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On-road Emissions of Motor Vehicles in Brazil: Current Status and Future Possibilities {presentation}

Donald H. Stedman

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On-Road Emissions of Motor Vehicles in Brazil: Current Status and Future Possibilities

www.feat.biochem.du.edu

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Department of Chemistry and Biochemistry

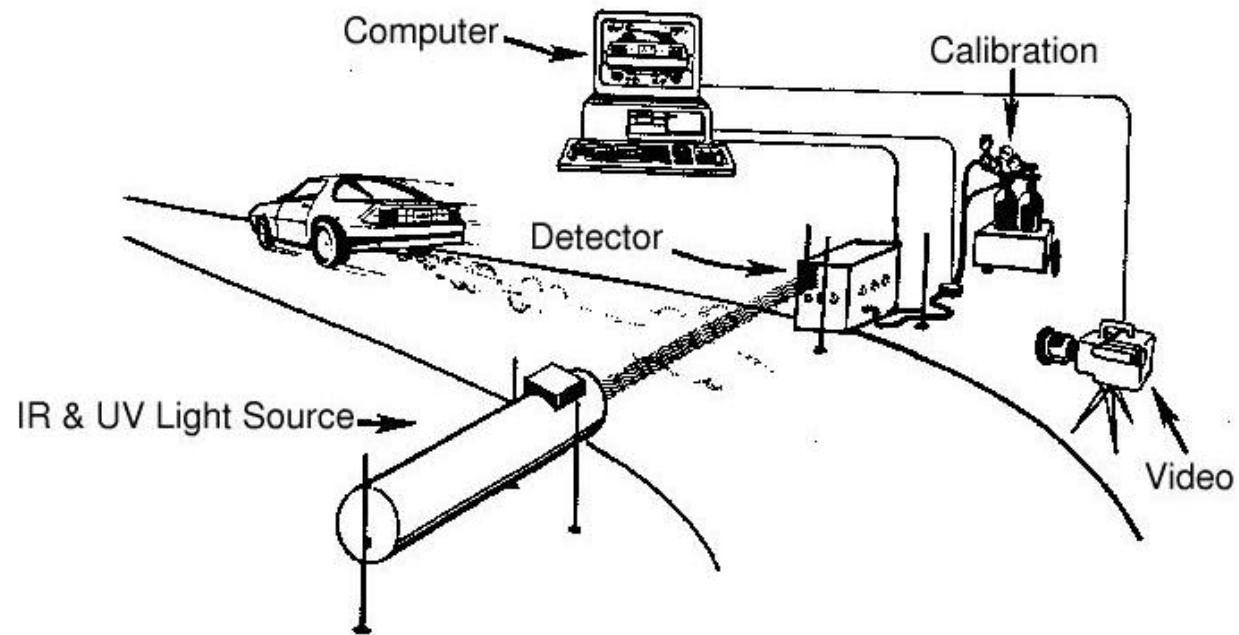
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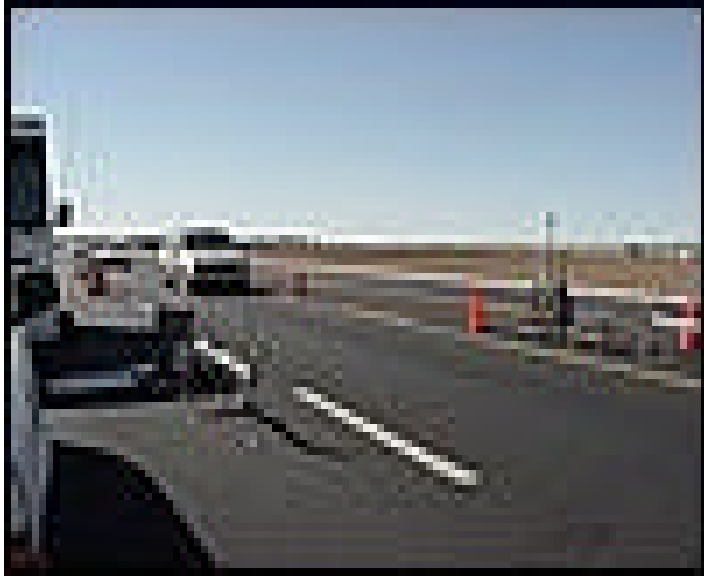
2101 E. Wesley Ave.

