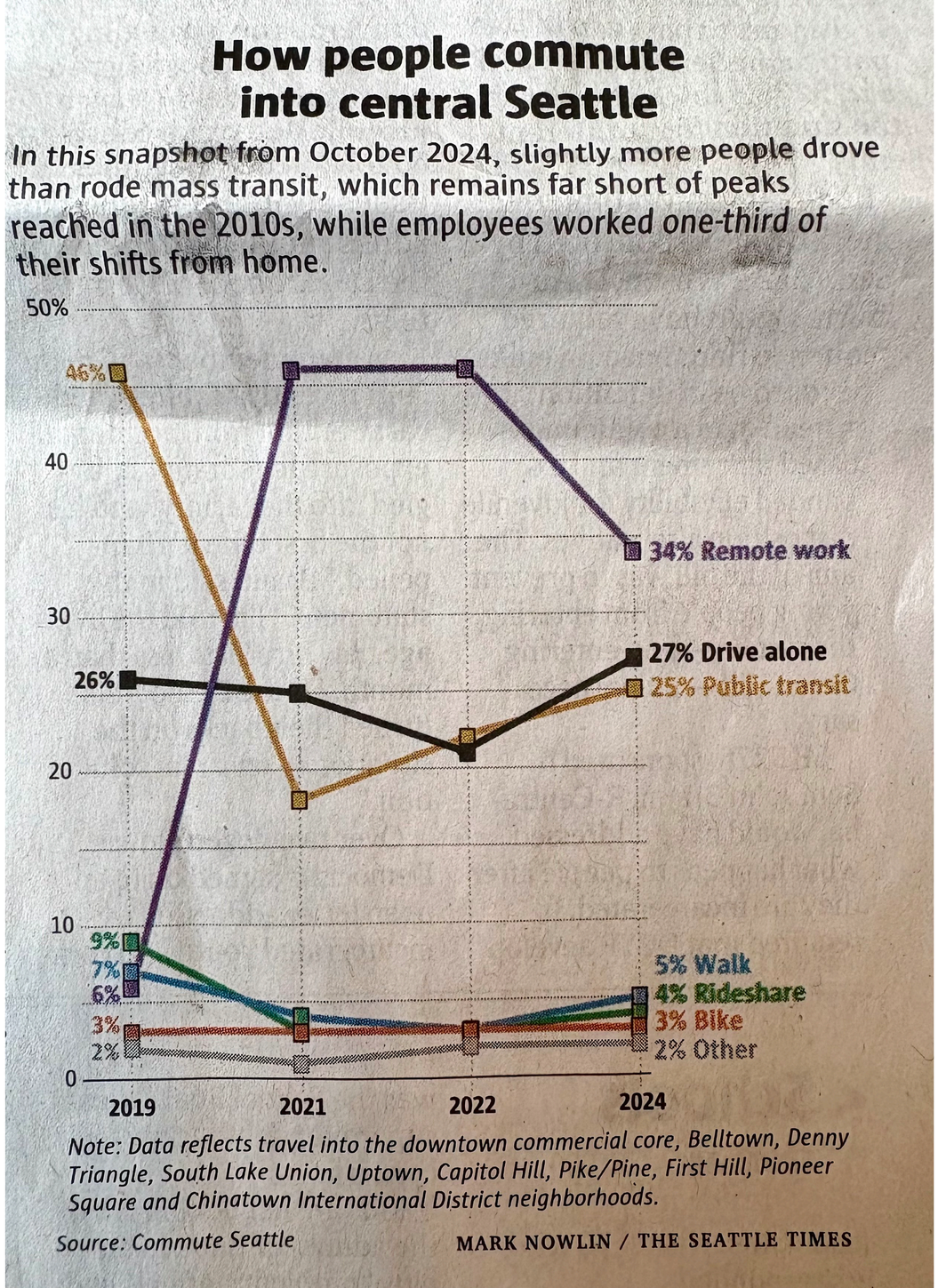
Multi-Modal Urban Design

SBAB meeting 8/19/2025

Ksenia and Josh

Issues identified

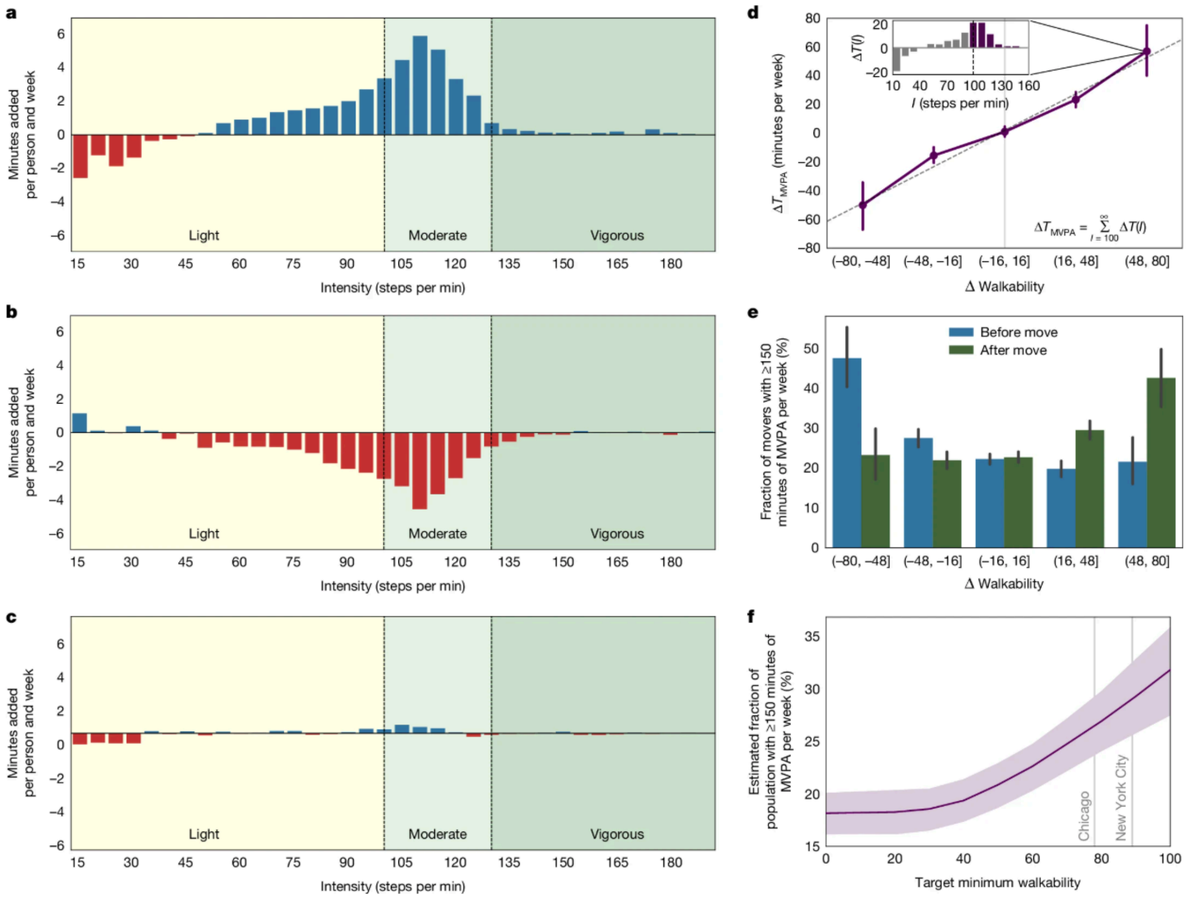
- Too many single-occupancy vehicles (SOV) on Seattle's streets leading to reduced walkability and safety, increased noise and air pollution, and overall unpleasant experience for people outside cars
- Many statistics used in street and trip planning reflect commuter traffic with no attention to the rest of people's lives (leisure, appointments, childcare, etc.)



