



Mercator Research Institute on
Global Commons and Climate Change gGmbH

Urbanization, Cycling Mobility and Health: Empirical Evidence from India

Sohail Ahmad

Alexander von Humboldt Research Fellow

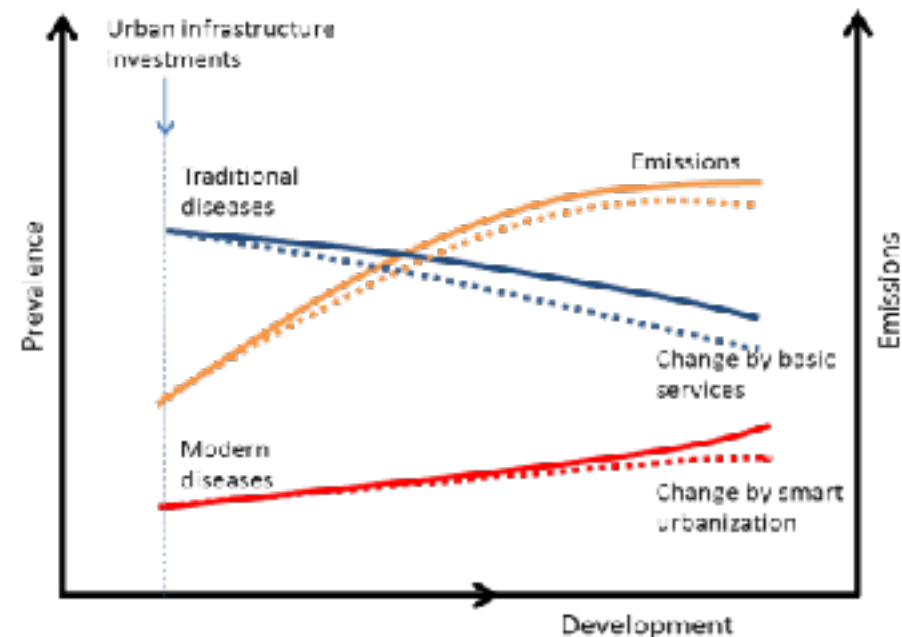
Presentation

- Motivation
- Objectives of the study
- Short term and major morbidity by socioeconomic characteristics
- Current trends of transportation in India
- Obesity versus socioeconomic activities
- Discussion

Motivation (I)

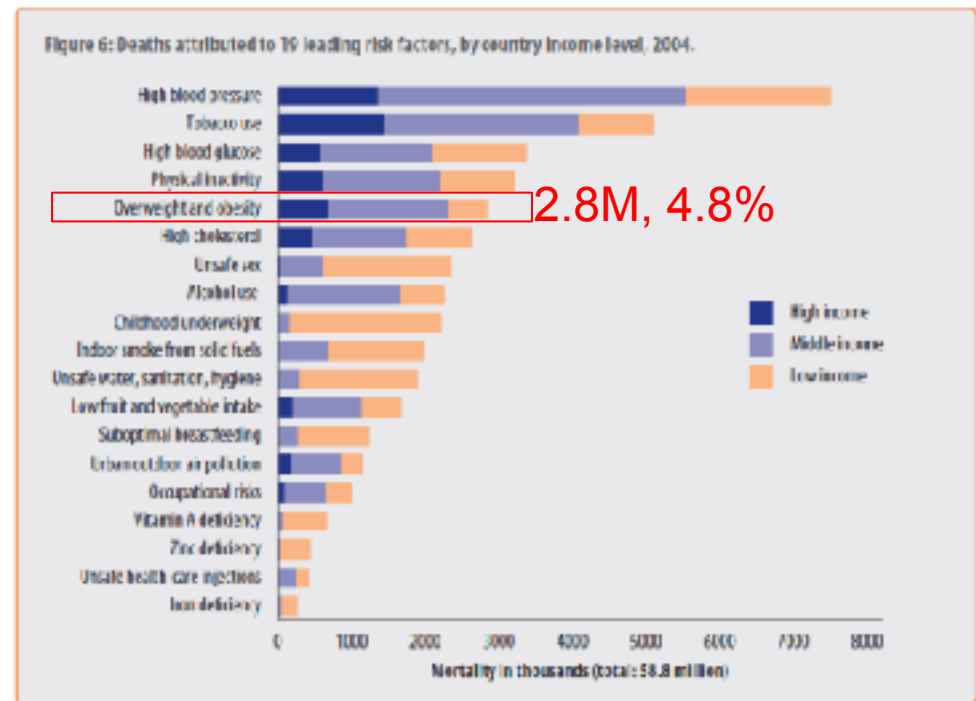
Triple transitions: demographic, energy, and public health

- 410M (2015) + 400M (2050) population
- Low pc emissions (1.6 t), overall global share is 6%, but increasing.
- Development reduces short term morbidity, but increasing major morbidity (via associated risks).



