Environmental Health Concerns in the Hunter

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Summary

The Hunter is a highly industrialised region of New South Wales. Increasing industrial development, and proposals for new development lead to community groups raising concern about cumulative health impacts in the region. To assess the environmental health concerns of Hunter stakeholders we surveyed 665 randomly selected residents of the Hunter over 15 years of age, the Environmental Health managers in all 11 local councils and members of the Area Health Services Health Councils. Air pollution was the major concern among all three groups followed by water pollution. Motor vehicle emissions were the primary source of concern. Environmental health concerns varied significantly by local government area and appeared to be influenced by both road traffic density and large industrial emitters such as coal mines and power stations.

Keywords: Environmental health, survey, community consultation, air pollution,

1. Background

1.1. The Hunter

The Hunter Valley of New South Wales has a long history of heavy industrial development focused upon coal mining, smelting, the steel industry and electricity generation. Approximately 540,000 residents live in a mixed urban and rural environment. The rationalisation of the steel industry and major restructuring of the coal industry has led to the closure of the BHP Newcastle steelworks, the closure of many underground mines and a move to more open cut mines. These changes have led to increased unemployment and a loss of traditional work opportunities in the Hunter Valley. The rapid change in industrial makeup and the loss of certainty of employment for current workers and future generations undermines the traditional local allegiances to industry and may fuel community concerns about industrial development.

1.2. The call for a cumulative health impact study

The Hunter has a concentration of industry including 3 large smelters, 5 power stations, and open 17 open cut coal mines (Box 1). According to the EPA the Hunter has 5 of the 10 largest emissions sources in NSW on the National Pollution Inventory. Community concern about the potential link between industrial emissions and health impact have led to repeated calls from the community for a range of health studies broadly described as a "cumulative health impact study". Prior requests for studies of this nature have led governments to acknowledge the potential future need for a regional health study. Planning NSW set a precedent in the mid 1990s by requiring industry to contribute to any future regional health study through Planning NSW development conditions of consent on at least one occasion (the Kurri Dross smelter).

Box 1 - Selected heavy industy in the Hunter

- 5 power stations
- 17 open cut coal mines
- 3 smelters
    - 2 aluminium
    - 1 lead-zinc

Since 2000, multiple environmental groups have made representation to Hunter Public Health Unit, the media, and politicians about the need for a study to examine the relationship between industrial emissions in the Hunter, particularly the Upper Hunter, and health outcomes. The potential need for a health study has been raised by a Singleton councillor, the local state MP in the Upper Hunter, ASMA NSW and environmental groups appointed by the NSW EPA Minister to the EPA Hunter Community Consultative Committee. When asked to comment on the feasibility of a "cumulative" environmental health impact study of pollutants in the area the Hunter Public Health Unit has warned of the need to be clear on community expectations and the limitations of such studies. Such a broad based study, without a prior hypothesis, specific health outcome, or specific exposure of concern is likely to be of little benefit to the community and be very resource intensive.

1.3 Drivers of concern

We do not have systematically collected data on the environmental health concerns of Hunter residents, however, the box below summarises the environmental health issues highlighted in the local media, through complaints to the Health Minister and the Public Health Unit and raised by environmental groups. The box below itemises drivers of concern that shape perceptions in the Hunter rather than a list of documented environmental health hazards.

Box 2. Issues raised by environmental health advocates, media, and complaints to the Public Health Unit.

- Recent Mothers and Babies report showing elevated rates of birth defects in the Hunter
- Proposals for "super dumps" in the Upper Hunter that have polarised support in the community.(approval was denied by Planning NSW Minister 7/3/02)
- Proposals for burning waste woods contaminated with heavy metals and contaminated soils in Upper Hunter power stations.
- Commissioning of large open cut coal mines in the Upper Hunter
- Proposal for further developments within existing industrial buffer zones.
- Commissioning of the new Redbank power station.
- Proposal for steel mini-mills in the Upper Hunter.
- Retrenchments in the mining industry in the Upper Hunter that may have undermined community support for the industry and led to activism on environmental issues.
- Continued poor emission performance from the lead smelter in Lake Macquarie.
- Entrenched high unemployment and low socioeconomic status of Hunter residents which produces poorer health outcome statistics for a wide range of conditions which are often linked to industrial emissions by residents.
- The perception that industrial emission monitoring results are difficult to access or not reliable.
- Rural health strategy acknowledged higher rates of asthma in Upper Hunter and perceptions of elevated asthma rates in Newcastle.
- Perception and media portrayal of high cancer rates around industry and in rural areas.
- Article in Singleton Argus 3/12/02 featuring a local MP and an environmental group announcing that a health study to assess the impact of pollution would be performed in the Upper Hunter.

