

Child Respiratory Health Impacts of Indonesia Forest and Peatland Fire



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Background

- Smoke from peatland and forest fires particularly in Sumatra and Kalimantan, Indonesia → high levels of particulate pollution.
- Exposure to ambient particulate matter (PM) is associated with acute and chronic adverse health outcomes especially on children and infant
- Few studies have been conducted in developing countries in locations where smoke pollution is the primary source of exposure



Objectives



- To assess the impact of haze toward children health
 - The association between PM10 with cardiovascular and respiratory systems on children under age 12 including ARI, Pneumonia, Asthma and Low Birth Weight
 - The association between PM10 with the school absentee
- To understand the community coping mechanism toward the health issues caused by the haze
- The overall objectives are:
 - To establish and increase awareness to the impact of haze and peatland fire on children's health and well-being
 - To utilize its findings for effective health emergency response and preparedness

Methodology

- Approach: Mixed-Method (Qualitative dan Quantitative)

- Area of studies: Palembang (Sumatera), Palangkaraya and Pontianak (Borneo/ Kalimantan)
- Times series (retrospective data of 10 years – 2006-2015)
 - Data PM10 (Meteorological, Climatological, and Geophysical Agency/BMKG)
 - Data ISPA, Pneumonia, Asma Bronchiale (Health office)
 - Data on School absentee
- Method of Data Collection: KII, FGD, Observation



Haze Studies Areas



Data Collection and data confirmation

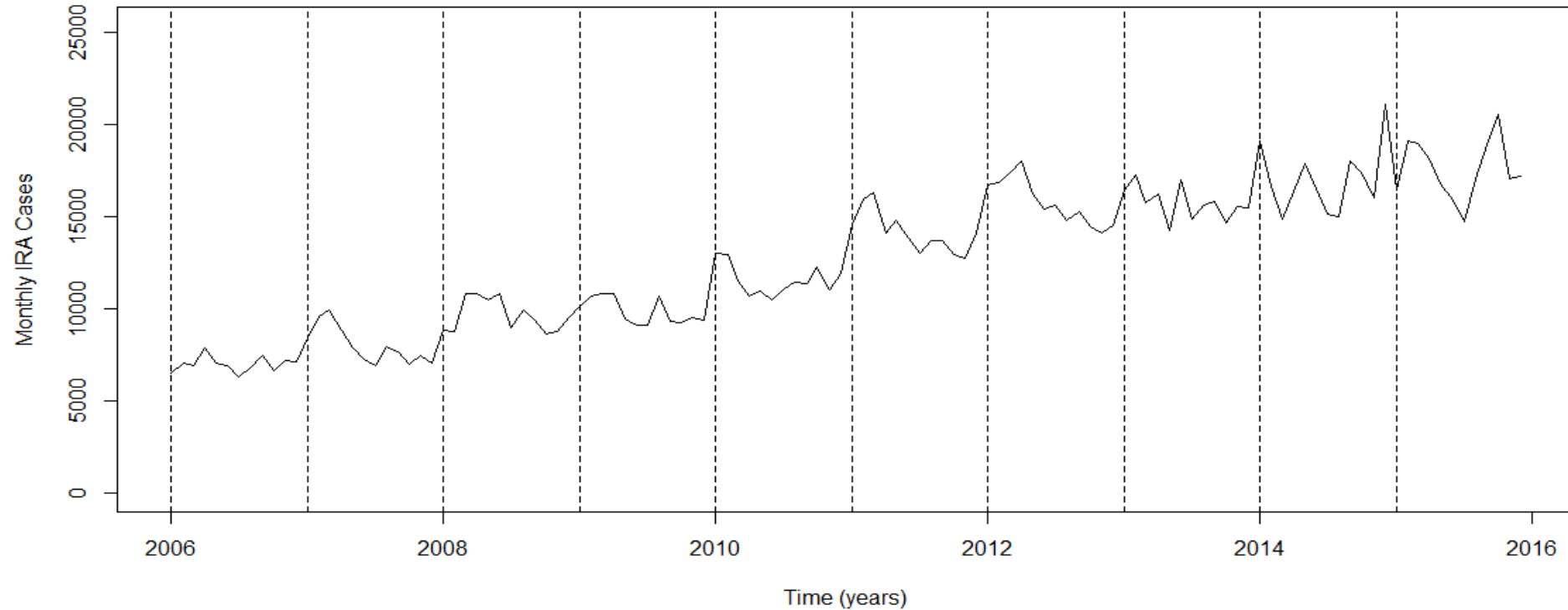
- In cooperation with the University Muhammadiyah in Palangkaraya, Pontianak dan Palembang
 - Primary data through FGD, KII, drawing
 - Secondary data from Meteorological, Climatological, and Geophysical Agency/BMKG, Health Office and Environmental Health Office
- Local and National Workshop



Children's respiratory health and air pollution in Palembang, Sumatra, Indonesia 2006 to 2015

- Time series epidemiological study to see the association between respiratory health and particulates from haze pollution in Palembang (population 1.5 million).
- Daily PM10 pollution data from fixed site monitors and monthly counts of patient visits to district health offices for Acute Respiratory Infection (ARI), asthma and pneumonia are collected
- Poisson analyses was implemented using Generalised Additive Models (GAM) to quantify the association between monthly counts of respiratory health outcome and monthly particulate concentration, controlling for seasonal trends and long-term trends in the health outcome.