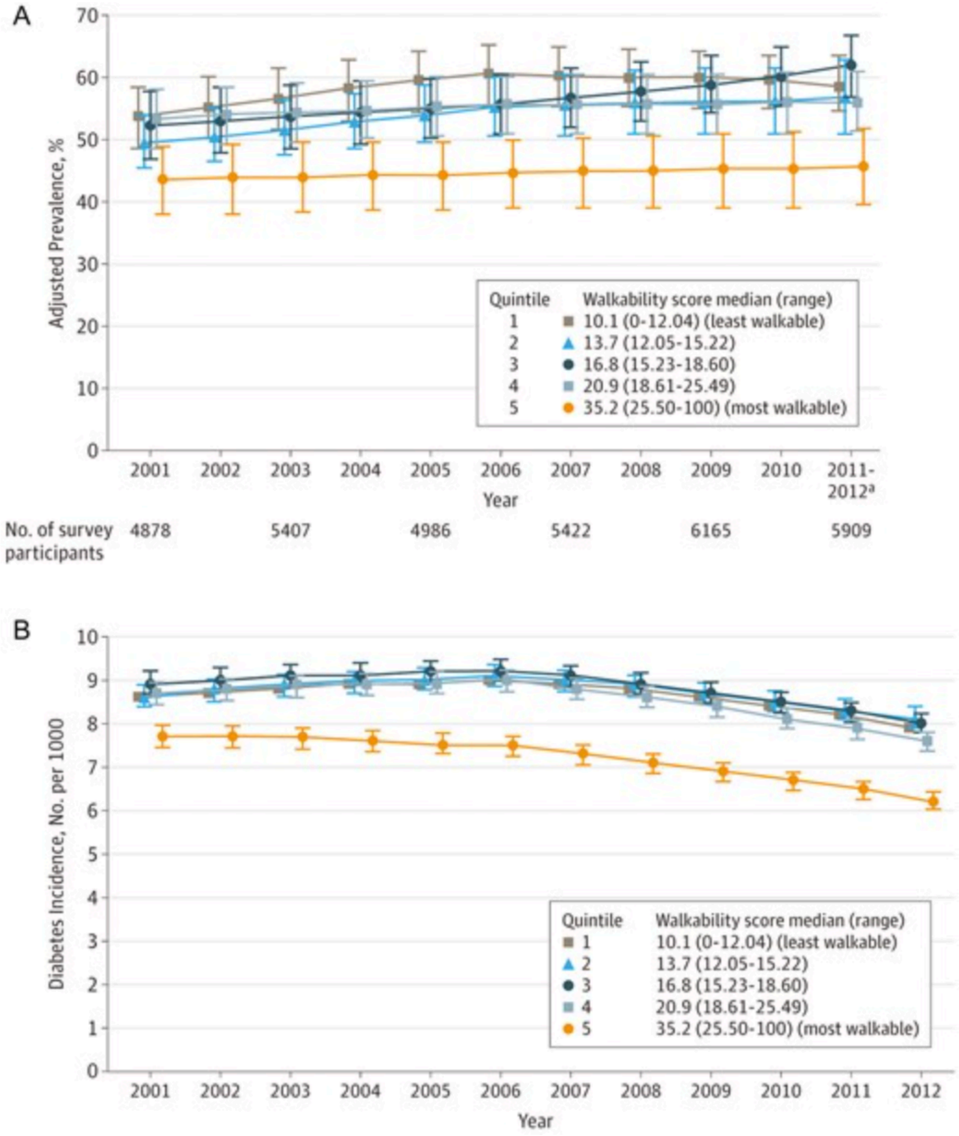
Why is walkability and welcoming urban environment important?

Fig. 3: Improvements in walkability are associated with increases in MVPA and with twice as many participants meeting aerobic physical activity guidelines (49+ point increase).

From: Countrywide natural experiment links built environment to physical activity