1.4 Evidence for environmental health impact

Despite these community concerns there is little objective evidence for health impacts from industrial emission, however, there are significant data gaps in our knowledge of the impacts of industrial and other source emissions. It is noteworthy that to date the community concerns expressed to Hunter Health focus on industrial emissions to the exclusion of other sources of pollution such as motor vehicle emissions.

There are significant emissions of sulphur dioxide from industry in the Valley and there is conjecture that a "rust belt" in the Valley may exist due to acid rain from sulphur dioxide emissions. The Hunter Public Health Unit does not have access to all monitoring information in the Hunter but the potential for health impacts, especially asthma, from a mixture of emissions including oxides of nitrogen, sulphur dioxide and particulates cannot be discounted. A local study showed a relationship between nocturnal cough and particulate levels in the Hunter but no association between respiratory effects and SO_2 (Lewis et al 1998).

1.5 Aim of this study

Before any studies of health impact of development in the Hunter Valley could be usefully performed it is important to understand the major environmental health concerns of stakeholders. The aim of this study was to systematically document the environmental health concerns of stakeholders in environmental health, namely Hunter residents, Area Health Service consumer representatives on Health Councils, and senior Environmental Health managers in local government.

2. Methods

2.1 Survey of community environmental health concerns

Commencing in May 2002, the Hunter Public Health Unit placed the following question in the Hunter component of the NSW Health Survey. Over one year, approximately 1000 residents of the Hunter were telephoned and surveyed about a range of health behaviours and conditions. They were asked the following environmental health question:

"What would you say is the single most important environmental health issue in the Hunter today?

By environmental health issues, I mean issues involving the contamination or pollution of air, water, land or food that can affect human health"

This question is based on a similar survey conducted by the NSW EPA which asked "What is the single most important environmental issue in NSW today?".(Who cares about the environment, 2000) The responses were coded by the Qualitative Research Laboratory at the

CCEB, University of Newcastle. Responses were coded to pollution of air, water, land or food, waste, general development and not otherwise specified.

The target sample comprised approximately 1,000 people in the Hunter. The sampling frame was developed as follows. Records from the Australia on Disk electronic White Pages were geo-coded using MapInfo mapping software to the Hunter Area Health Service region. Telephone numbers were randomly sorted. When households were contacted, one person was selected, using random numbers generated by the Computer Assisted Telehone Interview system. Households selected that had addresses in the electronic White Pages were sent a letter describing the aims and methods of the survey two weeks prior to initial attempts at telephone contact. Trained interviewers at the NSW Health Survey facility carried out interviews. For analysis, the survey sample was weighted to adjust for differences in the probabilities of selection among subjects. These differences were due to the varying number of people living in each household and the number of residential telephone connections for the household. 'Post-stratification' weights were used to reduce the effect of differing non-response rates among males and females and different age groups on the survey estimates. These weights adjusted for differences between the age and sex structure of the survey sample and the Australian Bureau of Statistics 2001 mid-year population estimates (excluding people resident in institutions) for the Hunter.