Denver, CO 80208



CO, HC and NO Remote Sensing





On-road system

Motorcycle system





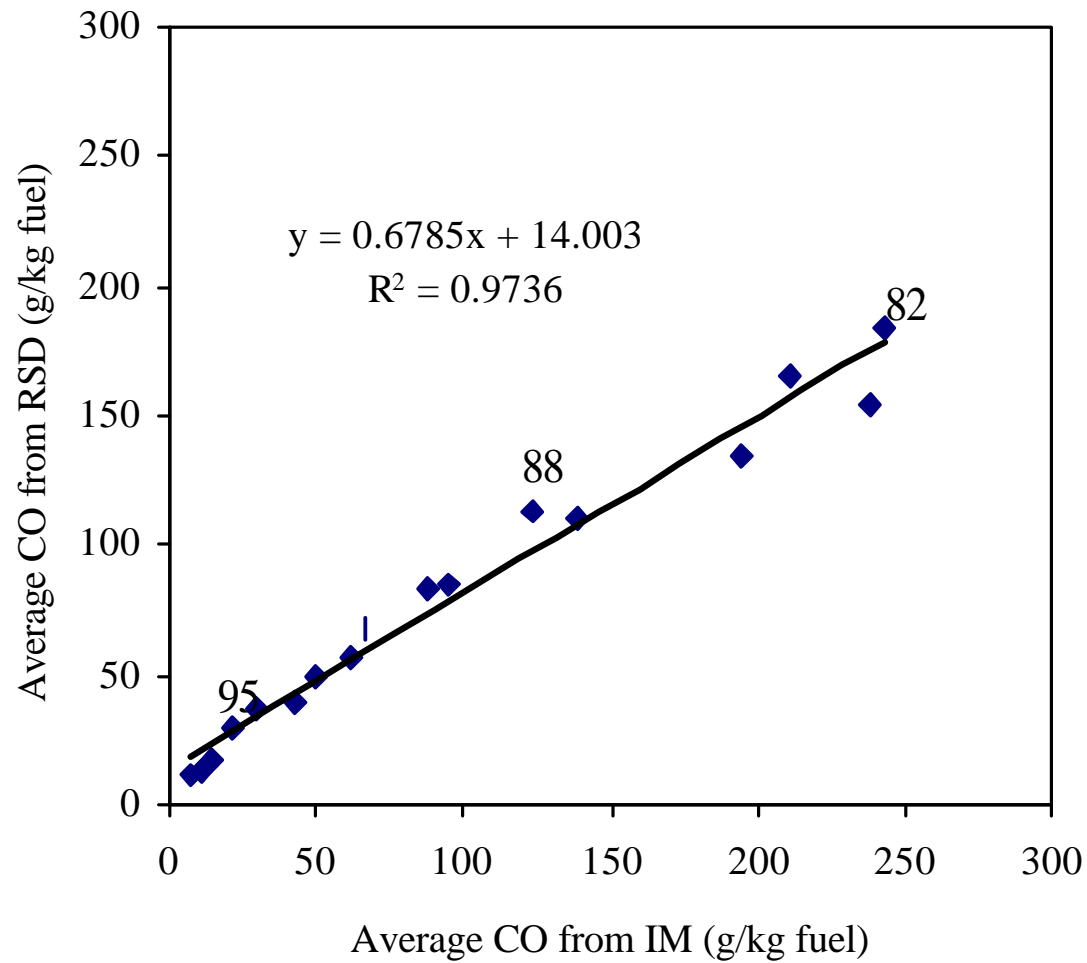
RSD measures Ratios:

Pollutant/CO₂ from which can be determined emissions in gm/kg gm/L and % (ppm) corrected for excess air not used in combustion (and for water).

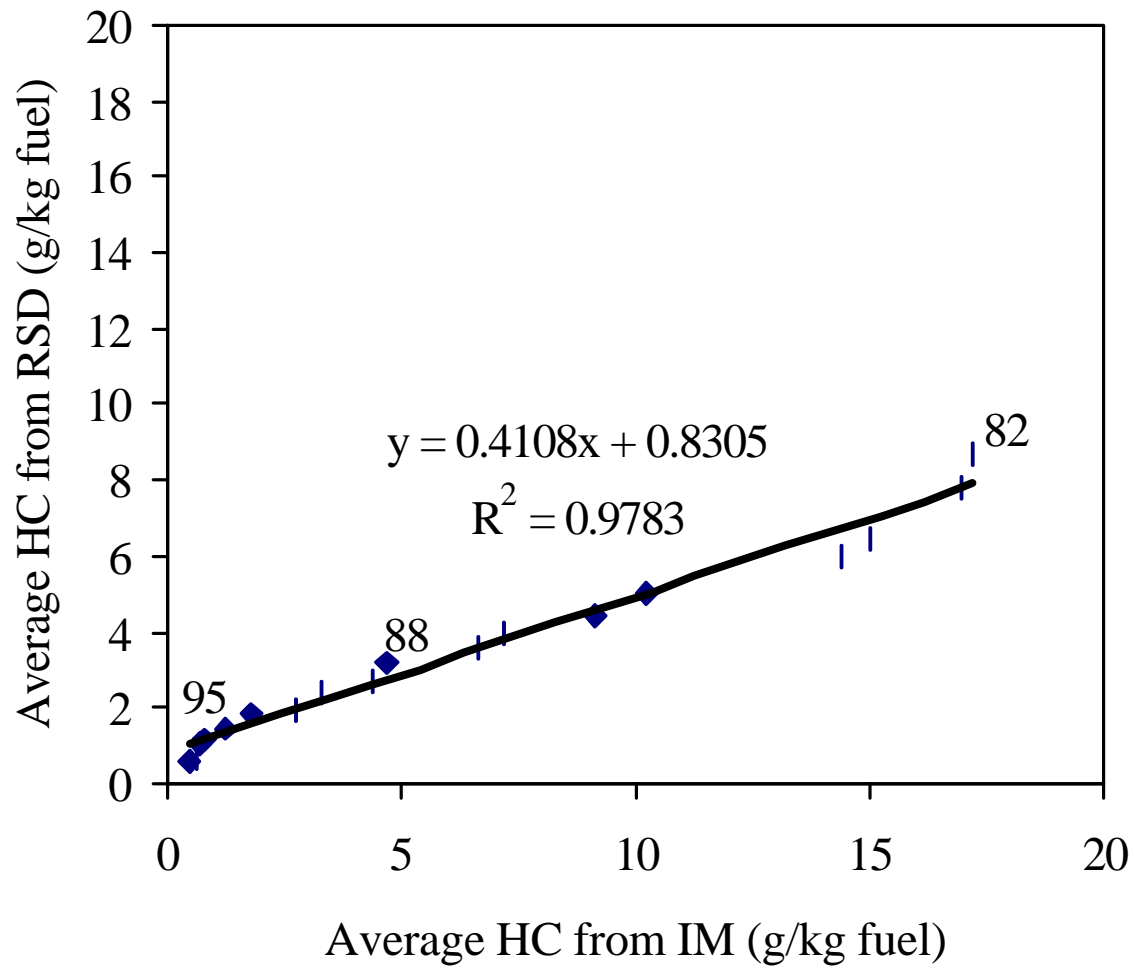
Remote Sensing versus IM240 Correlation in grams/kg