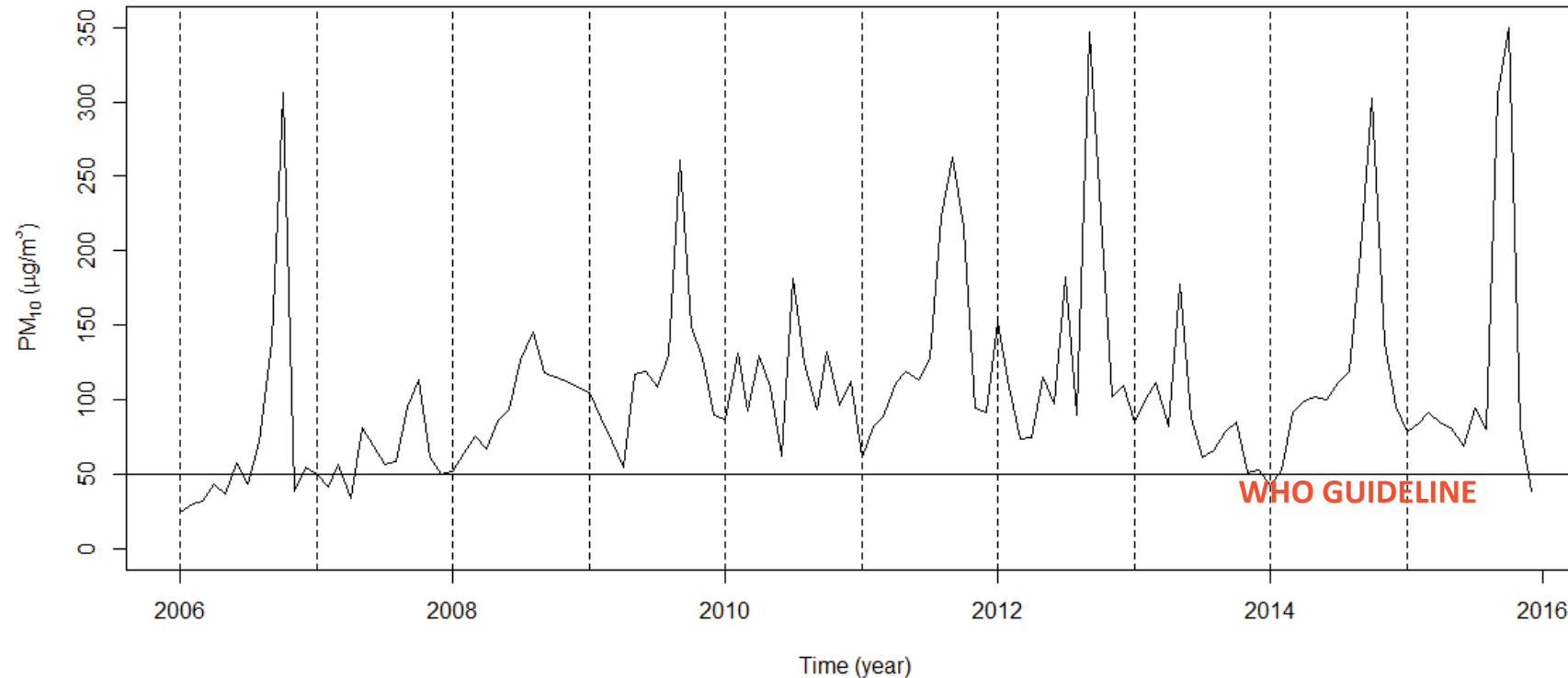
Monthly total counts of Acute Respiratory Infection (ARI), Palembang, Sumatra 2006-2015



- Seasonal pattern.
- ARI increasing over time - over and above population increase

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
6,282	9,291	12,941	12,626	15,893	21,125

Monthly PM₁₀, Palembang, Sumatra 2006-2015



- Generally well above WHO daily average guideline 50 µg/m³
- Highest in September (the end of the dry season) and October (the beginning of the wet season).

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
24.2	68.4	93.0	106.4	117.9	349.7

Children's respiratory health and air pollution in Palembang, Sumatra, Indonesia 2006 to 2015

Results

- The monthly average of daily PM10 was $106 \mu\text{g}/\text{m}^3$, ranging from 24 to $350 \mu\text{g}/\text{m}^3$ with an interquartile range of $50 \mu\text{g}/\text{m}^3$.
- ARI, Asthma and Pneumonia are significantly associated with PM10 exposure.
- A $50 \mu\text{g}/\text{m}^3$ increase in PM10 is associated with an increase in monthly counts of:
 - 1.7% (95%CI: 1.6% to 1.9%) for ARI
 - 1.0% (95%CI: 0.2% to 1.7%) for Asthma
 - 1.0% (95%CI: 0.2% to 1.9%) for Pneumonia

Conclusions

- PM10 pollution in Palembang is generally well above the WHO standard of 50 $\mu\text{g}/\text{m}^3$
- Annual haze pollution in Palembang causes regular extreme peaks of monthly PM10 concentrations above 250 $\mu\text{g}/\text{m}^3$ and compared to months where PM10 is at the WHO standard of 50 $\mu\text{g}/\text{m}^3$. These extreme peaks are estimated to be responsible for an additional:
 - 722 ARI patients visits
 - 23 Asthma patient visits and
 - 15 pneumonia patient visits.
- PM10 is significantly associated with increased respiratory morbidity. Reducing smoke pollution will improve the respiratory health of the population, especially vulnerable groups such as children.



Terima Kasih