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`The Impacts on health of air quality in Australia'

I am writing as a concerned General Practitioner regarding the impacts on health of air quality in Australia. While working as a medical practitioner for 16 years in the Hunter Valley I have noted an increased frequency in dust related diseases, particularly asthma, in the region. Furthermore from my observations this disease affects the children of the region most significantly.

With a combined population of 700,000, The Hunter Region is a service centre for industries including mining, power generation, tourism, viticulture, equine, agriculture, gas and military. The Hunter Region has an excess of 30 mostly open-cut coal mines and six active coal fired power stations. National Pollution Inventory data show that Singleton and Muswellbrook residents bear a significantly higher burden of air pollution compared to other areas of New South Wales, and Australia generally. The number of recorded excedences in the Hunter Valley indicates that residents at times have been exposed to health damaging levels of particulates.

Particulate matter (TPS) are tiny airborne particles or aerosols in the form of smoke, dust and vapours that are less than 100 micrometres which can remain suspended for extended periods.

Nearly half of the state's reported emissions of 'particulate matter' (PM10 and PM2.5) come from industries including mining and power generators located in the Upper Hunter. For example, in 2008/9 these industries poured over 58,000 tonnes of particulates (PM10) into the air, and this amount has increased steadily from 37,000 tonnes in 2002/3. By comparison, Maitland, Newcastle and Lake Macquarie had 260, 990 and 1900 tonnes of PM10 emissions respectively from all sources. In addition, power stations release significant amounts of sulphur dioxide (130, 240 tonnes 2006/7) and oxides of nitrogen (49,000 tonnes 2006/7) and combine with the mines to emit well over 100 tonnes of toxic metals into the atmosphere (including, arsenic, antimony, cadmium, manganese, chromium III & IV, mercury, nickel, selenium and zinc). According to industry estimates coal output in the Hunter Valley is expected to increase from 135 million tonnes in 2011 to 163 million in 2012 and 216 million tonnes in 2015. Production in the Muswellbrook shire has increased from 4 million tonnes in 2001 to about 37 million tonnes in 2011.

Environmental health research has established a clear association between particulate matter exposure in populations and poor health outcomes. High concentrations of PM_{10} and $PM_{2.5}$ particulates have been found to present a serious risk to people with asthma, cardiovascular, kidney and lung disease.

Numerous studies have associated outdoor particulate matter <$PM_{2.5}$ and PM_{10} with respiratory symptoms, pulmonary function, asthma hospitalisation and emergency

department visits. Fine particles are easily inhaled deeply into the lungs where they can be absorbed into the bloodstream or remain embedded for long periods of time. Ambient air pollution is especially harmful to people with lung disease such as asthma, chronic obstructive pulmonary disease, and bronchitis.

Mining generates fine dust particles, which acts on the respiratory system and may cause a variety of adverse health effects. Nitrous oxide (NO_2) and very small particles, can adversely affect lung development in children, reducing forced expiratory volume (FEV). The reduction of FEV can often precede development of other pulmonary diseases. Air pollution can trigger asthma attacks in children. This may be due to incomplete pulmonary development and the immaturity of their enzyme and immune systems which assist in detoxifying toxins. Compared with adults, children while exercising or playing sports may take in 20 to 50 percent more air per unit of body weight.

In 2009 and 2010 we invited school children in the Singleton area to participate in a pilot study consisting of Pulmonary Function Tests and a companion questionnaire. Pulmonary function tests are simple and safe tests used in clinical practices for a variety of reasons: diagnosing airway obstruction, measuring reactions to treatments for asthma or chronic obstructive pulmonary disease, and determining the severity and progression of the disease.

A spirometer was used to measure timed expired and inspired volumes to calculate how fast and effectively lungs can be emptied and filled. Spirometry is the lung function test of choice for diagnosing asthma and for assessing asthma control in response to treatment. Students participating in the Lung Function Tests had their height, weight, age and gender recorded. The tests were performed on children aged 8 and over. Over 680 students participated in the Lung Function Tests and approximately 1 in 6 had FEV (Forced Expiratory Volume) less than 80% compared to predicted value. This indicated there was increased airway resistance and decreased air flow. In 2010 the prevalence of asthma in Australia was 1:20.

Additional information is required relating to the extent of exposure to levels of environmental pollutants that could have a negative effect on human health over extended periods of time, the levels to which pollutants should be reduced to provide a safer environment for a healthier population. There is a need for planning of programs to explain to the community the nature of risks associated with air quality and how these risks can be avoided.

With the expansion of mining in the Hunter Valley, a comprehensive health study is necessary in the Hunter Valley to evaluate the association between respiratory illness and health outcomes in residents and daily air quality. There is a need to determine if other factors may contribute to respiratory illness and health outcomes and to express concerns about the possible impacts of industry on respiratory illness and general health in residents.

Governments need to consider Health Impacts Assessments as a requirement to be utilized as part of any future planning submissions. WHO (World Health Organization) defines Health Impact Assessment as "a combination of procedures, methods and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population". Methodology and conclusions from Health Impact Assessments would help to ensure that public health is a priority policy outcome.

We should recognize that while mining and power generators provide jobs and prosperity to these communities, in doing so they produce dust and decrease air and water quality in these areas . There is a need for governments and industry to balance between wealth, job creation and health costs.

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