

# Effect of gas and kerosene space heaters on indoor air quality: A study in homes of Santiago, Chile

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The impact of outdoor and indoor pollution sources on indoor air quality in Santiago, Chile was investigated. Toward this end, 16 homes were sampled in four sessions. Each session included an outdoor site and four homes using different unvented space heaters (electric or central heating, compressed natural gas, liquefied petroleum gas, and kerosene). Average outdoor fine particulate matter (PM<sub>2.5</sub>) concentrations were very high (55.9  $\mu\text{g}\cdot\text{m}^{-3}$ ), and a large fraction of these particles penetrated indoors. PM<sub>2.5</sub> and several PM<sub>2.5</sub> components (including sulfate, elemental carbon, organic carbon, metals, and polycyclic aromatic hydrocarbons) were elevated in homes using kerosene heaters. Nitrogen dioxide (NO<sub>2</sub>) and ultrafine particles (UFPs) were higher in homes with combustion heaters as compared with those with electric heaters or central heating. A regression model was used to assess the effect of heater use on continuous indoor PM<sub>2.5</sub> concentrations when windows were closed. The model found a