Investigation of PM 2.5 Concentration in the Wet Season of Bangkok, Thailand

Marie Frances Pagkalinawan1, Sumeet Saksena2, and Kraichat Tantrakarnapa3

1Department of Tropical Medicine, Medical Microbiology and Pharmacology, John A. Burns School of Medicine, University of Hawaii at Mānoa, Honolulu, Hawaii, USA; 2East West Center, Honolulu, Hawaii, USA; 3Department of Social and Environmental Medicine, Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand

INTRODUCTION

• Air pollution levels in Bangkok, Thailand are critical issues throughout the year. The mean concentrations of both pollutants, particulate matters (PM) PM2.5 and PM10, are over the limitation as announced by the Pollution Control Department (PCD). The daily mean standard Particulate Matters in Thailand’s capital changes during the transition period from rainy season to dry season (December and January) over the national standard every year. Sources of particulate matters are regularly exacerbated by smoke (haze) from nearby sources and regional transboundary effects. In addition, air pollution from traffic is also a major contributor in Bangkok. Previous studies shown that PM10 most commonly occurs in the environment. However, studies have been proven that PM2.5 is more harmful to the health of people due to a consistent amount of harmful chemicals such as PAHs (Polycyclic Aromatic Hydrocarbons). There are no studies published regarding PM2.5 concentrations during wet non-haze episodes.

OBJECTIVE

This project aims to investigate the PM2.5 concentration during non-haze episode (rainy season).

Methodology

- Data were collected using AirBeam 2, Aslung, and Plume devices.
- AirBeam 2 automatically measures PM1, PM2.5, PM10, relative humidity, temperature in Fahrenheit, time, date, and distance. The gathered data are automatically recorded in a download application in a mobile Android Operating System, AirCasting. AirCasting also has the capacity to record observational notes and pictures.
- Aslung was used a backup for AirBeam 2. Aslung automatically measures PM1, PM2.5, PM10. Relative humidity, temperature in Celsius, Carbon Dioxide, time, and date. Recorded samples were stored in a memory stick inserted inside Aslung device.
- Routes, time, distance, and speed were tracked by a downloaded application in a mobile Android Operating System, GPS Tracker.
- Plume automatically measures Nitrogen Dioxide (NO2), volatile organic compounds (VOC), PM2.5, and PM10.
- Chosen samples were from specific places in the central, north, south, east, and west locations of Bangkok.
- PM absorption by average speed were measured via usage of various modes of transportations.
- Statistical analysis regarding PM comparisons were analyzed by descriptive statistics and illustrated by a bar graph.

There is a high concentration of air pollutant PM2.5 in slow moving ferry boats surrounded by water located in West Bangkok

RESULTS

• PM10 is prominent in Bangkok, during non-haze episode although variance suggested a small difference between PM10 and PM2.5. The results suggests that PM2.5 are still in high capacity despite non-haze episodes in Thailand. PM2.5 results support the previous studies regarding the health hazard for humans.

• Results show that PM2.5 is common in areas where there is are slow-moving vehicles located in West Bangkok. This suggests that average speed might be associated with high concentrations of PM2.5. Lack of statistical analysis and further data set that could support the high concentration of PM2.5 in the west of Bangkok, becomes the limitation of the study.

Conclusions

Despite non-haze wet seasonal episodes, PM2.5 is still prominent in all areas of Bangkok. Results of this study can be used as baseline for future studies regarding the health impacts of PM2.5 in human health.

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