



Indoor Air Pollution Intervention Studies (IAPIS):

Towards multi-site intervention trials to study the risk decrease in communicable and non-communicable diseases in children and their mothers in Africa and Asia

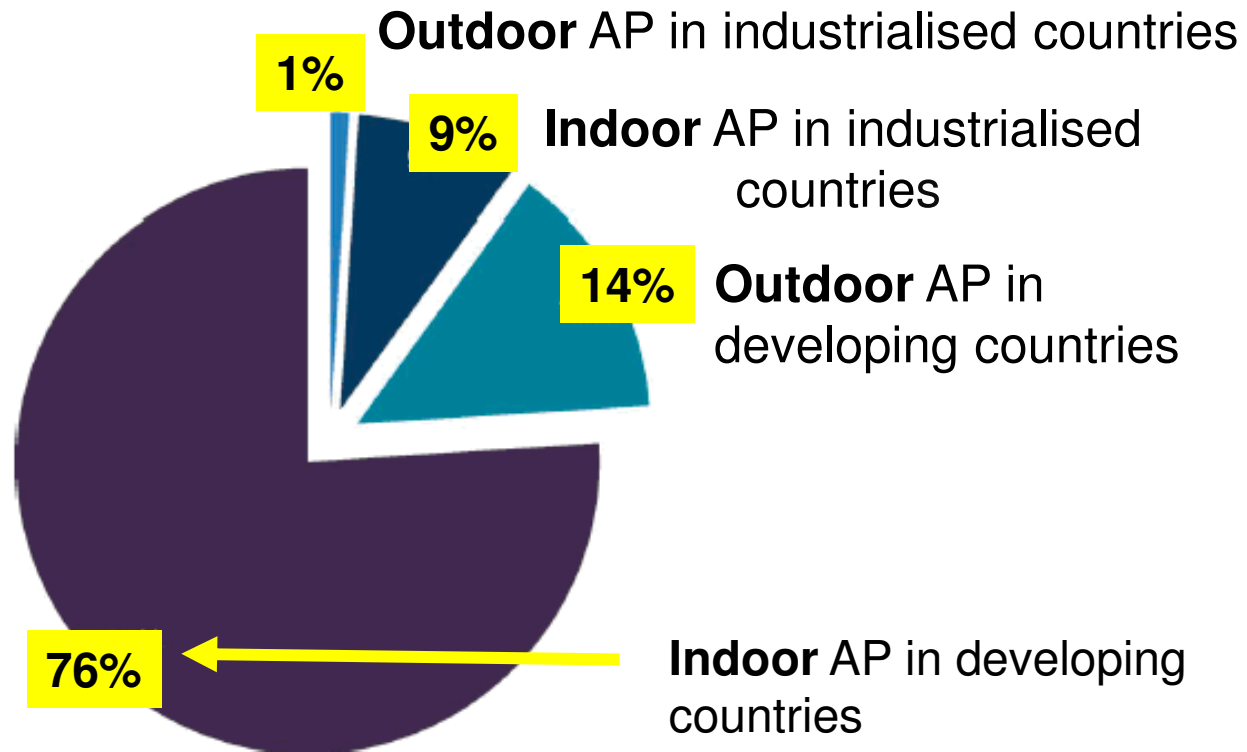
Dr. Sanjay Juvekar

On behalf of INDEPTH IAPIS Working Group

INDEPTH Network Scientific Conference, Maputo, 24-28th October 2011



AIR POLLUTION IN PERSPECTIVE



Global population exposure to particulate matter air pollution

(Kirk Smith 1993)

BIOMASS FUEL AND RESPIRATORY HEALTH

(Meta-analysis – 25 studies from 14 countries)



