

ACCESSING THE SHORT-TERM EFFECTS OF EXPOSURE TO PARTICULATE MATTER 2.5 ON EMERGENCY HOSPITALIZATION RATE DUE TO RESPIRATORY DISEASES IN ASTANA

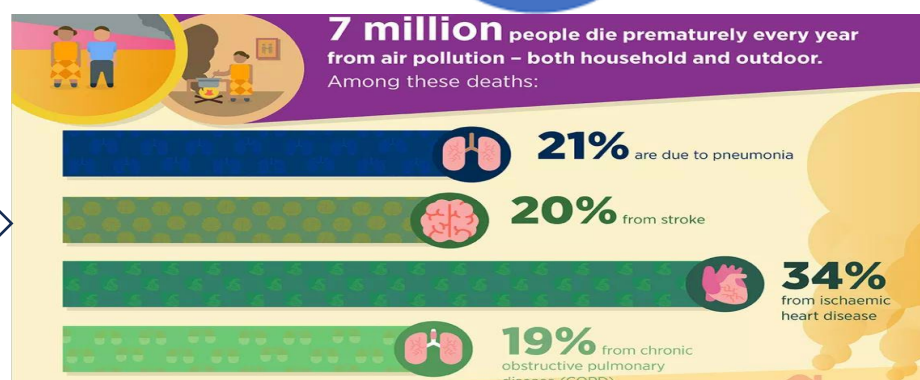
Introduction

- The menace of air pollution usually occurs in two forms in the environment, either; anthropogenic or naturally (Williams, 2016).
- Anthropogenic sources:** burning of fuels, smoke discharge, exhaust gases from cars, aircrafts, and ship, combustion of waste materials
- Natural sources:** Volcanic eruptions. Dust storms, Radioactive decay, Putrefaction process

What is PM2.5?



Categories of PM2.5



Research Justification

Objectives

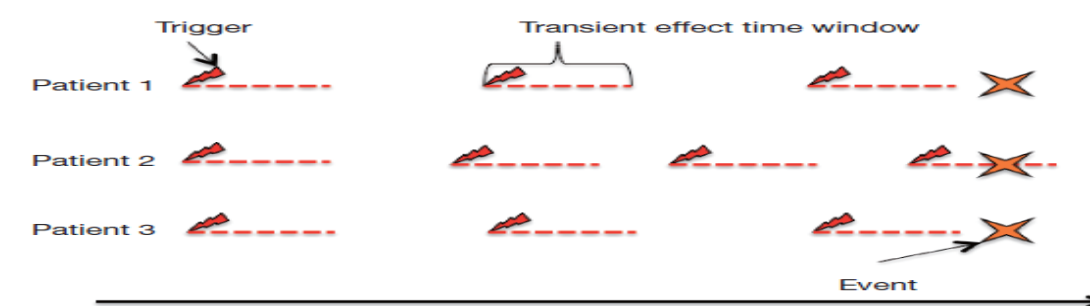
To evaluate the association between exposures to varying PM2.5 mean concentration in a given day with emergency hospitalization cases for respiratory diseases.

Results - 2

Lag Day	PM _{2.5} (Daily Maximum Concentration) Odd Ratio, (95% CI)	P-value
0	1.002 (1.001 - 1.003)	< 0.01
1	1.001 (1.001 - 1.002)	< 0.01
2	1.001 (1.001 - 1.002)	< 0.01

Methodology

- Study Location : Astana (The fast-urbanizing capital city of Kazakhstan. Formerly known as Nur-Sultan)
- Records of daily emergency hospitalization cases due to respiratory diseases
- Daily PM2.5 record (accessed from the US embassy website)
- Study Design: Case-Crossover study design



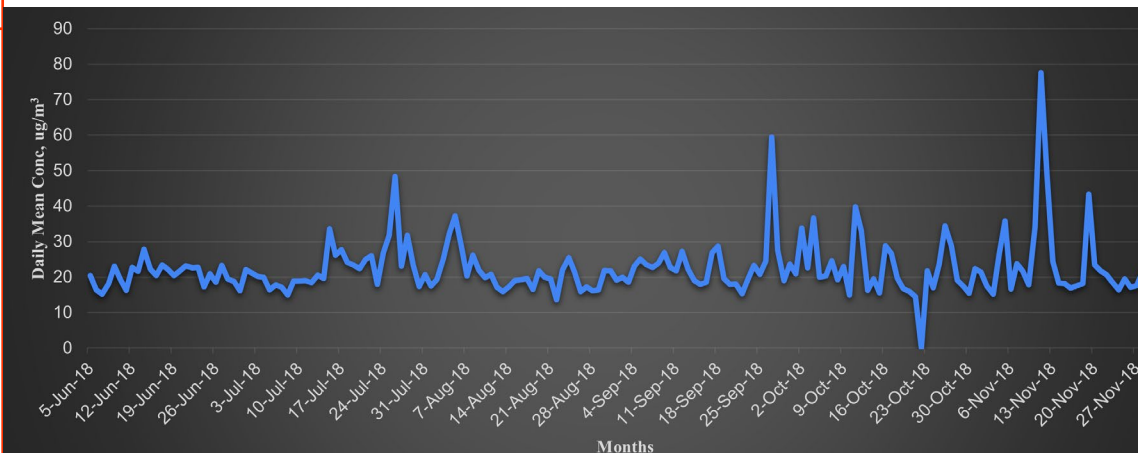
(Zhongheng, 2016)

Statistical Analysis

- STATA Software Package
- Basic Descriptive Statistics
- Conditional Logistic Regression

Results - 3

Time series chart showing the behavior and distribution of daily mean concentration of PM_{2.5} (June to November 2018)



Results - 1

General Characteristics of Patients – respiratory diseases (n = 35805)

Characteristics	Value (%)
Male	18147 (50.7)
Female	27658 (49.3)
Preschool (0-5yr)	18480 (51.6)
Adolescents (6-17yr)	3411 (9.5)
Adult (18-64yr)	11829 (33.0)
Seniors (≥65)	2085 (5.8)
Mean	17.3
Median	4.0

Association Between PM2.5 Daily Mean Concentration Exposure for Respiratory Disease Hospitalization (Single Pollutant Model)

Lag Day	PM _{2.5} (Daily Mean Concentration) Odd Ratio, (95% CI)	P-value
0	1.023 (1.020 - 1.026)	< 0.01
1	1.019 (1.016 - 1.022)	< 0.01
2	1.016 (1.012 - 1.018)	< 0.01

Conclusion

- Our study confirms the association existing between exposure to varying concentrations of PM2.5 and the rate of hospitalization due to respiratory diseases
- Further study should be carried out so as to ascertain the impact of indoor air pollutant.