- Data averaged by model year correlate very well
- Cost of RSD data: \$25,000
- Cost of IM240 data: \$25,000,000

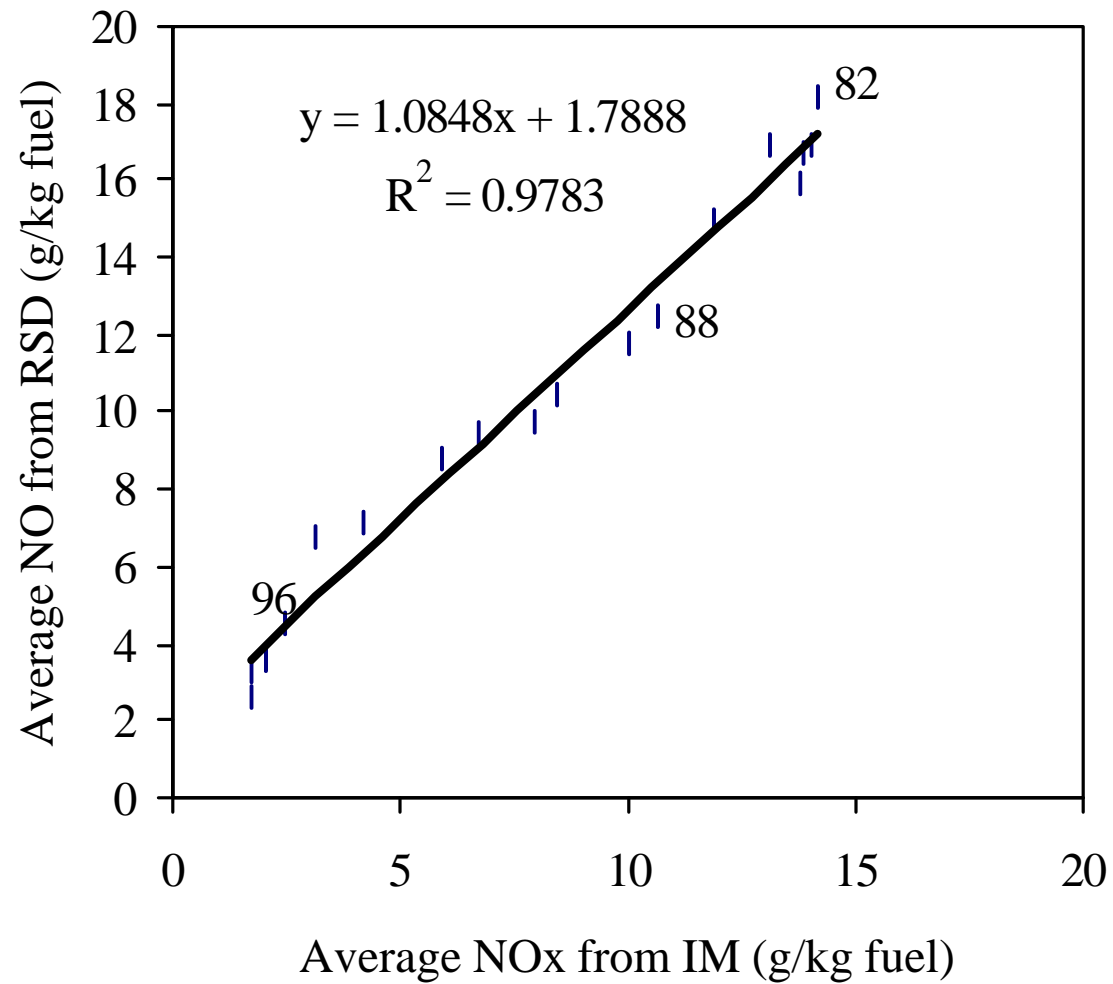