2.2 Survey of local government councils

The 11 Hunter councils were surveyed to identify the major environmental health concerns of council officers and their constituents. General Managers were emailed requesting that a senior manager responsible for responding to community environmental health perceptions complete an online survey

2.3 Survey of Hunter Health Council members

The Hunter Area Health Service has three Health Councils (called the Upper Hunter, Central Hunter and Lower Hunter health councils) which provide feedback on community/consumer concerns in relation to health issues. There are 9 elected executive members on each Council and approximately 1200 ordinary and associate members. A survey was mailed to all 1200 of the Health Council members with the option of answering the survey on paper and returning it in a provided postage paid envelope or answering the survey online using a web based data entry form. Health council members were asked the same question open ended question as in the NSW Health Survey and responses were coded to air, land, food, water, and other environmental health issues.

3. Results

3.1 Survey of community environmental health concerns

719 Hunter residents over the age of 16 years were surveyed as part of the NSW Health Survey between March 2002 and December 2002 resulting in 665 responses to the question "What is the single most important environmental health issue in the Hunter today?" Because of the sampling protocol employed in the survey method, the numbers given in the results are weighted to reflect the numbers of responses expected from a population of 540,000 Hunter residents.

Eighty-eight percent of respondents named an environmental health concern, with no difference in percentages nominating a concern by gender or 5 year age group (data not shown), self rated health status (data not shown), history of having an asthma diagnosis (data not shown) or self-reported stress levels (data not shown). There was a trend for respondents of higher socioeconomic status (by postcode SEIFA score) to name an environmental health concern compared to those of lower status (Figure 1.)

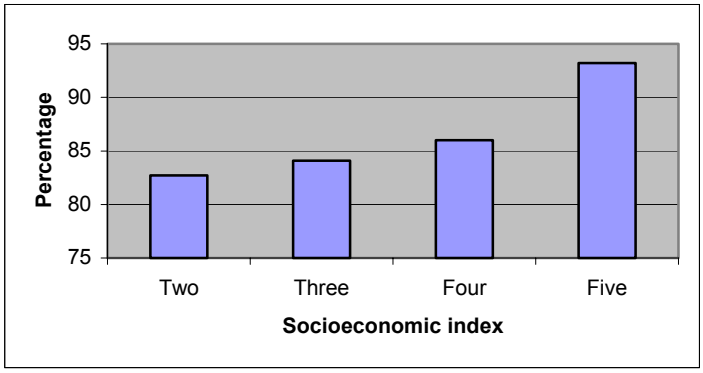

Figure 1. Percentage of Hunter residents naming an environmental health concern by socioeconomic index of postcode, NSW Health Survey, 2002 - 2003.

Air pollution was the most frequently named environmental health concern followed by water pollution (Figure 2). There were no differences by gender.

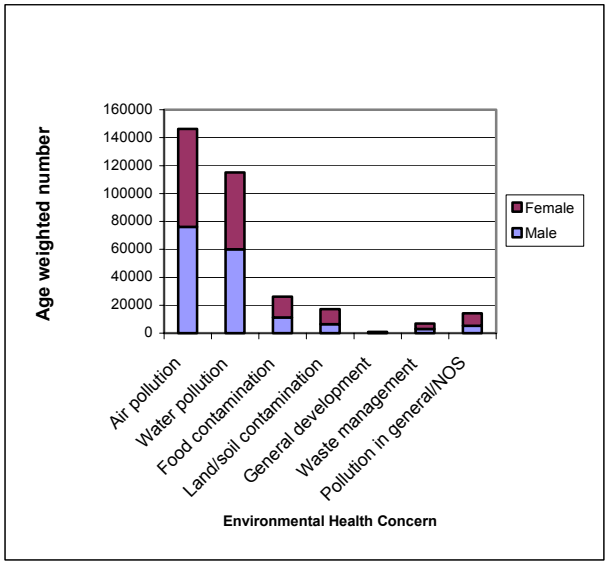

Figure 2. Environmental health concerns of Hunter residents, NSW Health Survey, 2002-2003.

Table 1. Age-weighted number of Hunter residents mentioning specific pollutants in relation to most important environmental health concern in the Hunter. Health Survey, 2002- 2003.