Motivation (II)

- “Double burden” of disease: infectious disease/under nutrition ~ high risks NCDs
- Emerging as one of the most significant contributors of ill health
- Key risk factor for chronic and noncommunicable diseases (WHO, 1999)



Source: WHO, 2009

Notes: Out of 44% of global deaths and 34% of DALYs

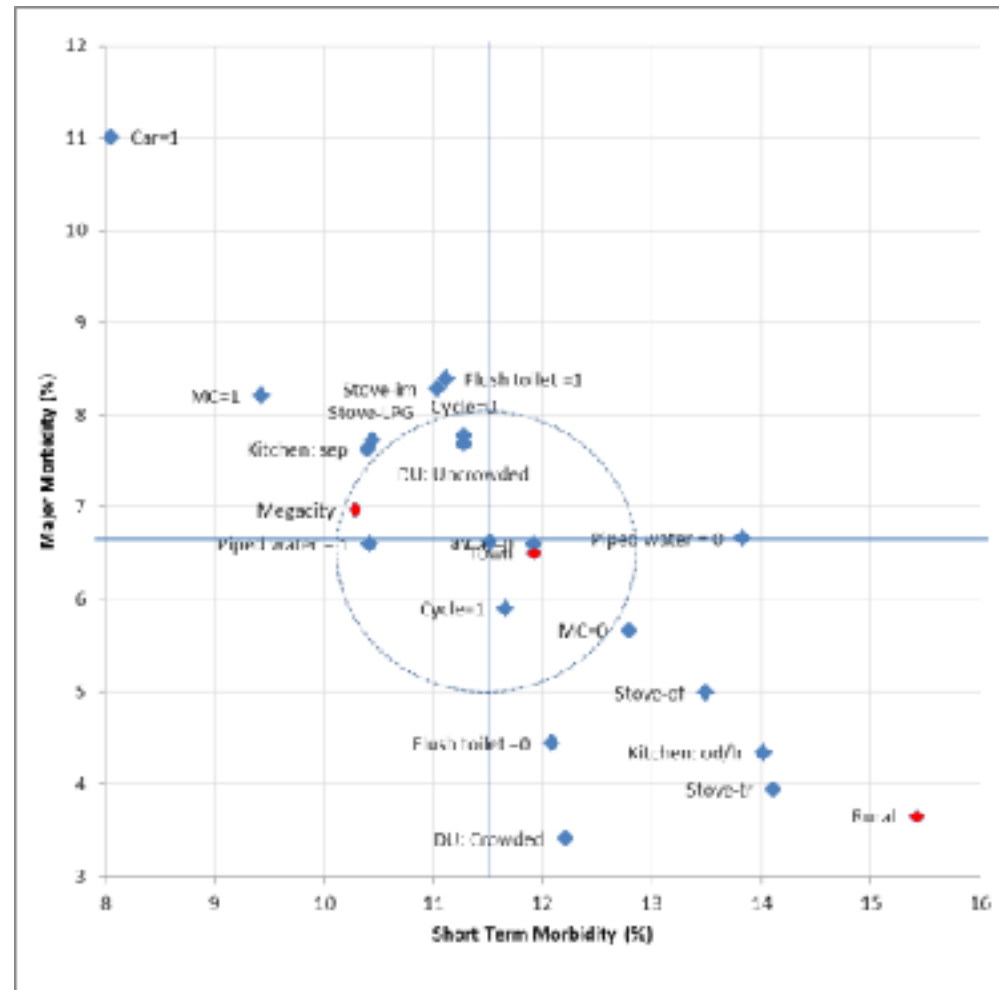
Objectives

- to assess the prevalence of short term morbidity and major morbidity, including overweight or obese population
- to describe determinants for morbidity
- “whether and to what extent residential location and transportation mode choice influence the prevalence of morbidity or overweight/obese population”