Denver 1999 CO

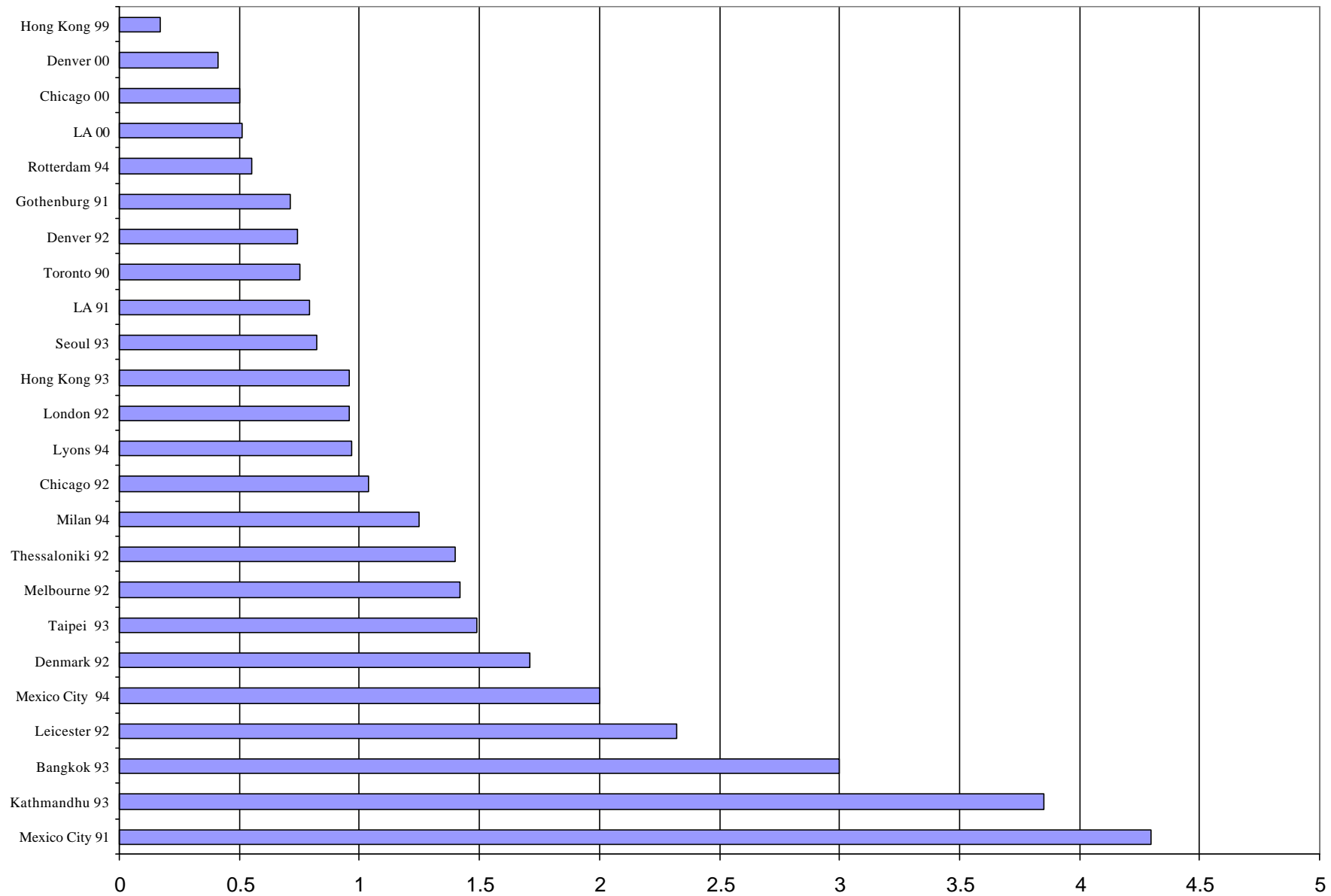


Denver 1999 HC

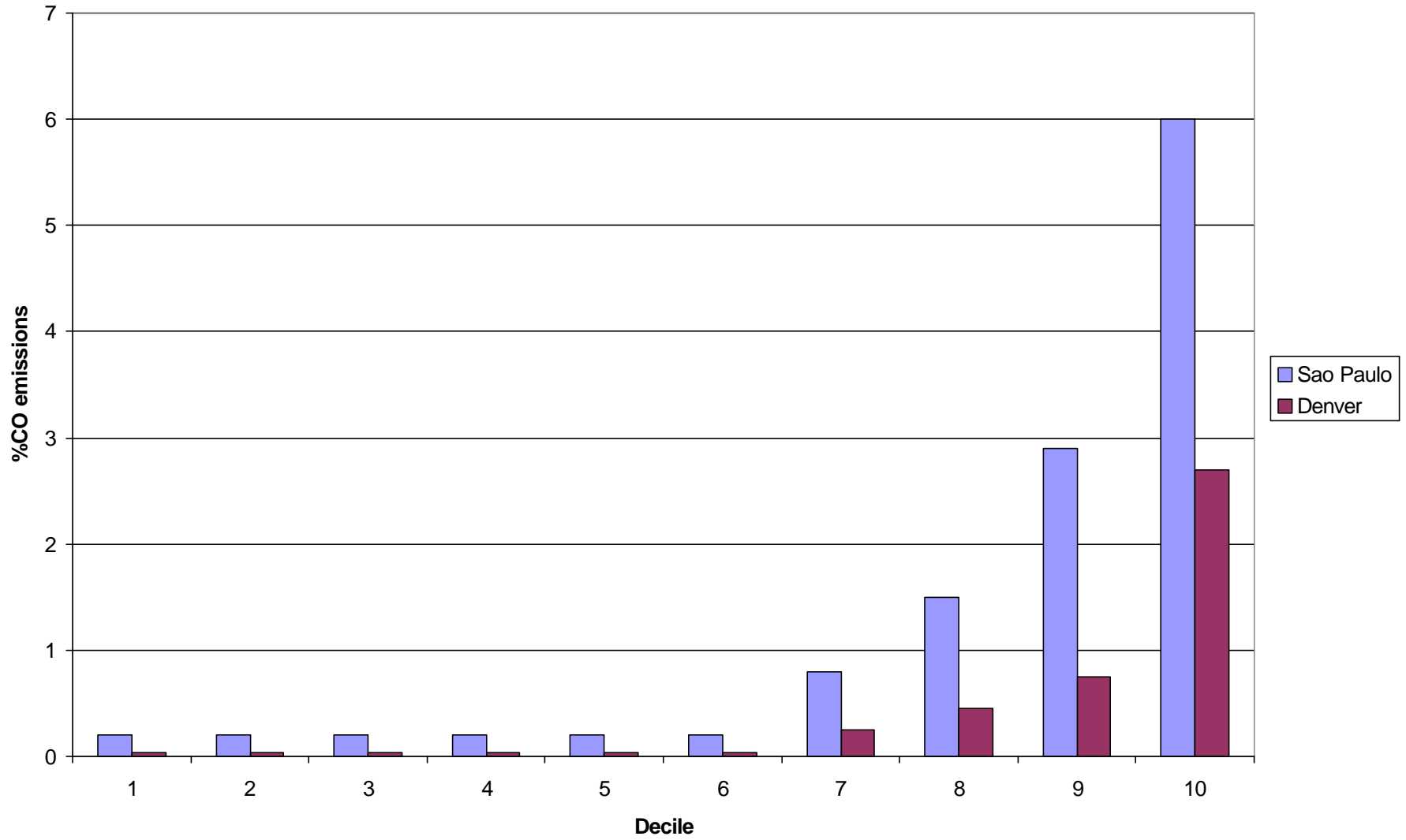