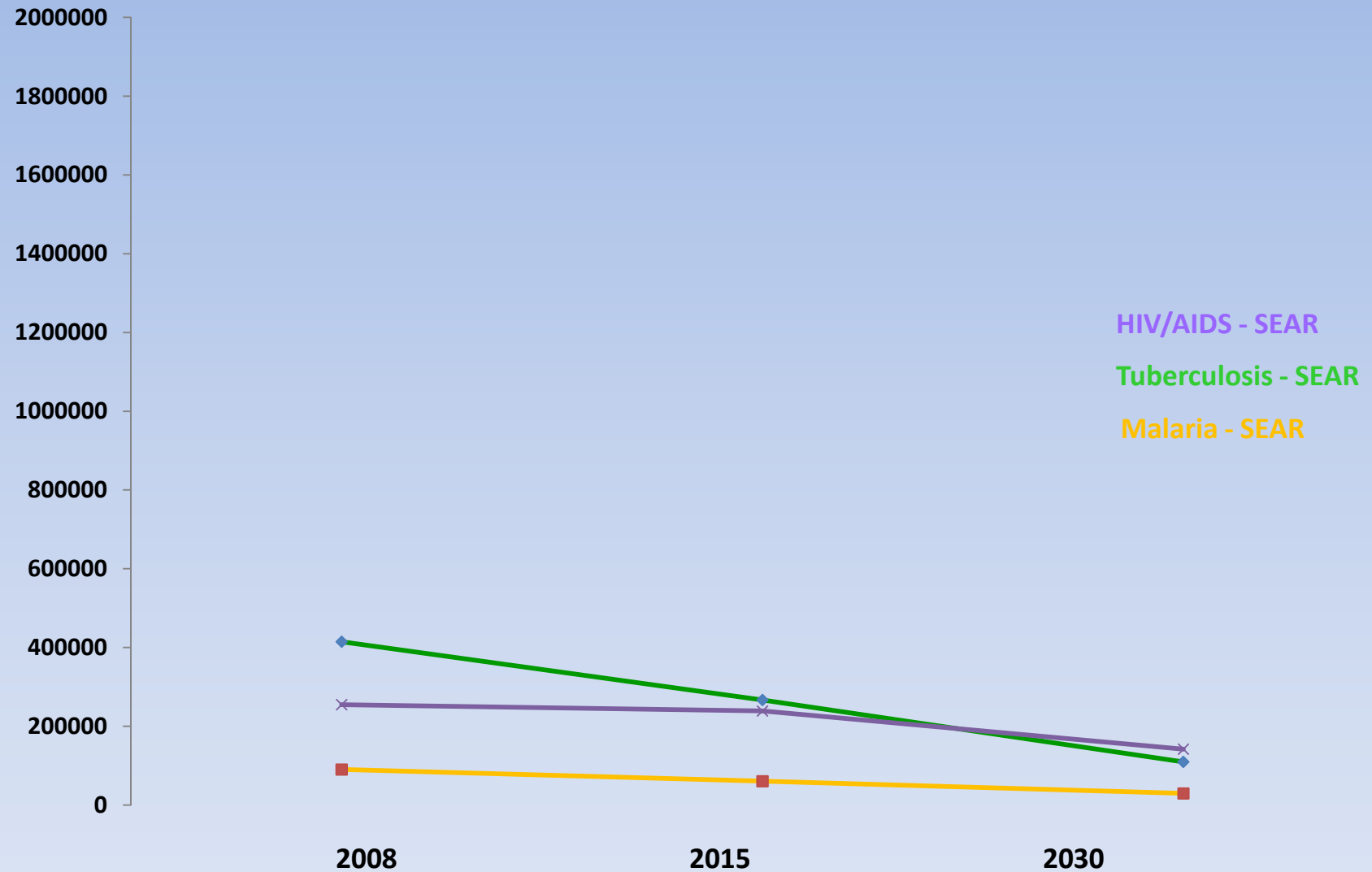
Children:

Acute Lower Respiratory Infections
OR: 3.5 (1.94 – 6.43)

Women:

Chronic Obstructive Pulmonary Disease
OR: 2.40 (1.47 – 3.93)