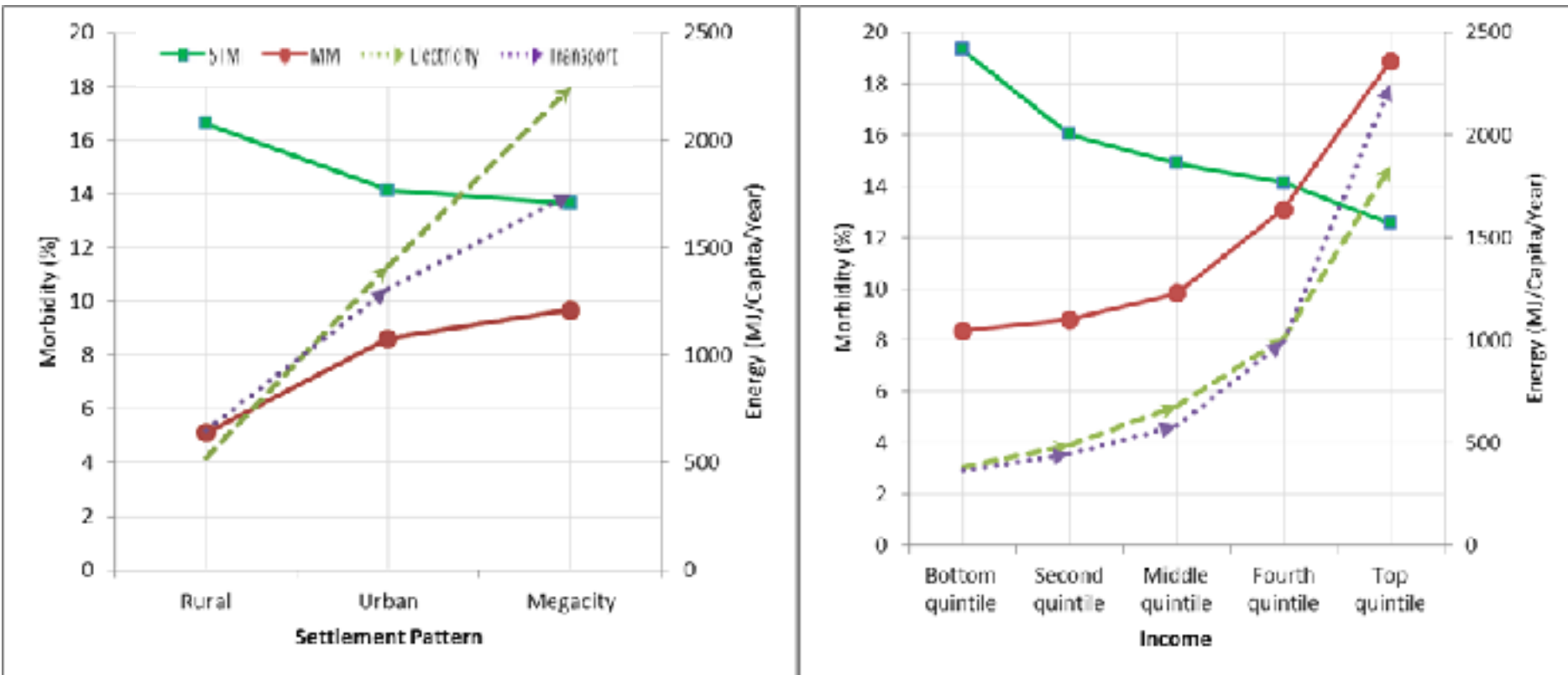
Prevalence of morbidity by socioeconomic characteristics

