Time series study on air pollution and mortality in Delhi

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Background

• Air quality issues are of major concern for many cities in Asia and other developing countries
• Increasing attention from policy makers, legal body, NGOs, research, academic institutions and funding agencies
• Many initiatives, but gaps in research still exist
Aim and Objectives of the study

• **Aim:** To generate site specific database on effect of air pollution on mortality for the city of Delhi, India

• **Specific objectives:**
  – To develop exposure series for air quality parameters
  – To assess the time series data on air quality parameters and mortality to study the relationship between air pollution and mortality in Delhi
  – To assess the daily change in mortality in relation with change in air quality after controlling for the exogenous parameters
Salient features of the study

- Multidisciplinary team
- Meeting ICMR guidelines on ethical aspects
- Review and guidance from ISOC
- QA/QC audit
- Capacity building
  - Training on developing exposure series
  - R Package
  - Core model for time series analysis
Multi disciplinary Team

• R Uma, TERI – Air quality and Exposure Assessment
• K S Nairy & Meena Seghal, TERI – Bio Statistician
• Dr Deoraj Caussy, WHO SEARO – Epidemiologist
• Dr S K Chhabra, V P Chest Institute - Clinical
• Dr G C Kilnani – Clinical
• NDMC, MCD & CPCB
Methodology

• Collection of retrospective time series data (2002, 2003 & 2004) on
  – Ambient air quality
  – Mortality data
  – Meteorological data (Temperature, humidity, visibility)

• Statistical analysis of data to study the association of age specific death (all cause mortality) with exposure to air pollution
Location of the study

Delhi: Air Quality Monitoring Stations
RSPM Concentration for 2003, Delhi, India

RSPM Concentration

Monitoring Station
- IHC
- ITO
- Srifort
Correlation Analysis

Correlation analysis of RSPM (in µg/m³) data between 2 monitoring stations in Delhi

\[ r = 0.722 \quad P < 0.05 \]
Trend in Temperature

Trend in minimum and maximum temperature - 2004

Temperatures (in degree Celsius)

Day

MIN_TEM
MAX_TEM
Trend in Death Counts


No of deaths

Days

MCD_COUN
NDMC
TOTAL

0 16 32 48 64 80 96 112 128 144 160 176 192 208 224 240 256 272 288 304 320 336 352
Work in progress

• Mortality data collection and cleaning (for the year 2003)
• Core model development and application
Thank You