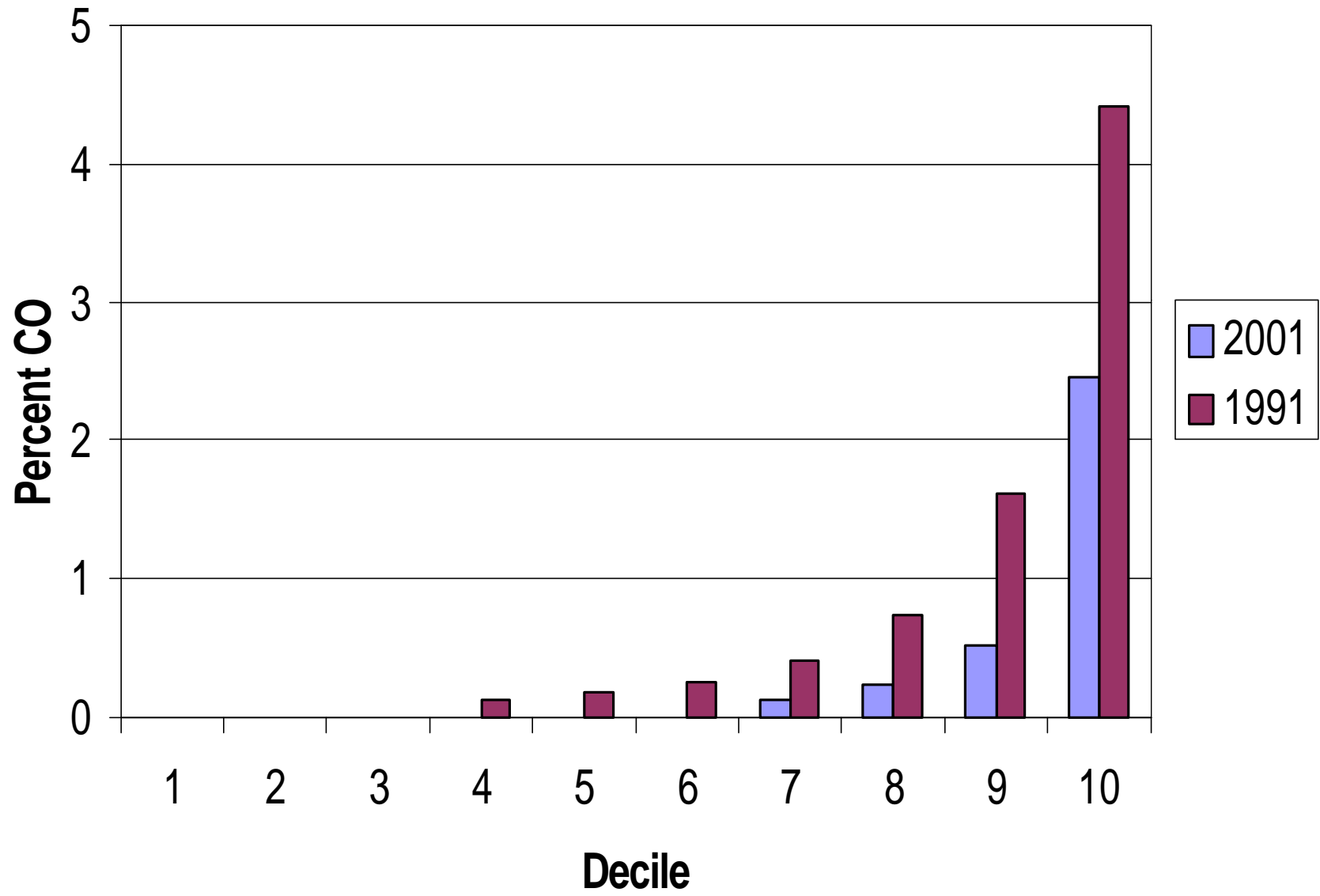
Denver 1999 NO

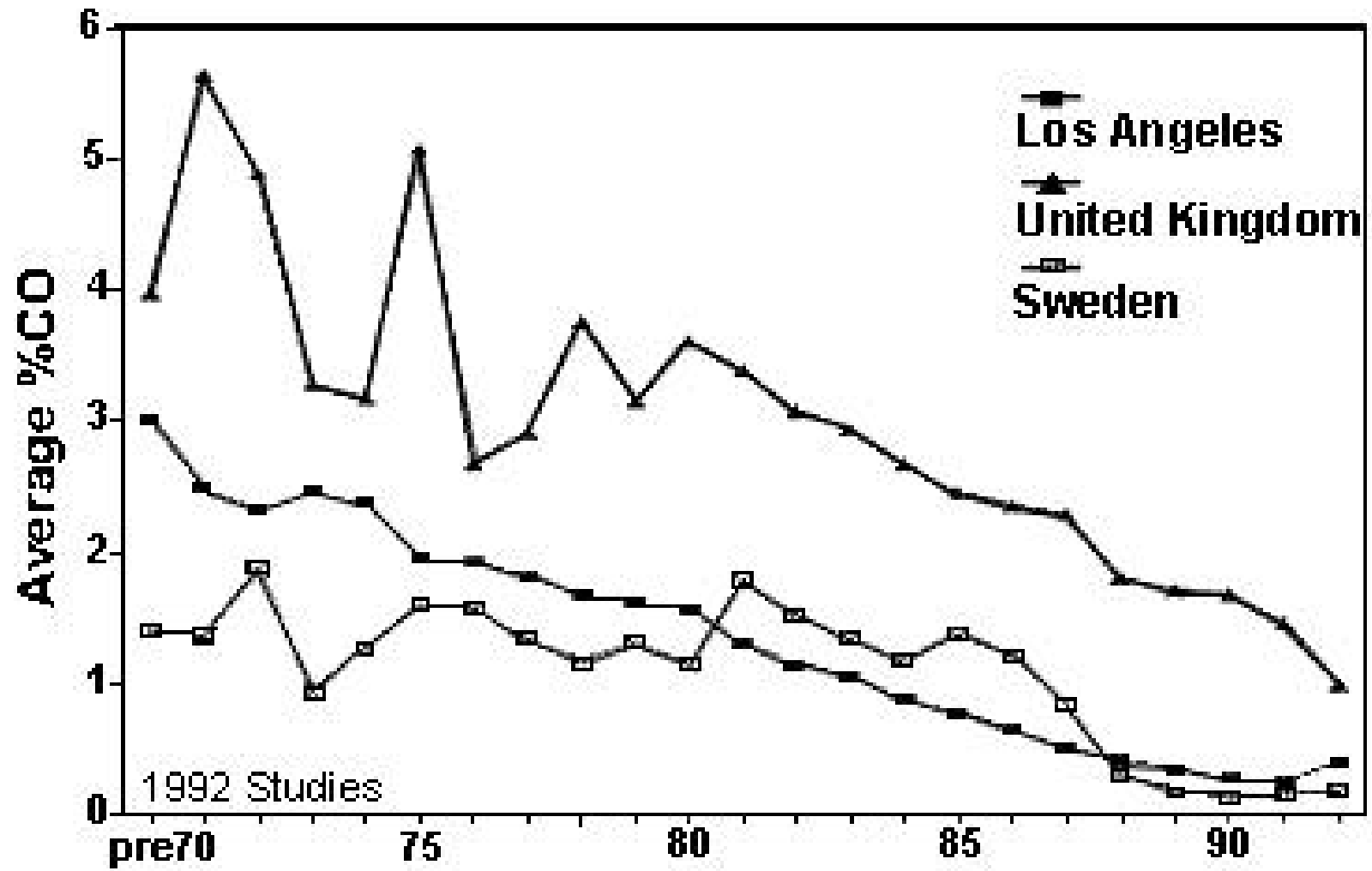




Year 2000 Emissions