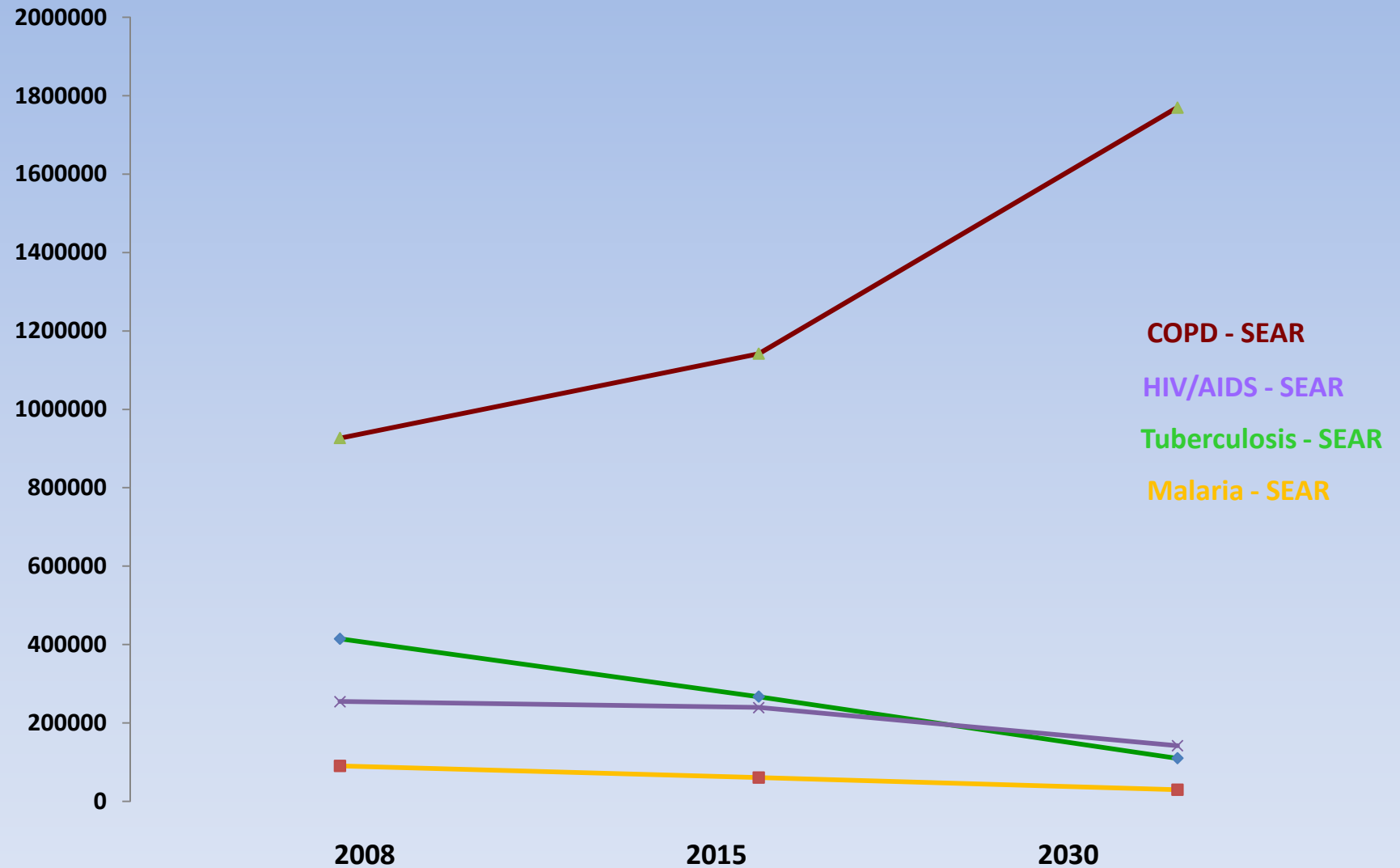
CAUSES OF DEATHS IN SOUTH EAST ASIAN REGION



(The Global Burden of Disease, WHO 2008 Oct)

www.who.int/healthinfo/global_burden_disease/projections/en/index.html

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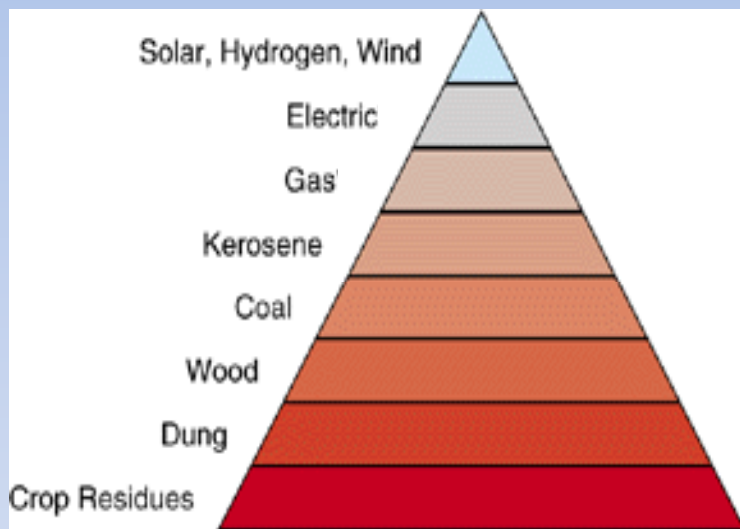
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INDEPTH Network