Pollutant mentioned	Number of residents
Vehicle Emissions	18276
Litter	17919
Run off, residential/industrial/nonspecific	12342
Non specific fires/fumes/smoke/smog/gases	10099
Dust from mines	7478
Chemicals	9504
Lead	8645
Fires, Bush	7038
Effluent	3411
Food Additives	1234
Salinity	4345
Algae	4038
Pollutant, Non-specific	1842
Pesticides	2171
Fertilisers	563
Smoke, Cigarette	3062
Silt	842
Weeds	1840
Fires, Wood	542
Genetically Modified Food	1727
Sprays, Non-specific	1796
Fires, Home	1461
Fires, Industry	410
Metals	510

When the open ended question was coded to identify references to specific types of industry, among respondents that made such a reference, 67% made reference to coal mining, 49% to power stations, 39% to metal based industries. Some respondents made reference to multiple industries.

3.2 Survey of local government councils

All 11 local government council environmental health managers responded to the online survey. Environmental health managers identified water pollution (6), air pollution (4), and land/soil pollution (1) as the most important environmental health issue in the Hunter. When asked if they thought their prioritisation might differ from that of their constituents, they acknowledged the importance of air pollution as the primary concern of residents. Four of six environmental health managers who prioritised water pollution acknowledged air quality as the primary concern of residents as did the one environmental health manager who prioritised land pollution. Five of the 11 managers believed the environmental health issue was causing ill health among Hunter residents, 4 did not know, and 2 stated there was no health impact. From a picklist of a wide range of health impacts the managers selected the following health impacts: asthma (4), other lung disease (3), mental stress (2), allergies (2), cancer (2), and decreased mental development (1).

3.3 Survey of Hunter Health Council members

One hundred and sixty four Hunter Health Council members responded to the survey. Only eight respondents answered the survey online despite at least another 22 respondents had active email addresses.

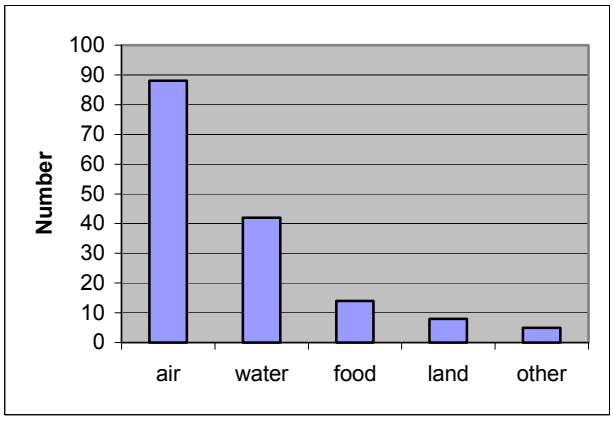

Figure 3. Number of Hunter Health Council members naming selected environmental health concerns, 2003.

Table 2. Number of Hunter Health Council respondents and percentage reporting the belief that their major environmental health concern was causing illness among residents.

Local government area	Number of respondents	Believe environmental health issues causing illness (%)
Cessnock	7	67
Dungog	7	71
Lake Macquarie	40	88
Maitland	7	71
Merriwa	10	78
Murrurundi	5	60
Muswellbrook	8	100
Newcastle	34	81
Port Stephens	26	65
Scone	8	88
Singleton	11	91

Hunter Health Council members identifying air pollution as the major environmental health issue in the Hunter (91%) were 1.4 times more likely to believe that the environmental issue was causing ill health in residents compared to members reporting nonair pollution environmental health issues (63%).

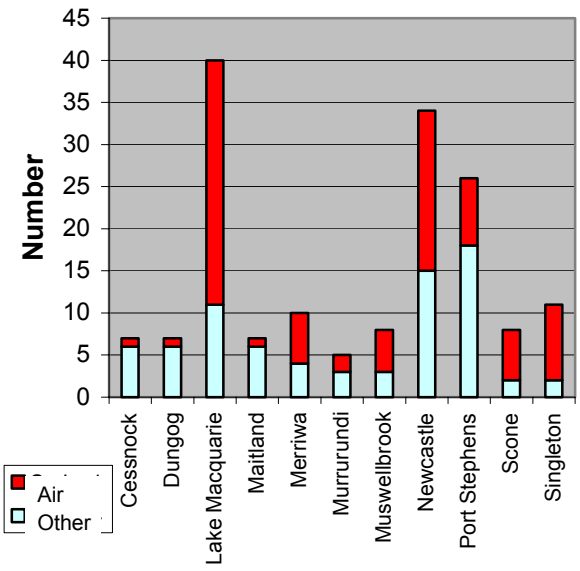

Figure 4. Numbers of Hunter Health Council respondents by LGA of residence comparing major environmental health concern equals "air pollution" versus other concerns, 2003.

