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Senator Rachel Siewert 8th March 2013

Chair,

Standing Committee on Community Affairs (References Committee)

Parliament House, ACT 2600

By email community.affairs.sen@aph.gov.au

Dear Senator Siewert,

Re: Senate Inquiry into the impacts on health of air quality in Australia

I wish to make this submission. I note that your inquiry specifically includes particulate matter pollution. My comments are relevant to wood smoke as a major source of particle pollution and as a source of polycyclic aromatic hydrocarbons.

My interest follows from my work as a respiratory physician since 1990 in Launceston, Tasmania, where there has been a high wood smoke air pollution problem. I have been involved with a number of organizations since then to investigate this pollution and to find solutions. As a consequence of this involvement, I was invited as a member of the Health Advisory Group for the NEPM Ambient Air Quality review in 2001. The Launceston and Tamar Valley wood smoke particle pollution has been included in the reports from Environment Australia and Environment Department in Tasmania.

I will make some comments as you have itemized:

(a) particulate matter, its sources and effects

The sources of particulate matter include wood smoke, airborne dust (from soil and roads), pollens, diesel fumes and sea salts. The source of main concern to me is that from wood smoke. Wood smoke arises in our

communities from burning wood for home heating, industrial wood-fired boilers, back-yard burn-offs, rural vegetation burn-offs, planned forestry burn-offs and unplanned forest fires.

Wood smoke contains fine particles which are breathed into the lungs. They irritate the bronchial tubes and affect those with pre-existing lung disease, especially asthma, chronic bronchitis & emphysema.

The adverse health effects of wood smoke have been shown consistently by numerous studies and are reviewed in the many Ambient Air Quality NEPM reviews. They include short term effects (hours, days and weeks) and long term effects (over many years). The adverse effects include deaths, hospitalisations and ill-health without a need for hospitalisation. The particle levels in summer are usually 1 – 10 micrograms per cubic metre of air per day (µ/m3). Some key studies have shown that for every rise of 10 µ/m3 of daily particle concentrations, there is an increase of:

- 1% of daily deaths from all causes,
- 3% of daily deaths from lung causes,
- 3% of daily admissions to hospital for lung disease, &
- 3% of daily lung symptoms in the general population.

There are also increasing concerns about the long term effects of inhaling wood smoke which are relevant to all persons exposed to environmental wood smoke. A large study of 500,000 people from the USA investigated the causes of death over a 16 year period and concluded in 2002 that long-term exposure to wood smoke is an important environmental risk factor for dying from heart or lung disease and from lung cancer. The study corrected for the known risk factors for these diseases including tobacco smoking. There have also been many reports from under-developed nations about lung cancers developing in people cooking with wood stoves, often in poorly ventilated kitchens. The mechanism for causing lung cancer may be by inhalation of polycyclic aromatic hydrocarbons which are produced when wood is burned and which are inhaled with the particles.

The harmful effects of wood smoke appear similar to those of environmental tobacco smoke (ETS). We know there is no safe level of exposure to this. Individuals can choose not to smoke and can usually avoid ETS. However, a resident of a valley filled with wood smoke cannot easily avoid breathing in the polluted air.

(b) those populations most at risk and the causes that put those populations at risk

The populations at risk are all people who have frequent high exposure to wood smoke as well as those with those with lung disease (especially asthma, chronic bronchitis & emphysema). The proportion of Australians

with a serious lung disorder is estimated at 1 in 5. This is a very high number of people at risk. The very young and the elderly are also at a higher risk.

The people who have frequent high exposure to wood smoke include fire-fighters and residents of regions where wood fuel is commonly used. The regions most affected by wood smoke are populated inland valleys in the winter, where residents often heat their homes by burning wood in slow-combustion heaters. The smoke is trapped by temperature inversions in the valleys so that it lingers close to the ground overnight. There are areas of wood smoke pollution reported in many cities in Australia. High particle levels (over 50 µ/m3) were consistently recorded on many winter days in Launceston, Canberra & Armidale in the 1990's. The pollution levels have improved as residents have switched to alternative home heating sources, especially electrical. This has been helped by Government funded programs which provide a rebate to offset some of the costs of buying alternative heaters. Tasmania has the luxury of an environmentally friendly electricity supply from hydro- and wind-generated sources.

(c) the standards, monitoring and regulation of air quality at all levels of government.