- BETTER HEALTH INFORMATION FOR BETTER HEALTH POLICY

THE ENERGY LADDER



Dung cakes



Wood

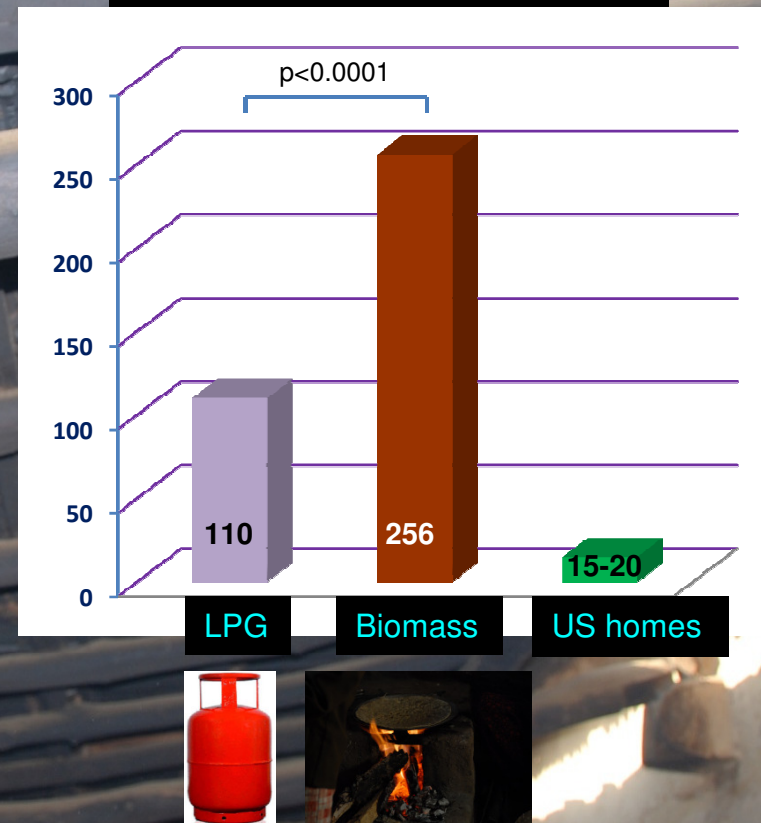


Crop residues

INDOOR AIR POLLUTION DUE TO BIOMASS EXPOSURE

Indoor PM2.5 levels:
287 homes
2 different seasons
Measurement over 24 hrs

Indoor PM2.5 levels in mcg/m³



(Mukkunuwar U et al, ERS 2011, Abst.)

What Strength do we the INDEPTH-Network members have to study IAP and its effects on health?

- **42** HDSS field sites in Africa, Asia and Oceania
- Access to **large populations and diverse settings**
- Established **trust of communities**
- Pregnancy, birth, death and cause-of-death **records**
- Experience with **household cluster randomised trials**
- Potential to follow **cohorts** when early life exposures are known

Health Impact of Indoor Air Pollution

Health outcome	Evidence ¹	Population	Relative risk ²	Relative risk (95% confidence interval) ³	
Acute infections of the lower respiratory tract	Strong	Children aged 0–4 years	2.3	1.9–2.7	S U F F I C I E N T
Chronic obstructive pulmonary disease	Strong	Women aged ≥ 30 years	3.2	2.3–4.8	
	Moderate I	Men aged ≥ 30 years	1.8	1.0–3.2	
Lung cancer (coal)	Strong	Women aged ≥ 30 years	1.9	1.1–3.5	
	Moderate I	Men aged ≥ 30 years	1.5	1.0–2.5	
Lung cancer (biomass)	Moderate II	Women aged ≥ 30 years	1.5	1.0–2.1	I N S U F F I C I E N T
Asthma	Moderate II	Children aged 5–14 years	1.6	1.0–2.5	
	Moderate II	Adults aged ≥ 15 years	1.2	1.0–1.5	
Cataracts	Moderate II	Adults aged ≥ 15 years	1.3	1.0–1.7	
Tuberculosis	Moderate II	Adults aged ≥ 15 years	1.5	1.0–2.4	

