Health Impacts of Indoor Cooking Smoke on Women and Children

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Biomass/Solid Fuels Widely Used for Heating and Cooking by the Global Poor

Primary fuel source for the poor in lower and middle income countries

• Biomass fuels (variable content of water)
  – Wood/ charcoal
  – Crop residues/ leaves/ combustible debris
  – Dung

• Solid fuels
  – Coal or biomass
Health Effects from Indoor Air Pollution on Women Occur within a Social-Cultural Context

- Social / behavioral / cultural issues
  - women lead different lives than men!
- Absence of decision-making control
- Absence of opportunity for education and independent economic growth
- Unique vulnerabilities for displaced or refugee populations
Health Effects from Exposure to Household Smoke from Burning of Biomass/Solid Fuels

- Infancy: low birth weight, perinatal morbidity and mortality, sepsis?
- Respiratory: ALRI in children, COPD, asthma, otitis media
- Cancer: lung and upper airway cancers
- Cardiovascular: hypertension, coronary heart disease
- Infection: tuberculosis, acute pneumonia in adults (?)
- Ocular: cataracts
- Musculoskeletal injuries/ hernias
- Burn injuries
Almost 2 Million Deaths Attributable to Indoor Air Pollution Every year

- 872,000 children under 5 from acute lower respiratory infections
- 1,057,000 adults from COPD
- 36,000 adults from lung and upper respiratory cancers
Woman in Guatemala Cooking Indoors

Courtesy of Kirk Smith, PI of RESPIRE study
RESPIRE Study in Guatemala

• RCT to assess impact of reducing household air pollution (HAP) using improved cookstoves with chimneys.
  – 265 intervention and 253 control children with primary outcome of physician diagnosed pneumonia

• Significant reductions in three secondary outcomes of pneumonia:
  – Fieldworker assessed severe pneumonia
  – Physician assessed severe pneumonia
  – RSV-negative pneumonia

• Exposure (CO) response analysis suggests a minimum of a 50% reduction in exposures (and perhaps as high as 80-90%) is necessary to achieve a significant reduction of severe pneumonia.

Launch of the Global Alliance for Clean Cookstoves
HEALTH BURDEN OF INDOOR AIR POLLUTION ON WOMEN AND CHILDREN IN DEVELOPING COUNTRIES
### New Stove Technologies in the Marketplace

<table>
<thead>
<tr>
<th>Semi-Industrial Manufacturers</th>
<th>Innovative Element</th>
<th>Cambodia: GERES</th>
<th>Guatemala: HELPS</th>
<th>Uganda: wood Ugastove</th>
<th>StoveTec 2-door stove (charcoal or wood)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Over $1M in carbon financing received in 2008</td>
<td>charcoal stove</td>
<td>wood stove (tortillas)</td>
<td>1st stove to get carbon credits under Gold Std.</td>
<td>Mass manufactured at low cost; combustion chamber can stand alone</td>
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<tr>
<td>Multinational Corporations</td>
<td>Innovative Element</td>
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<td>Oorja pellet stove (formerly BP)</td>
<td>Emerging markets strategy; pellets from local ag waste</td>
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<tr>
<td>EnviroFit/Shell Foundation wood stove</td>
<td>5-yr warranty on metal combustion chamber (can be stand-alone, too)</td>
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<td>Philips wood fan stove</td>
<td>Extremely clean, but pricey; not yet in market</td>
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<td>Bosch-Siemens plant oil stove</td>
<td>Major focus is to ensure sustainable oil production</td>
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Global Alliance for Clean Cookstoves: A Mission to Save Lives

- The Challenge:
  - HAP is the leading environmental cause of death in the world today (1.9 million deaths/yr)
  - As many as 600-800 million households

- How to solve:
  - Clean and efficient cookstoves and fuels implemented “at scale” that prevent disease and “save lives”
  - The Alliance: Public-private partnership by the UN Foundation to raise $250 million
  - 2020 goal: 100 million homes to adopt clean and efficient stoves