Lower socioeconomic status → STM

Higher socioeconomic status → MM

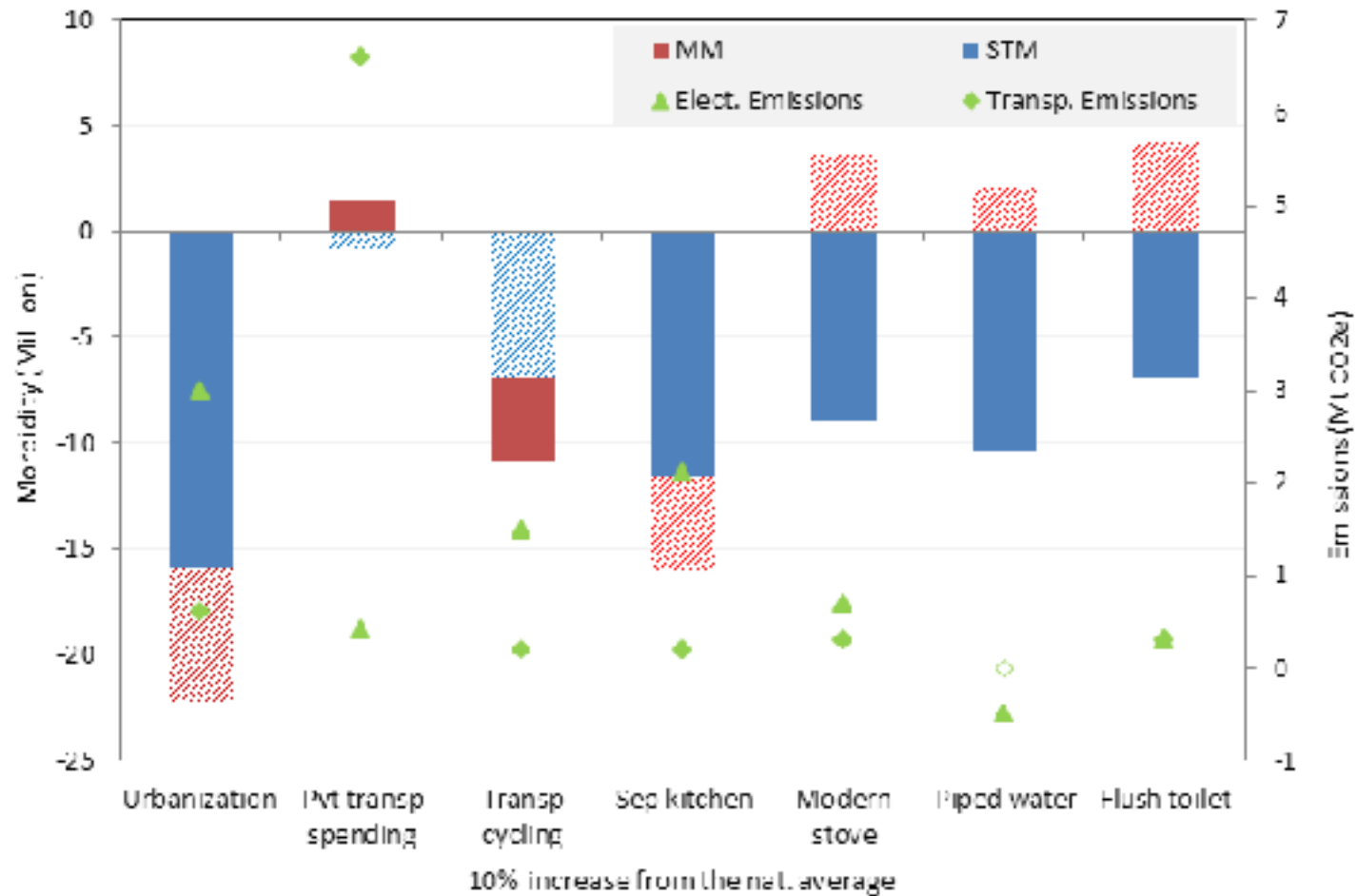


Morbidity Incidence and Energy & Transport Spending Patterns



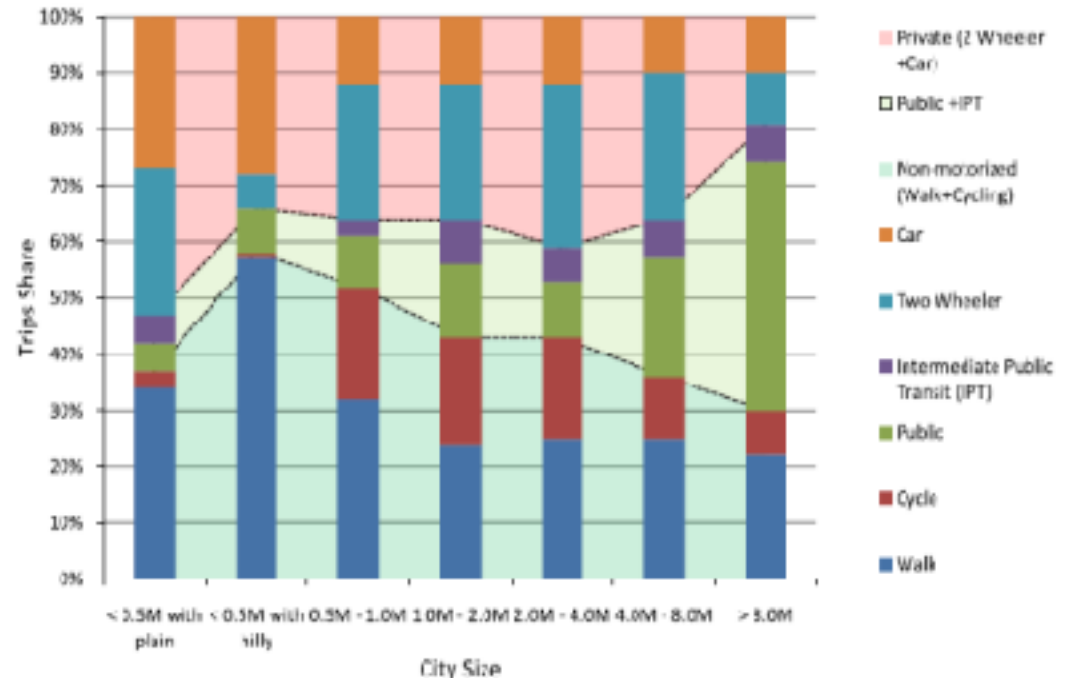
STM, energy (electricity & transport) spending reduce and MM increase with urbanization and income

Influence of urbanization and household infrastructure on STM, MM, and energy



Transport modes by city size

- Secondary cities dominated by private transport
- Large cities by public transport
- NMT (cycling and walking) decreases with city size.

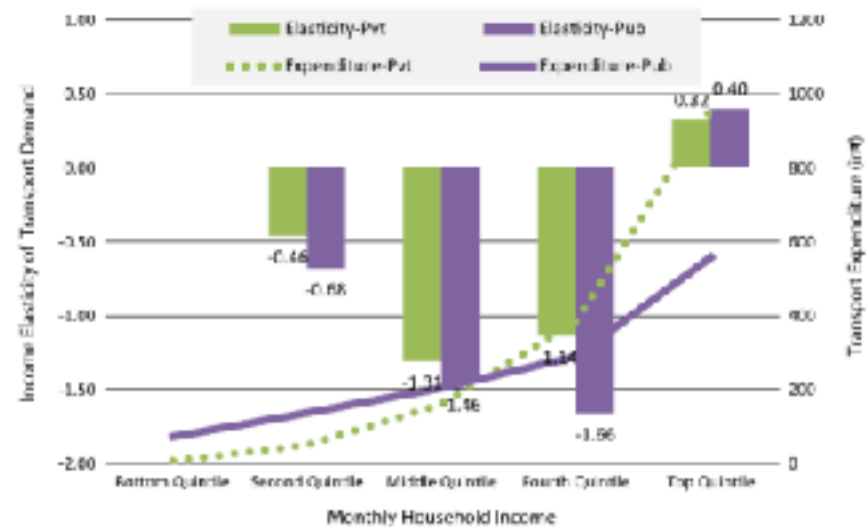


Mode share(number of trips) by city size, 2007, MoUD (2008)

Source: Ahmad, S., & de Oliveira, J. A. P. (2016). Determinants of urban mobility in India: Lessons for promoting sustainable and inclusive urban transportation in developing countries. *Transport Policy*, 50, 106-114.

Transport expenditure by income groups

- Transport expenditure increases with income
- Income elasticity for transport demand is negative up to 4th quintiles, and positive in 5th quintile



Transport expenditure and income elasticity of demand by income quintiles, 2009–10

Source: Ahmad, S., & de Oliveira, J. A. P. (2016). Determinants of urban mobility in India: Lessons for promoting sustainable and inclusive urban transportation in developing countries. *Transport Policy*, 50, 106-114.