¹ Strong evidence: Many studies of solid fuel use in developing countries, supported by evidence from studies of active and passive smoking, urban air pollution and biochemical or laboratory studies.

Moderate evidence: At least three studies of solid fuel use in developing countries, supported by evidence from studies on active smoking and on animals. Moderate I: strong evidence for specific age/sex groups. Moderate II: limited evidence.

² The relative risk indicates how many times more likely the disease is to occur in people exposed to indoor air pollution than in unexposed people.

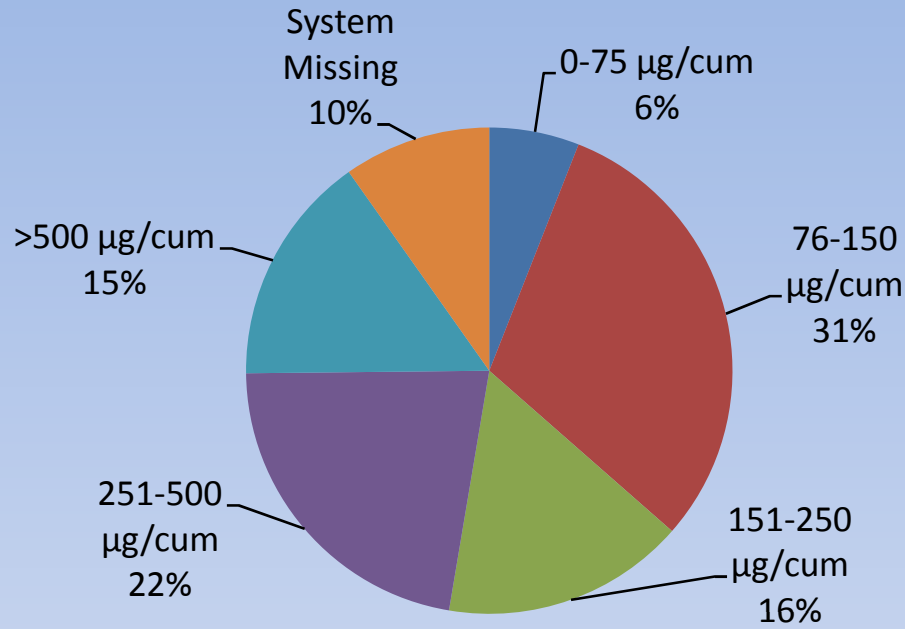
³ The confidence interval represents an uncertainty range. Wide intervals indicate lower precision; narrow intervals indicate greater precision.

Crow workplace exposures to air Pollutants.

DO environmental factors increase the burden ding and home or of Tuberculosis?

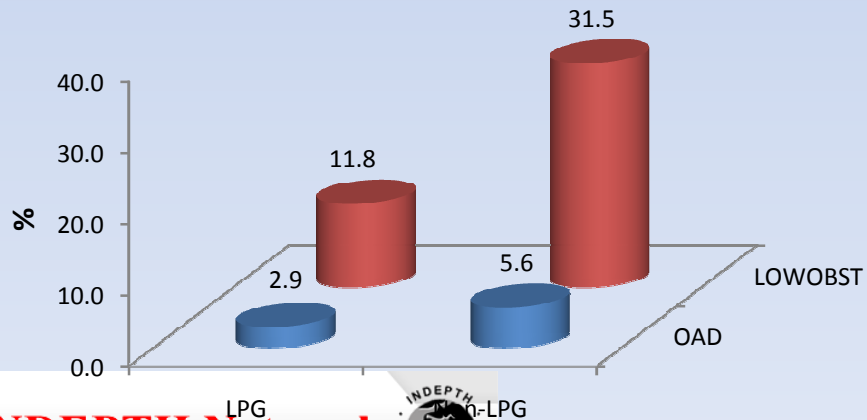
2.5 million people die annually from cardiovascular disease attributable to environmental factors, including chemical, air pollution, and environmental tobacco smoke exposures.