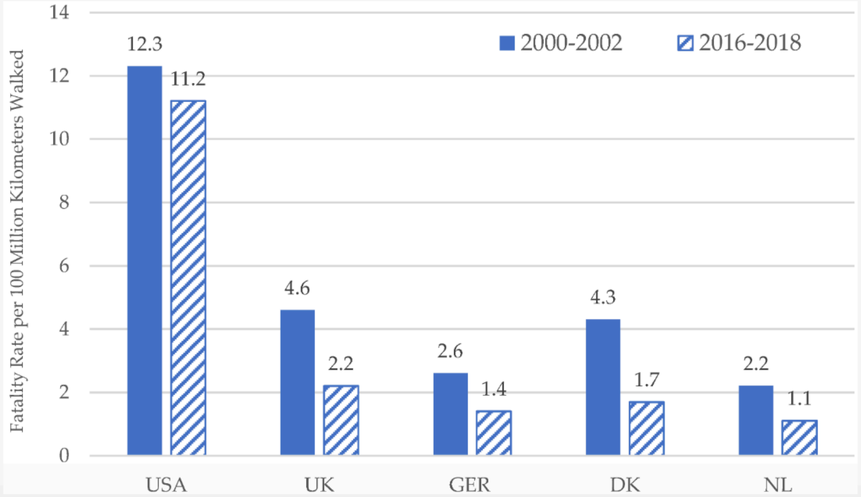
Althoff, T., Ivanovic, B., King, A.C. et al. Countrywide natural experiment links built environment to physical activity. Nature (2025). https://doi.org/10.1038/s41586-025-09321-3



Nicholas A Howell, Gillian L Booth, The Weight of Place: Built Environment Correlates of Obesity and Diabetes, Endocrine Reviews, Volume 43, Issue 6, December 2022, Pages 966–983, https://doi.org/10.1210/endrev/bnac005

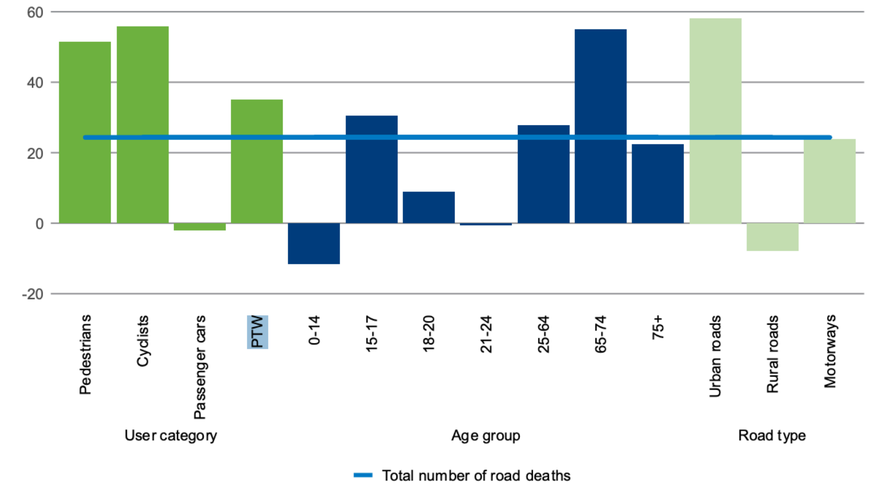
Why is walkability and welcoming urban environment important?

Figure 10. Trends in pedestrian fatalities per 100 million kilometers in the USA, the UK, the Netherlands, Denmark, and Germany, 2000–2018. Source: National travel surveys and national travel fatality statistics in each country [11,12,15,18,20,26]. Note: Differences in data collection methods, timing, and variable definition across countries and over time limit comparability of the data.



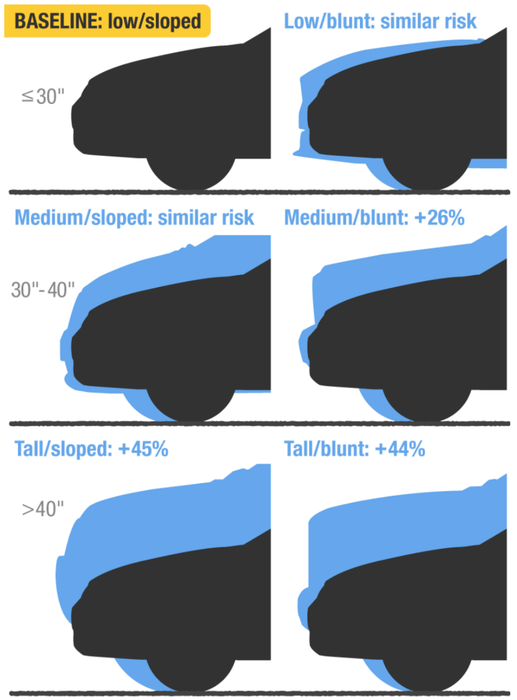
Buehler R, Pucher J. Overview of Walking Rates, Walking Safety, and Government Policies to Encourage More and Safer Walking in Europe and North America. Sustainability. 2023; 15(7):5719. https://doi.org/10.3390/su15075719