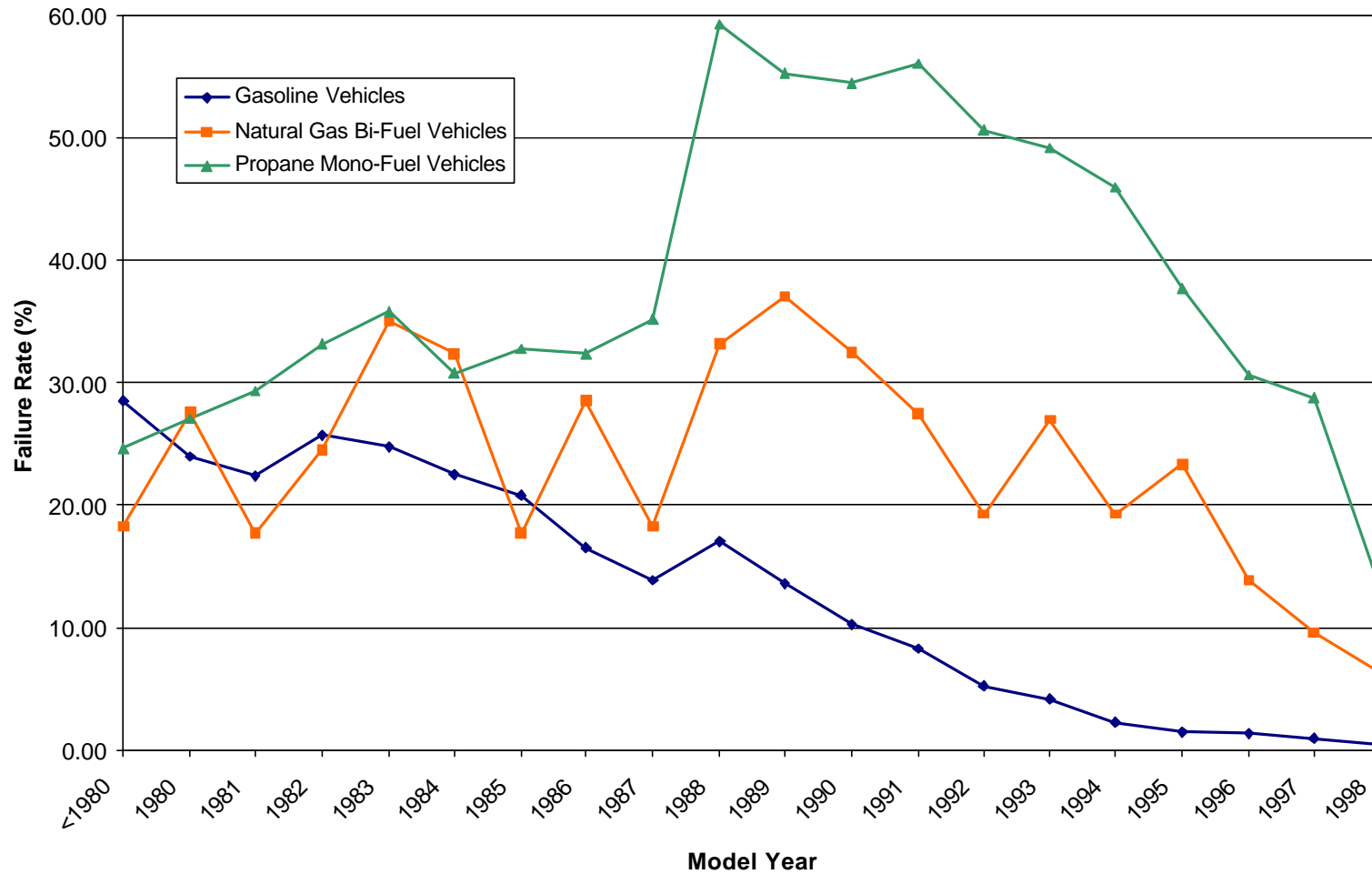






AirCare 1 Alternative fuel failure rates comparison (inspections in 2000)

Failure Rates of Different