It is important that the standards for particle pollution and other pollution continue to be set by Environment Australia and that all Australian States and Territories adhere to these. This requires daily measurements of the main pollutants, including particles, with appropriate equipment and personnel. This information also needs to be made available to the public promptly and preferably via a web-based facility to provide continuous access. I am aware that there is a process in place for this already via the NEPC of Environment Australia and that annual reports are required from each Australian State and the ACT.

For Particle Pollution, the Ambient Air Quality NEPM standards are based on daily PM 10 values. The NEPM review in 2011 recommended that a NEPM standard be introduced for PM 2.5. I support this and, like others, I would like to see the current recommendations for PM 2.5 become NEPM standards. These require that the daily PM2.5 remain below 25 µ/m3 and the annual daily average below 8 µ/m3.

It is useful to continue to set a maximum number of exceedences (eg 5 per year) as a guideline, but it is more important to explore the reason for each exceedence. This is especially important for particle pollution, where the response needs to be very different if the exceedences are from home wood heaters compared with exceedences arising from vegetation burn-offs or forestry fires or dust storms. Hence, it is equally important to request the reporting authorities to include data about the likely explanation for each exceedence.

For pollutants with no threshold safe value, such as PM10 & PM2.5, it would also be beneficial to have similar explanations provided for high levels which fall within the NEPM standard (perhaps those which are above 50% of the maximum permitted value).

(d) any other related matters

An important consideration is that there is no safe threshold for particle pollution, in the same way that there is no safe threshold level for exposure to tobacco smoke. Small but statistically significant associations have been found in large population studies between premature death from heart disease or lung cancer and a long term exposure to particle pollution (after correction for confounders such as tobacco smoking). These are important studies because they suggest that all residents exposed to particle pollution are potentially at risk of illness and not just those with lung disease. This makes it even more important to reduce particle levels to the lowest levels which can be achieved in modern urban and rural Australia.

Also important is the high economic cost of particle pollution in Australia in addition to its cost on human health. It follows that more resources could be directed to reducing particle pollution. It would be useful to recommend that PM2.5 be monitored in all cities and towns of Australia, perhaps with populations of at least 10,000 people. It would also be useful if residents could access current PM2.5 levels in their local regions, particular in areas known to have temperature inversion layers or wood smoke. This information is already available in Launceston and some other cities in Tasmania but it is not yet available in similarly affected regions like Armidale and Tuggeranong.

The rising cost of electricity in Australia provides a threat to the efforts to reduce wood fuel burning for home heating. Although wood is also an expensive source of fuel when purchased from wood merchants, many Australians can access wood supplies at a very low cost by cutting it themselves from a variety of sources. People who use wood fuel to reduce their home heating costs are doing so at the expense of residents in their neighbourhood, who all suffer the health and economic consequences from inhaling the particle pollution. One means of deterring this is for local councils to introduce a permit fee per household for permission to burn wood, in the same way that permits are required for burn-offs. The fees should be set appropriately and the monies from these used as incentives to help residents who wish to switch to cleaner home heating alternatives, especially electrical.

Some people mistakenly believe that modern wood heaters burn more efficiently and hence remove any concerns about wood smoke. This is not the case for several reasons. All wood heaters produce a lot of smoke when they first start up, for several minutes. If every household does this

and if there are temperature inversions, then that wood smoke will hover close to the ground all night, even if the ongoing smoke production is much less. In addition, even a modern heater will continue to produce a lot of smoke if the wood used is not dry and if it is not placed correctly in the wood heater. New wood heaters are now designed without a control to dampen the air vent. However, there are reports of some operators modifying the manufacture of the devices to permit dampening of the air vent so that the last load of wood can burn more slowly overnight. This practice increases wood smoke. A study of new wood heaters showed that only a minority complied with the manufacturer's claims about their burning efficiency, even with optimal usage. These are all reasons to discourage new installations of wood heaters in populated areas.

Each person can choose not to smoke tobacco products and they can actively avoid being exposed to other people's tobacco smoke. Government regulations in Australia are very good at assisting people to not be exposed to tobacco smoke, by banning smoking in confined public places. However, a non-smoking Australian living in a region with high particle pollution levels, is unable to escape that pollution and the associated risks without moving to a different location. This fact, together with the absence of a safe threshold level of exposure to wood smoke, provides a powerful reason as to why Governments should regulate the burning of wood to protect the population.

In conclusion, particle pollution from all sources, and especially from wood smoke, is harmful to our lungs. Residents should be encouraged and assisted to switch to safer alternative home heating. The burning of wood in residential areas should be regulated and discouraged, to protect all residents. This should help all residents to breathe more safely in winter, particularly those who have asthma or other chronic lung illness.

Yours sincerely,

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