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Ties between air quality and climate change in South Africa and their impact on human health

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The relationship between air quality and climate change in South Africa, as well as the resultant health impacts, are not well understood and pose a unique challenge as these problems are a blend of those faced by both developing and developed countries. For example, the major anthropogenic sources of air pollutants include sources such as industrial emissions, emissions from domestic burning of wood, coal and paraffin for cooking and heating, and vehicular emissions. This deteriorating air quality in South Africa has large impacts on human health, with indoor air pollution and urban air pollution ranking fifteenth and seventeenth, respectively, as risk factors causing the national burden of disease (MRC, 2008). Recently, the National Air Quality Act was passed that set standards for the ambient concentration of criteria pollutants, which will be regulated through Air Quality Management Plans. However, air quality, its management and its resultant health impacts are all impacted by a changing climate; and very little is known on how air quality in South Africa may be impacted on by regional climate change. In addition, through increasing temperatures, climate change itself has the potential to directly impact human health, thus adding another risk factor to an already compromised health situation. Due to these interactions, understanding and appropriately planning to effectively mitigate health impacts due to air pollution and climate change is a complex and multi-faceted problem. In this project, areas within South Africa that are at risk of negative health impacts from both deteriorating air quality and climate change were identified. In order to understand how changing temperatures will impact South African's health from seasonal to century-long time scales, projections of temperature and relative humidity were produced across timescales. This information was translated into potential health impacts utilizing a heat index. In order to understand the potential for deteriorating air quality to impact human health, historical and current data of the near-surface ozone and aerosol particle concentrations were mapped nationally and related to their potential health impacts. These projections and air quality data were combined spatially in order to understand a) which areas may be at risk for both climate change related health impacts and air quality related health impacts; b) the potential combination of air quality and climate change related health impacts; and c) where air quality management may be most vulnerable to changes in climate. Utilizing this information, it will now be possible to focus research efforts into these areas to understand how air quality may change with a changing climate and the resultant impact on human health. References MRC (2008) Risk factors South African Comparative Risk Assessment Summary Report January 2008. Pretoria, South Africa, 1-19.