IMPACT OF AIR POLLUTION ON POPULATION HEALTH IN VIET NAM

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INTRODUCTION

- **Air pollution**: contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere.

- **Sources of air pollution**: Household combustion devices, motor vehicles, industrial facilities and forest fires.

http://www.who.int/topics/air_pollution/en/
INTRODUCTION

Industria-lization ↑↑↑

socio-economical ↑↑↑

air pollution level ↑↑

Population health problem in VN

BUT: only few studies on the effect of ambient air pollution on population health in Viet Nam
CURRENT STATUS OF AIR QUALITY IN HANOI

Hanoi 2016

121  Average AQI
50.5  Average PM 2.5 concentration
123  Days violating national regulations
282  Days violating WHO regulations

Hanoi Q1 2017*

123  Average AQI
54.6  Average PM 2.5 concentration
37  Days violating national regulations
78  Days violating WHO guidelines

*90 days

* All data from https://www.airnow.gov
Smoke from straw burning from the countryside blanket Hanoi in haze

People in the roads protect themselves from air pollution with masks and sunglasses

Lang – Hoa Lac highway was dim in the smoke from straw burning from the countryside

Buses in Ha Noi
Out-of-date factories release tons of air pollutants into the atmosphere

A factory in Kinh Mon, Hai Duong Province
Straw burning in the countrysides not only pollutes air in the rural areas but also can send haze to the urban areas nearby.
AIR POLLUTION AND PUBLIC HEALTH IN VIET NAM

Burden of disease attributable to 15 leading risk factors in 2010, expressed as a percentage of Vietnam DALY’s.
Change in estimated number of health impacts in 2010 and 2020 compared to 2005 in Ha Noi

<table>
<thead>
<tr>
<th>Health Endpoint</th>
<th>Number of Cases Incurred</th>
<th>Change from 2005 BAU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
<td>2020</td>
</tr>
<tr>
<td>Mortality</td>
<td>1,260</td>
<td>2,824</td>
</tr>
<tr>
<td>Adult Chronic Bronchitis</td>
<td>2,174</td>
<td>4,872</td>
</tr>
<tr>
<td>Child Acute Bronchitis</td>
<td>19,580</td>
<td>43,889</td>
</tr>
<tr>
<td>Respiratory Hospital Admission</td>
<td>513</td>
<td>1,150</td>
</tr>
<tr>
<td>Cardiac Hospital Admission</td>
<td>450</td>
<td>1,008</td>
</tr>
<tr>
<td>Emergency Room Visit</td>
<td>21,181</td>
<td>47,479</td>
</tr>
<tr>
<td>Asthma Attacks</td>
<td>260,942</td>
<td>584,916</td>
</tr>
<tr>
<td>Restricted Activity Days</td>
<td>3,444,434</td>
<td>7,720,888</td>
</tr>
<tr>
<td>Respiratory Symptom Days</td>
<td>16,466,340</td>
<td>36,910,203</td>
</tr>
</tbody>
</table>

• Annual averages on total PM10: expected to ~ 50% in the urban parts of Hanoi. An unabated emissions scenario for 2020 → > x2 of the ambient PM10 concentrations. → PM10 levels are expected to be average > 200μg/m3 (WHO: 80μg/m3).
• Under business as usual, for the estimated ambient levels → health impacts incurred compared to 2005 BAU are calculated → Nº of mortality cases is expected to ~ x2 (2010) and > x4 (2020)

Effects of Short-Term Exposure to Air Pollution on Hospital Admissions of Young Children for Acute Lower Respiratory Infections in Ho Chi Minh City, Vietnam

HEI Collaborative Working Group on Air Pollution, Poverty, and Health in Ho Chi Minh City (Le Truong Giang, Long Ngo, Sumi Mehta, et al.)

• Exposure to air pollutants:
  • (+) associated ~ hospital admissions for ALRI (dry season - Nov–Apr)
  • (-) associated ~ hospital admissions for ALRI (rainy season - May–Oct).

→ concentrations of NO2, SO2, and PM10: associated ~ hospital admissions for ALRI in young children of HCMC in the dry season.

• PM10: associated ~ hospital admissions in the dry season, but the high correlation between PM10 and NO2 ($r = 0.78$) limited our ability to distinguish between PM10 and NO2 effects.
A time-series regression analysis, 2004 - 2007 in Ho Chi Minh City

- NO₂ and PM₁₀ ↑: **strongly** associated ~ respiratory + cardiovascular diseases (CVD) hospital admissions
- SO₂ ↑: moderately associated ~ respiratory + CVD hospital admissions
- ↑ 10μg/m³ of each air pollutant
  → risk of respiratory admissions ↑ 0.7% - 8%
  → risk of CVD admissions ↑ 0.5% - 4%
5- and 6-ring PAHs (BeP, BbF, BkF, BaP, BghiP and InP) ↑↑↑ in total suspended particulate samples in HCM City, ~ 82% of total PAHs.

>>> Osaka

→ these PAHs are highly carcinogenic and mutagenic in humans.
1. Vietnam doesn’t have Law on Clean Air

2. Standard on emission concentrations is still lower than international standard.

3. Implementation the regulations in the Environmental Protection Law 2014 is still limited and not enough.
“Cleaning up the air we breathe prevents non-communicable diseases as well as reduces disease risks among women and vulnerable groups, including children and the elderly...”
Dr Flavia Bustreo, WHO Assistant Director-General Family, Women and Children’s Health

**WHAT WE ARE GOING TO DO?**

<table>
<thead>
<tr>
<th>Practical policy measures</th>
<th>Communities or individuals measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Stop waste burning</td>
</tr>
<tr>
<td>Transport</td>
<td>Promote green spaces</td>
</tr>
<tr>
<td>Waste</td>
<td>Walking/cycling</td>
</tr>
<tr>
<td>Energy systems</td>
<td></td>
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</tbody>
</table>
WHAT WE ARE GOING TO DO?

- Issueing the Laws and regulation on clean air and revising the standard to match with international ones (WHO)
- Taking prompt action to reduce emission from coal-fired power plant
- Promoting development and application of renewable energy
- Reducing emissions from means of transportation
CONCLUSION

1. Air pollution in Vietnam is increasing, major risk for public health and negative impacts of air pollution on whole population.

2. Challenges on Air Quality Management in Vietnam: Law on Clean Air,

3. More studies should be conducted in order to provide evidences for policy makers to reduce air pollution.
THANK YOU FOR ATTENTION