Figure 10. Evolution of road fatalities by user category, age group and road type, 2013-23



https://www.itf-oecd.org/sites/default/files/united-states-road-safety.pdf

Comparative risk of pedestrian fatality by hood leading edge height and shape



https://www.iihs.org/news/detail/vehicles-with-higher-more-vertical-front-ends-pose-greater-risk-to-pedestrians

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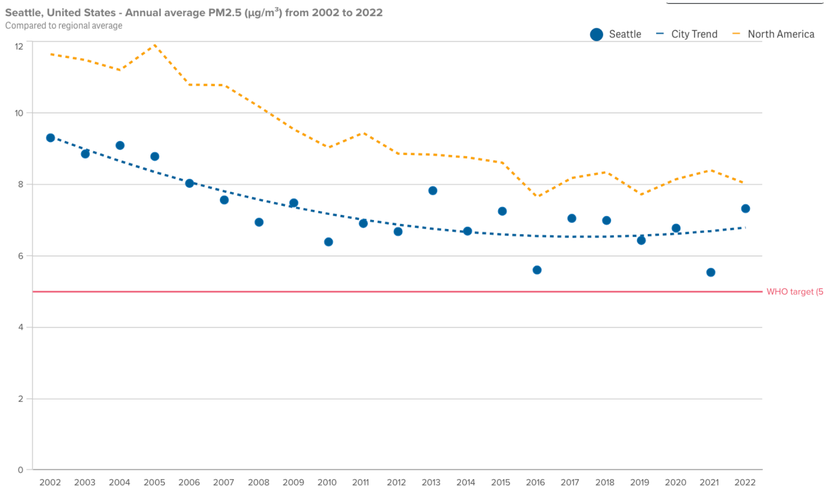

Seattle, United States - Air quality and health impacts attributable to PM2.5 in 2022

	City	Region
	Seattle	North America
PM2.5 level (µg/m³)	7	8
Total mortality attributable to PM2.5, of which:	227	10,810
Stroke	14%	14%
Ischemic heart disease (IHD)	41%	40%
Chronic obstructive pulmonary disease (COPD)	14%	14%
Lower respiratory infection (LRI)	4%	4%
Lung cancer	17%	18%
Type II Diabetes	10%	10%
PM2.5 attributable mortality per 100k inhabitants	30	33
Disability-adjusted life years (DALY)	4,717	219,449
Health damage cost (death & morbidity - USD PPP)	2 billion	85 billion

https://www.c40knowledgehub.org/s/article/Air-Quality-Data-Explorer?language=en_US