Data sources and health measures

Data Sources: IHDSI and IHDS-II

(about 40,000 households and 200,000 individuals survey representing India)

Health measures:

We adopted WHO criteria, where

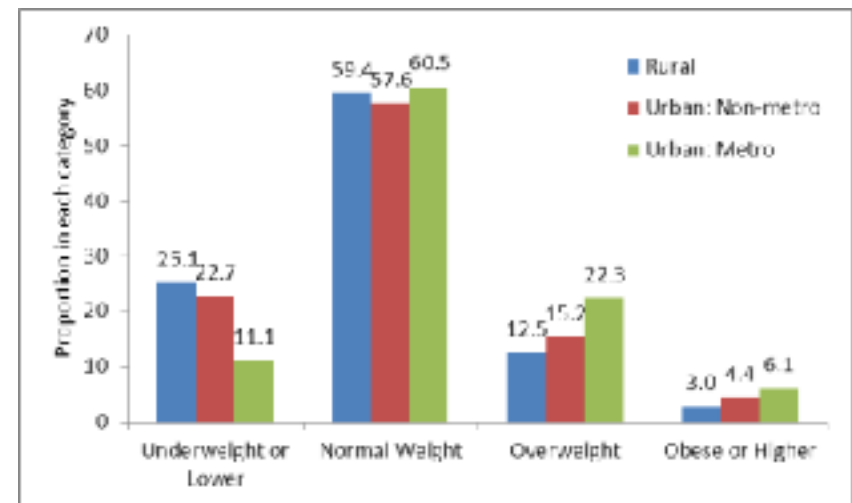
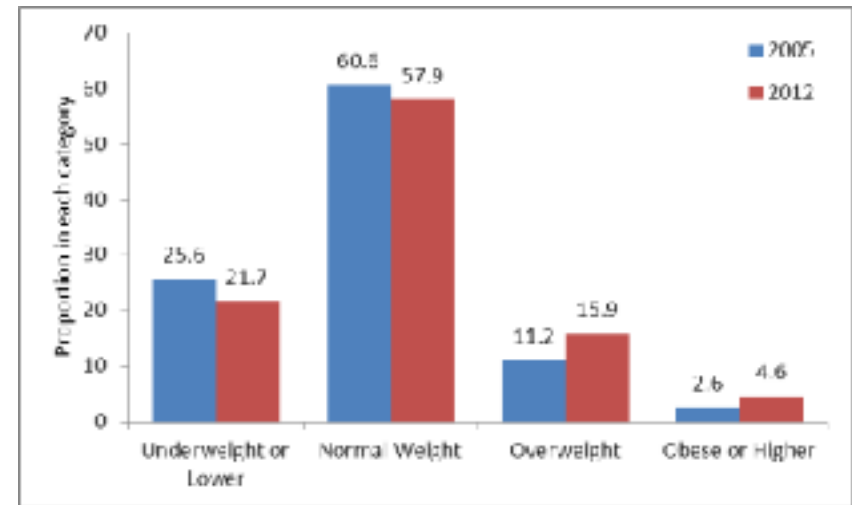
underweight: $BMI < 18.5 \text{ kg/m}^2$,

normal weight: $18.5 \leq BMI < 25 \text{ kg/m}^2$, overweight: $25 \leq BMI < 30 \text{ kg/m}^2$,
and

obese: $BMI \geq 30 \text{ kg/m}^2$.