Fuel Types Vehicles by Model Years



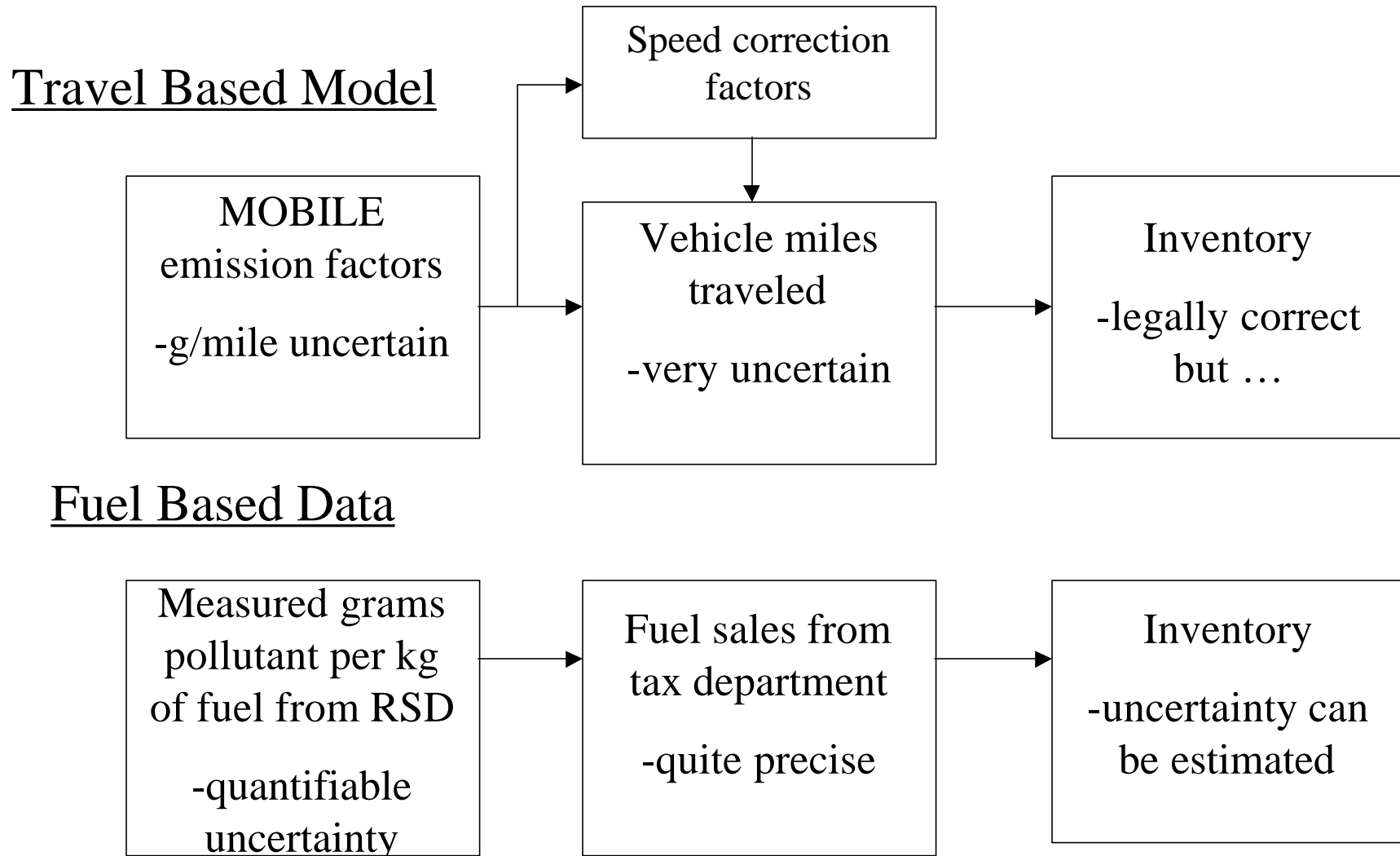
**A few broken vehicles cause
most of the emissions.**