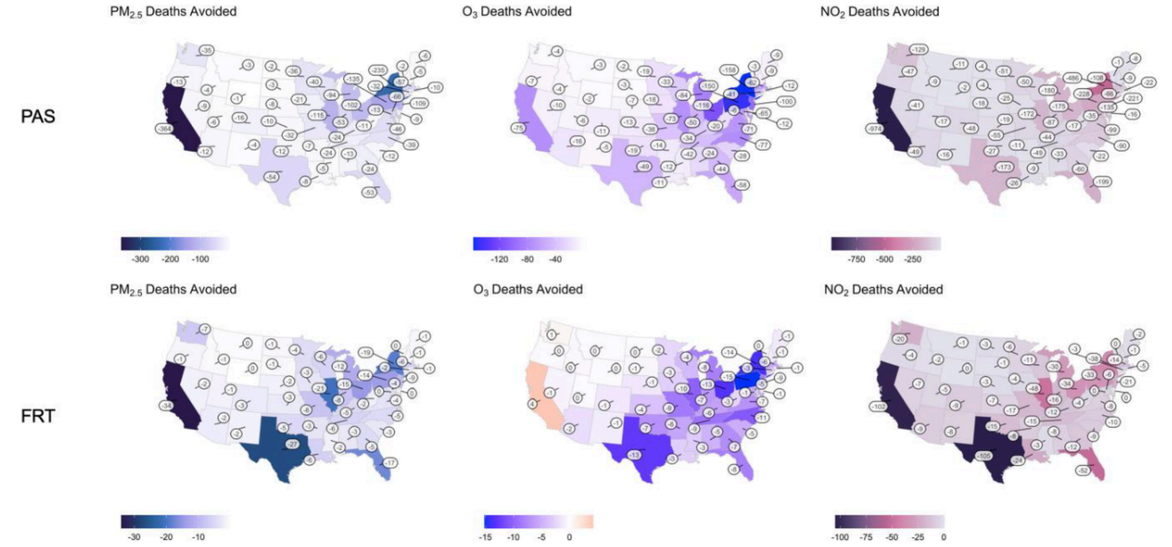

Fig. 4. Premature mortalities were avoided due to VMT reductions from COVID-19.

Arter, Calvin A., Jonathan J. Buonocore, Vlad Isakov, Gavendra Pandey, and Saravanan Arunachalam. 2024. "Air Pollution Benefits from Reduced On-Road Activity Due to COVID-19 in the United States." PNAS Nexus 3 (1): gae017. https://doi.org/10.1093/pnasnexus/pgae017.

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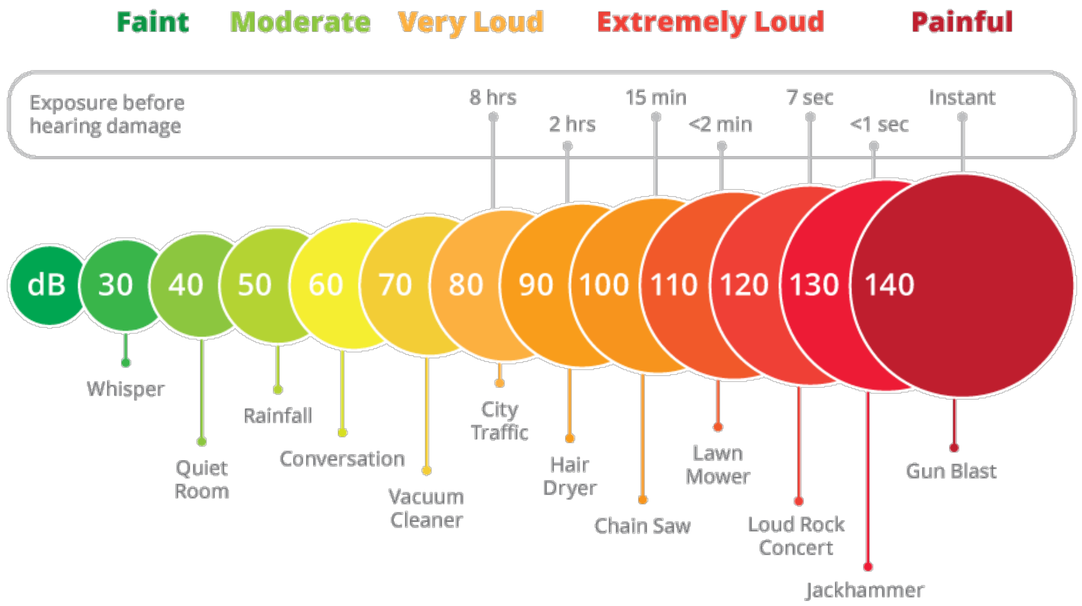