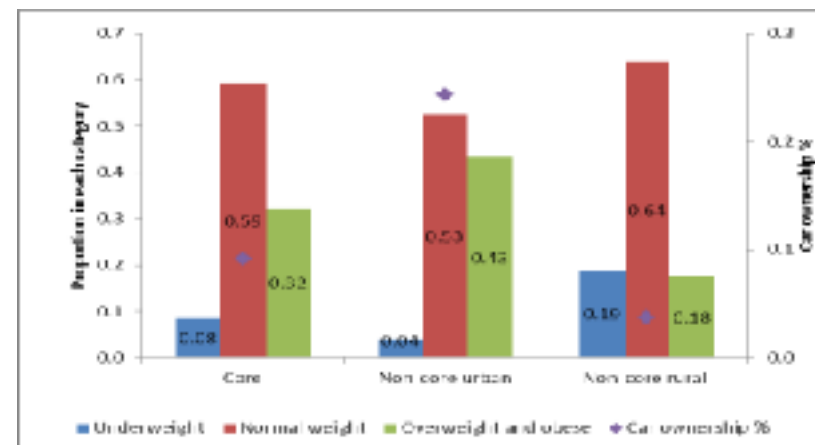
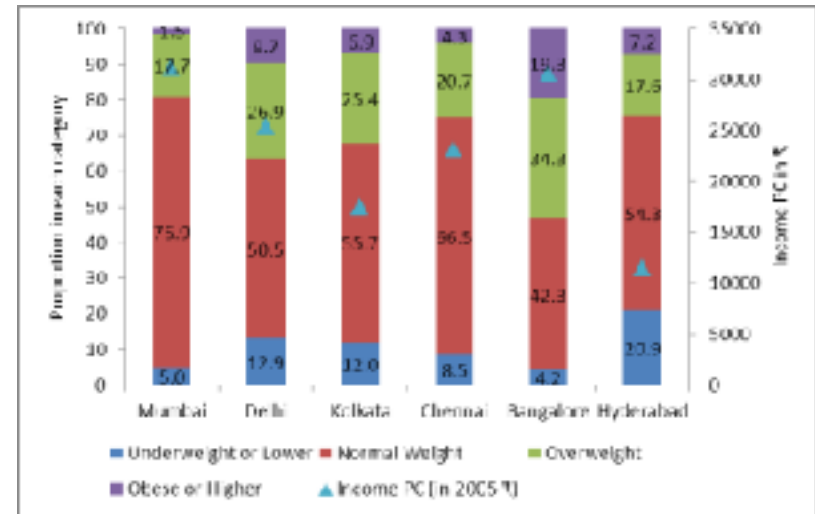
Overweight or obesity: temporal and spatial context

- Overtime, obesity has increased!
- Significant variations by settlements rural versus urban



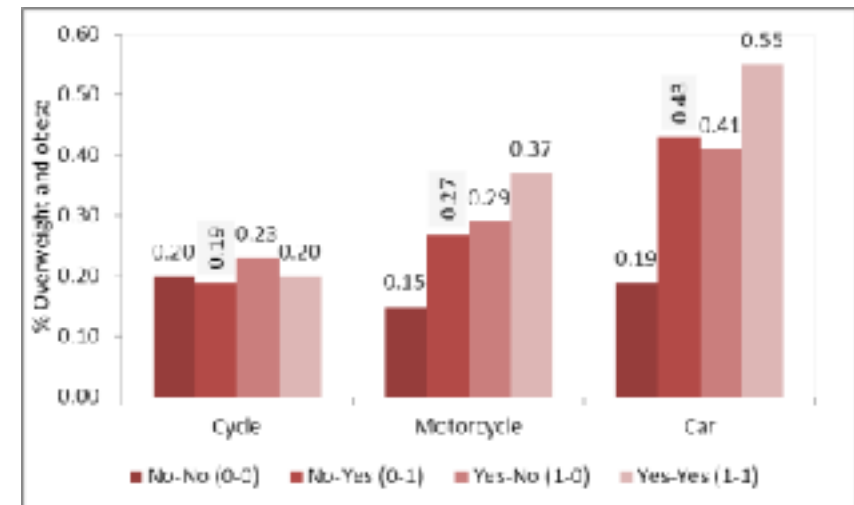
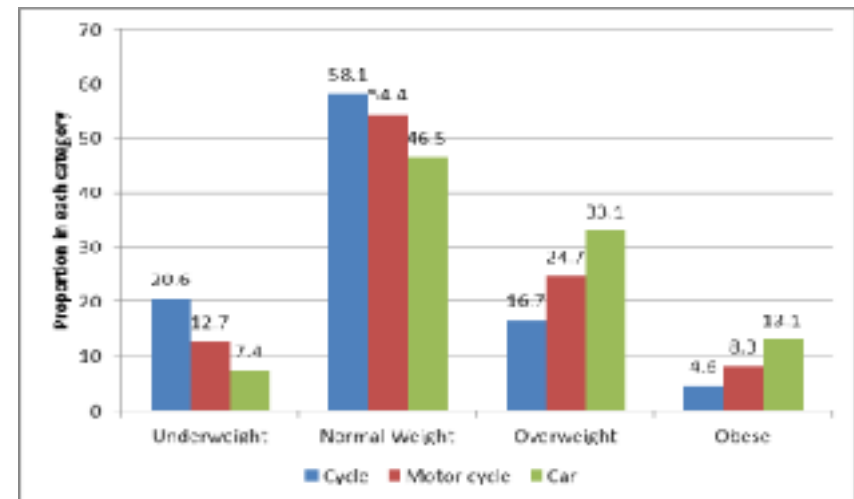
Overweight or obesity: metro cities and its regions

- Large variation by city, Mumbai lowest, Bangalore highest.
- Highest share of overweight or obese in peripheral urban region of metro cities.