Indoor PM2.5 Levels across study area

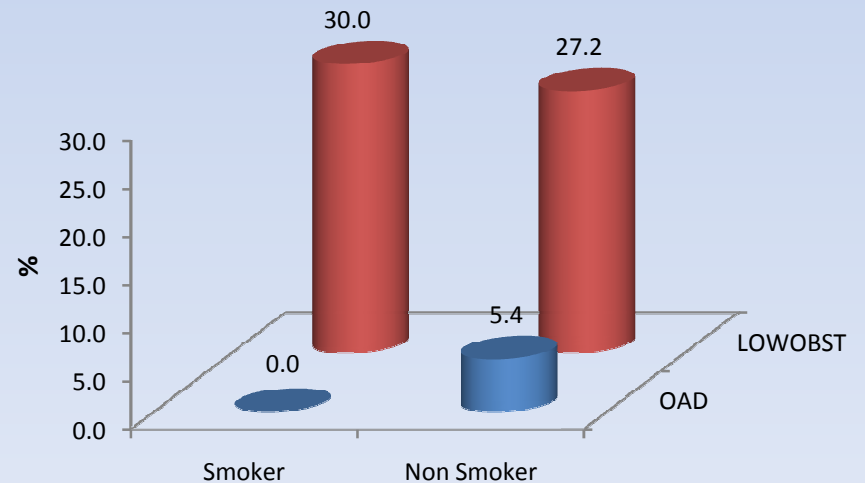


Significant Findings

Fuel Vs Disease Prevalance



Smoker Vs Disease Prevalance



Where we stand today?

Proposal development funding secured from STPH to

- 1) Review **biomass fuel use** in interested sites.
- 2) Review local improved **stove options & opportunities** in countries.
- 3) Determine range of **exposures** across variety of fuel / cooking technologies in sites.
- 4) Develop a **multi-site RCT proposal**.
- 5) Seek coordinated multi-site trial **funding**

AIMS

- 1) To establish effects of reduction of IAP from biomass combustion on priority health outcomes (acute and chronic respiratory illness, cardiovascular disease and mortality) in children and adults.
- 2) To widen understanding of IAP in terms of nature, prevalence, societal and cultural aspects, risk factors and potential for intervention to reduce pneumonia, low birth weight, growth rates, COPD, asthma, and cardiovascular risk markers within INDEPTH HDSS Network sites.

WORK PACKAGES

Work Package 1: **Project Coordination and Administration**

The aim is to develop and maintain good relationships with research teams at the study sites based on partnership and support.

- Multi Centre Coordination
- Work Package Coordination

Work Package 2: Exposure Reduction

- Training
- Analysis
- Outputs and Deliverables

WORK PACKAGES

Work Package 3: **Exposure Measure**

The aim here is to provide accurate information on exposure among control and intervention groups, quantify concentrations of pollutants, detect changes in exposure that occur immediately, obtain information concerning the seasonality of exposures and determine short term variation in exposure.

- Training
- Analysis
- Outputs and Deliverables

WORK PACKAGES

Work Package 4: **Acute Health Outcomes in Children**

- Training
- Analysis
- Outputs and Deliverables

Work Package 5 : **Chronic Health Outcomes in Adults**

- Training
- Analysis
- Outputs and Deliverables

Work Package 6: **Livelihood Outcomes**

- Training
- Analysis
- Outputs and Deliverables

WORK PACKAGES

Work Package 7: **Data Systems and Management**

Work Package 8: **Synthesis and Dissemination**

- Comparability of Data Collection between Study Sites.
- Publications and Reporting Policy

Work Package 9: **Capacity Strengthening and Training**

- Organization of Field Worker Training

FUTURE DIRECTIONS!

- INDEPTH cross site proposal finalization workshop in Pune in early 2012
- Preparation of the budgetary requirements in consultation with INDEPTH Finance department
- Identification of an appropriate probable funder to the proposed study
- Submission of the proposal through the secretariat