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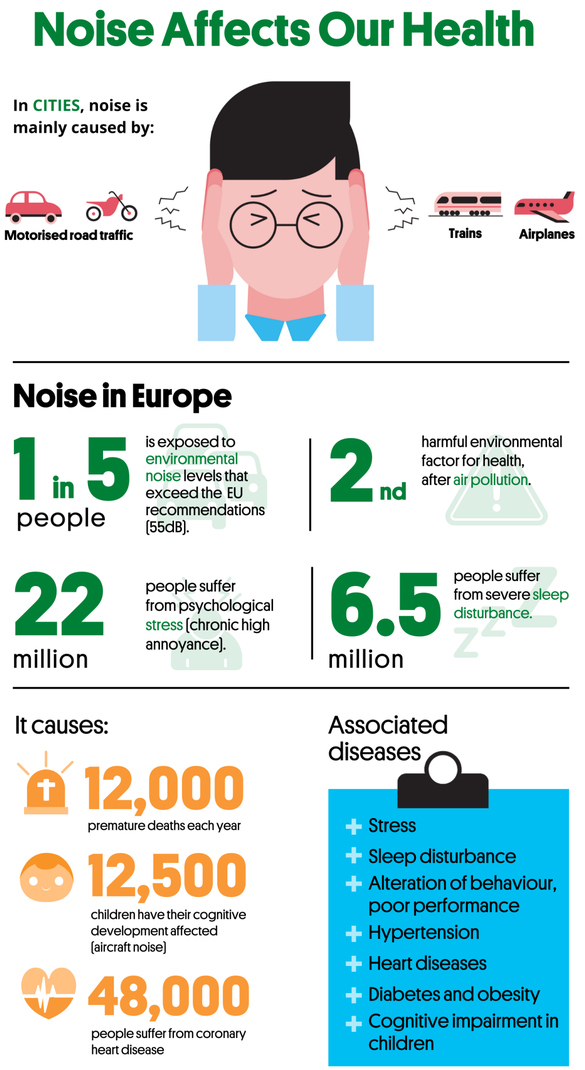


https://www.isglobal.org/en/healthisglobal/-/custom-blog-portlet/ruido-ciudades-como-atajarlo

Why do we need better statistics?

- **Multimodal Level of Service (MMLOS)**

Introduced in 2010 to account for the various ways people use our streets. MMLOS accounts for transit, walking, biking, and driving as modes. Each mode is evaluated independently (quality of infrastructure, accessibility, etc.) and evaluated for potential conflicts. However, by far **not a comprehensive metric**

- **Statistics collected by SDOT**

  - User experience. Collected biannually and is used to track public perception of SDOT's ability to deliver a better transportation experience.

  - Bicycle-facility miles delivered, spot improvements, bike parking, crashes and fatalities

  - Transit- % of households within a 10-minute walk of transit, change in ridership, spot improvements, urban village service

  - Pedestrian- Injuries/fatalities, number of pedestrian involved accidents per 100k residents, spot improvements delivered, % of children walking or biking to school

Why do we need better statistics?

- **Multiple agencies involved in multi-modal design:** SDOT has the biggest role in the design of Seattle's streets; other organizations include WSDOT, Sound Transit/King County Metro, and other City Council Boards.