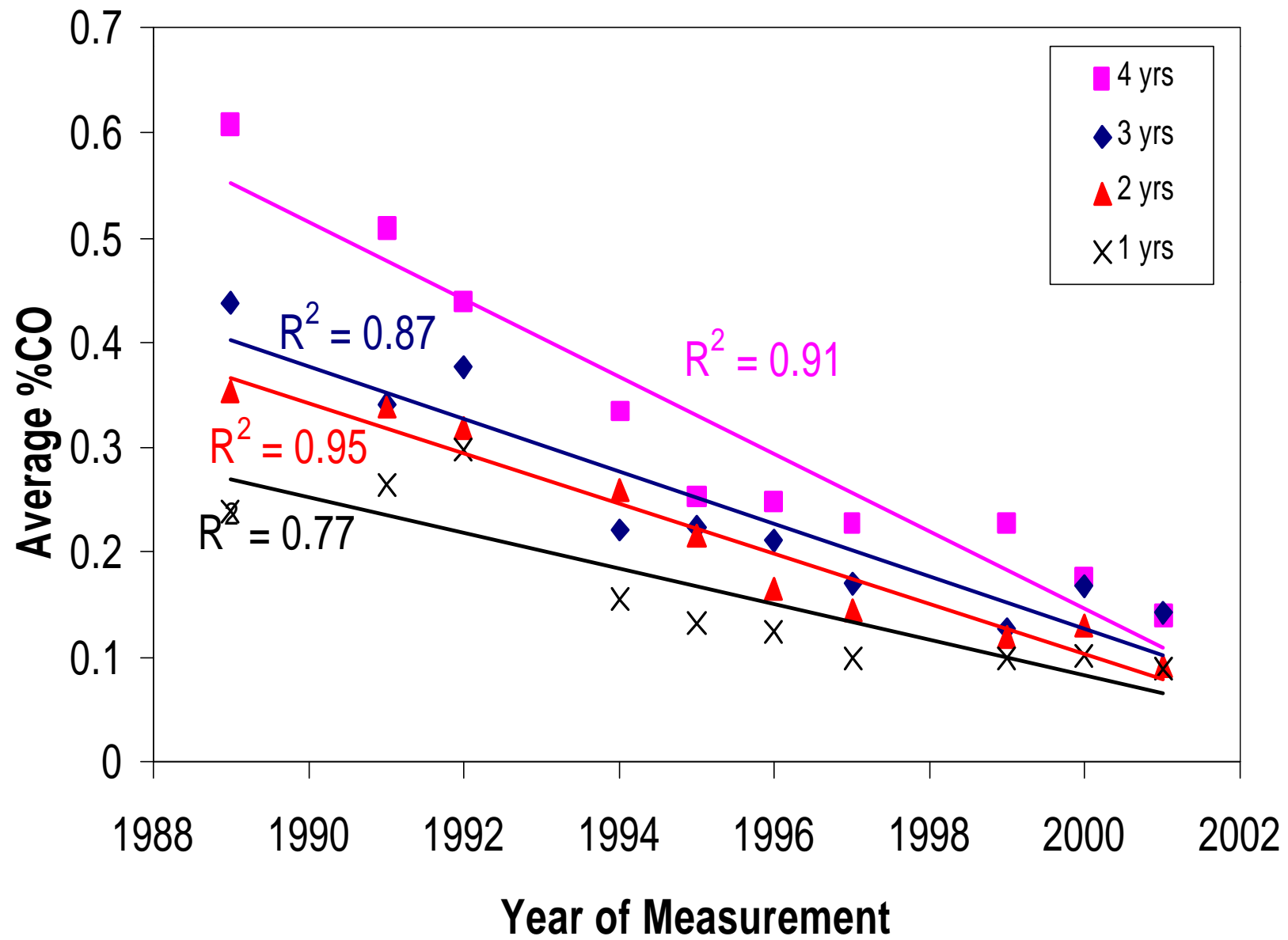
Catalysts and maintenance are
both important.

Propane and CNG are NOT
“cleaner burning”.

RSD is a very good tool for
emissions inventory.

Mobile Source Emissions Inventory Methods





- From 1990- 2001, newer cars in USA are lower emitting and stay that way longer because of new car standards
- This observation could be repeated in Brazil
- If emission testing is needed RSD is the most cost effective test.

Potential Applications

- Clean Screen (Missouri)
- Dirty Screen (Texas)
- SMART SIGN
- CARS, TRUCKS, LOCOMOTIVES,
MOTORCYCLES AIRPLANES,
SNOWMOBILES
- Measures CO, HC, NO, Smoke



Implications

- RSD method ideal for realistic on-road mobile source emissions inventories
- RSD is criticized for variable readings from vehicles measured repeatedly, but all emission tests demonstrate this feature.
- RSD can identify on-road high emitters very cheaply. The political will must exist to repair or scrap them. See i2i.org and click to emission testing.