4. Discussion

This series of surveys reviewed the environmental health concerns of a wide range of stakeholders. The NSW Health Survey has the advantage of being a truly random survey with weighted analysis to account for age and gender variations in the sampling. The local government survey brings the perspective of senior management from local councils. Councils are the agency that is closest to the community and charged with broad environmental health decision making, development approval, and responding to community concerns about environmental health issues in partnership with other agencies. The Hunter Health Council members are a self nominated group who volunteer to provide community feedback to the Area Health Service. We believe this is the first time a Health Council has been consulted about environmental health issues.

Community consultation plays an important role in modern public health practice. It is advocated in the National Environmental Health Strategy (Commonweatlh Department of Health and Aged Care 1999) and the NSW Healthy People 2005 document (NSW Health 2000). The use of systematic surveys provide insight into wider community concerns that may not be reported in the media or result in complaints to health, environment protection, or local government agencies. The concern associated with vehicle emissions is not an issue that would normally be referred as a "complaint" to a government agency hence the usefulness of such a survey.

These surveys demonstrate the broad concern with air pollution in the Hunter Valley associated with both vehicle emissions and industrial emissions. It is to be expected that respondents with from local government areas with easily identifiable emitters to air were more likely to nominate air pollution as the major environmental health issue. Hence we see Lake Macquarie respondents (impacted by motor vehicles and the lead zinc smelter), Newcastle (motor vehicle emissions), Singleton (open cut coal mines and power stations), Muswellbrook (open cut coal mines and power stations) more often reporting air pollution than respondents from the more rural nonindustrial local government areas of Cessnock, Dungog, Maitland and Murrurundi (Figure 4). However, the rural nonindustrial local government areas of Scone and Merriwa report air pollution suggesting there is a perception of impact from the neighbouring local government areas.

The prioritisation of air pollution in this study is consistent with the findings of the NSW Environment Protection Authority's *Who cares about the environment?* survey which has found residents of NSW rate water then air issues significantly above other environmental issues.

We did not find a difference in environmental health concern by gender. Given the findings of gender differences in environmental risk perception we might have expected to find some differences in the Hunter (Slovic 1999), however we did find a difference in response by socioeconomic level.

It is reassuring to find that the local council environmental health managers, while having slightly different environmental health concerns, are in touch with the concerns of residents as described in these surveys.

There are many limitations to be acknowledged in this study. The question in the NSW Health Survey was open ended and required coding for analysis. By defining environmental health in the question we will have affected the range of issues raised by respondents. Coding of responses may introduce biases, particulary the coding of themes subordinate to the main theme of the question. Nevertheless these finding will help inform environmental health policy in the Hunter.

There is an obvious need to address community concerns about air pollution both from an industrial and transport perspective. This has implications for development approval and sustainable transport planning. To respond to these concerns the Hunter Public Health Unit is developing a special web site dedicated to providing information on the sources and composition of the major environmental health issues identified in the survey including resources on the potential health impact of pollution.

Further consultation with community and other agencies will be required before the usefulness of a region-wide cumulative health impact study can be explored. It may be that a comprehensive ambient monitoring program designed to ensure compliance with, or monitoring against, a set of health based standards would be a better public health investment.

5. Acknowledgements

I would like to acknowledge the assistance of Mr Tim Sladden, Environmental Epidemiologist and Mr John James Senior Environmental Health Officer, Hunter Public Health Unit, and Dr Nick Higginbotham, Centre for Clinical Epidemiology and Biostatistics for reviewing the survey instruments.

6. References

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