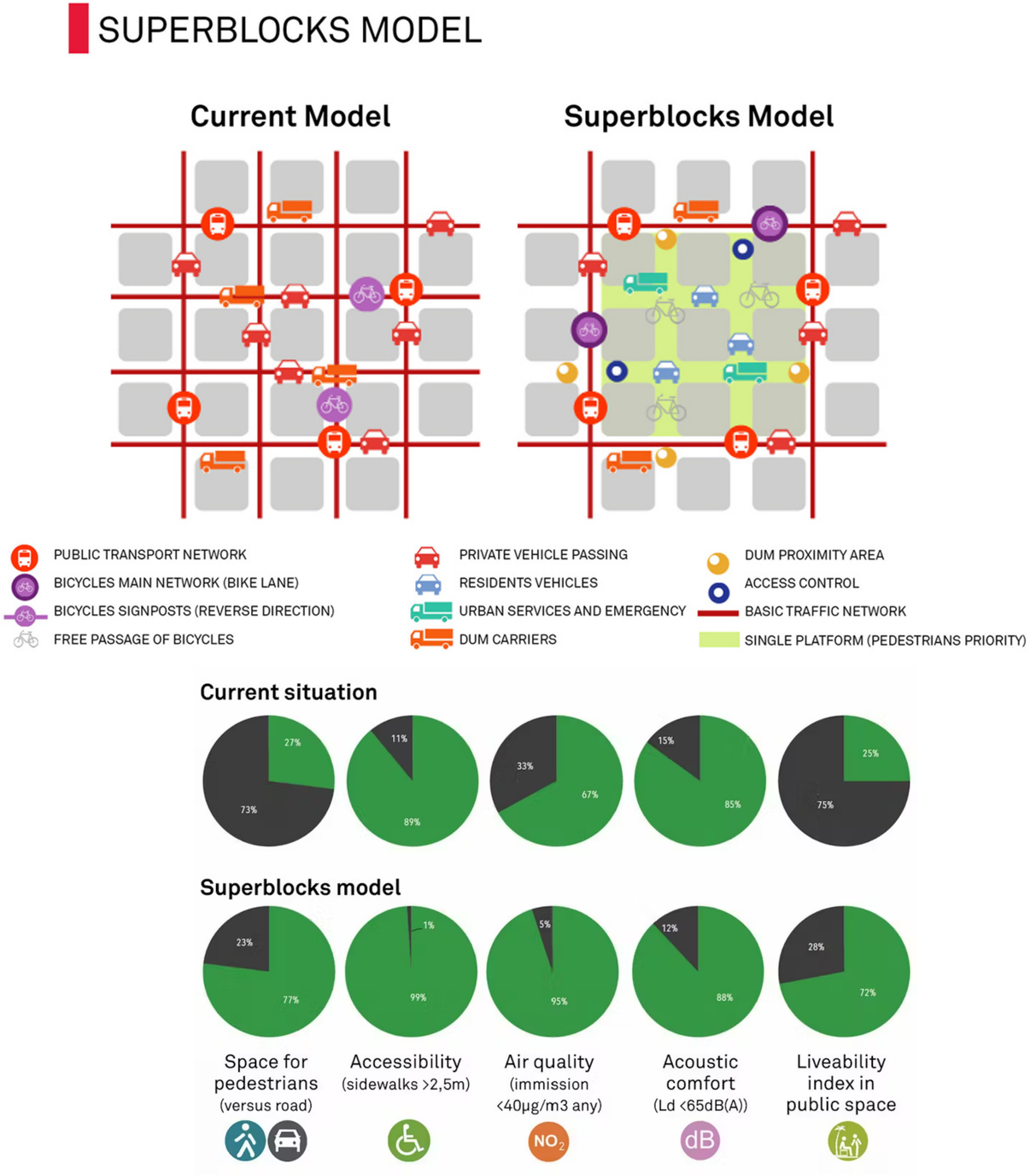
- Difficult to develop one metrics that would serve every agency

- SDOT street design is determined by the Seattle Transportation Plan (STP), the subject of the joint modal board meeting. There are 9 different elements that SDOT is designing around, ranging from curb space to bicycle infrastructure.

Multimodal approach in action

- A reduction in air pollution in the Superblock around Barcelona's central Sant Antoni market included a 25% decrease in NO2 levels and a 17% decrease in PM10 particle levels
- More than 60% of people surveyed in the Horta neighborhood Superblock were more comfortable walking in the interior, narrower streets, and thought that accessibility for strollers and people with reduced mobility had improved.
- The reduced noise pollution within the Poblenou Superblock led to an improvement in mental wellbeing for survey respondents.
- If implemented more widely across the city, it is estimated that the health benefits of the Barcelona Superblocks could prevent almost 700 deaths each year.

https://www.who.int/news-room/feature-stories/detail/barcelona-using-urban-design-to-improve-urban-health



Conclusions and Challenges

- A multimodal approach is the best hope we have to create and preserve a livable city!
- Two major challenges to implementing a multimodal system in Seattle.
  - Comprehensive metrics are needed to promote multimodal design
  - Challenging historical *status quo:* cars always had priority in competition for limited urban space. As soon as the public realizes that reducing car usage is in everyone's best interest, the demand for multi-modal systems will skyrocket. We need to be ready.

Suggested action items for SBAB

- Convenience is going to be a deciding factor in convincing people to get out of their cars. **We propose adding evaluating convenience to SBAB tasks during infrastructure project presentations + think of new metrics on how to evaluate convenience**.

- Infrastructure that promotes easy multimodal connections will induce demand. In order to improve cycling in Seattle. **We suggest that SBAB should advocate for projects that are not only directed to bicycling itself but also reduce car use and add public transit and pedestrian infrastructure.**