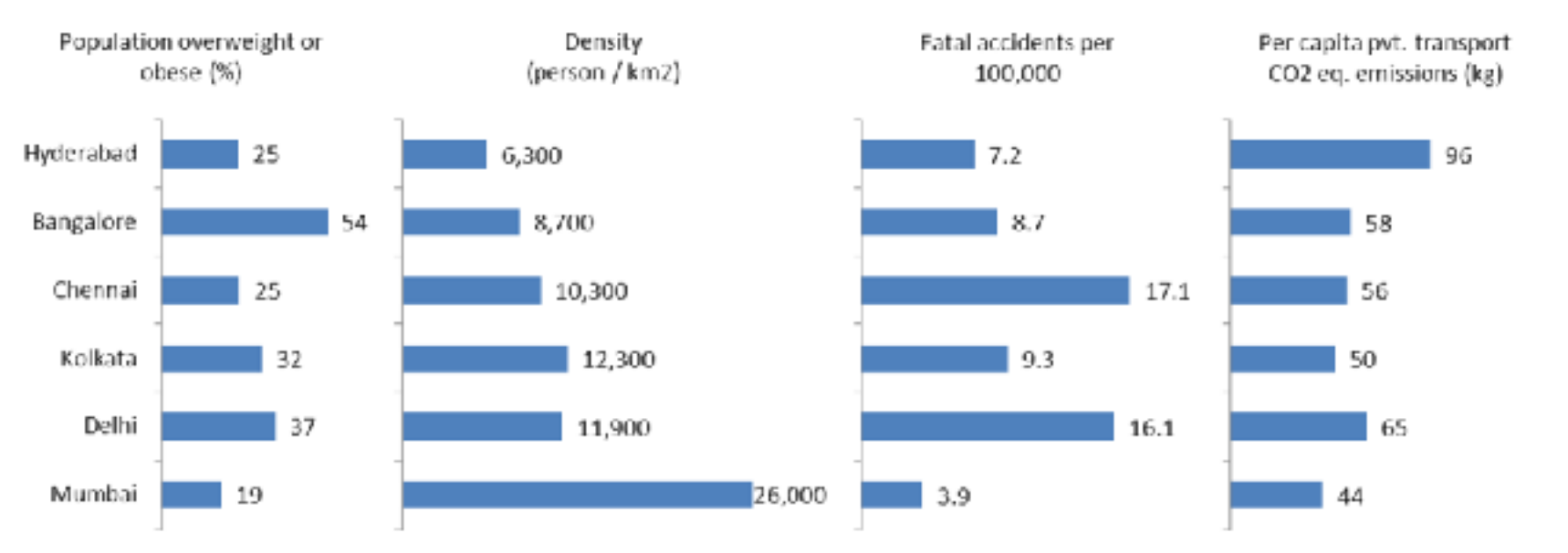


Overweight or obesity: vehicular ownership

- Share of overweight or obese population is highest among car users and lowest among cycle users
- After owning private vehicles, significant increase in shares of overweight or obese population



Obesity relationships with other variables



Mumbai has lowest overweight or obese population, highest density, lowest fatal accidents, and also lowest private transport based emissions

Discussion

- Household infrastructures reduce STM.
- In transportation sector, either lesser expenditure on private transport or the use of non-motorized transport, provide only opportunity to reduce MM as well as reduce overweight or obese population.
- The hotspots of overweight or obese population is urban areas, particularly metro cities and its regions
- Beyond traditional public health measures, urban planning measures can contribute in reducing overweight or obesity
 - Reorganizing urban space to denser and restricting further sprawl
 - Promotion of non-motorized transport (walking/cycling)
 - Inverse, limiting car would be greatly helpful in reducing weight gain