Medical Officer of Health

Environmental Health ADVICE

Environmental Health Quarterly Report 2004 Vol. 7, Issue 1

Inside

Introduction

Vehicle emissions in the Auckland Region have a significant adverse effect on public health. Auckland Regional Public Health Service supports measures to reduce vehicle emissions.

The Auckland Regional Public Health Service is funded by the Ministry of Health to contribute biosecurity and quarantine services in the Auckland region. A core component of this work is the prevention of the establishment of exotic mosquitoes in our region. In this issue we outline our main activities for mosquito surveillance.

Impacts of vehicle emissions on air quality in the Auckland Region

Improving our air quality is an important issue for the Auckland region. The air-borne pollutants of concern in the Auckland region are particulate matter, carbon monoxide (CO), nitrogen dioxide (NO_2), ozone and volatile organic compounds (VOCs) (including benzene and 1,3 butadiene). Peak concentrations of CO, NO_2 and particulate matter (PM) often exceed air quality guidelines (ARC 2003). World-wide and in New Zealand, there is a growing body of evidence that exposure to unacceptable levels of air-borne pollutants in air can shorten lives and cause or worsen a wide variety of health problems. In some developed countries, air pollution kills more than twice as many people as car accidents.

Common acute health effects include cough or wheeze, worsening of asthma and heart disease, and pneumonia. These can lead to restricted activity, missing school or work, visits to doctors or emergency departments, or hospitalisation. All of these effects have been observed in relation to days of higher than usual air pollution in many countries, including New Zealand. Research currently being undertaken, the Health and Air Pollution in New Zealand (HAPINZ) study, will quantify these health effects. This will be done for people of all ages, throughout the country, with complete results expected in 2006.

Vehicles contribute significantly to air pollution either through exhaust emissions or evaporation of fuel. The Auckland Regional Council estimates that vehicles produce over 80% of the nitrogen oxide and CO emissions in the region (ARC 2003). In 2003, the Auckland Regional Council commissioned a study of vehicle emissions. Tailpipe emissions were measured in vehicles driving along the road using remote sensing. The study showed that the most polluting 10% of vehicles contributed 53% of the total carbon monoxide emissions, 39% of the total nitrogen oxide emissions and 51% of the total hydrocarbon emissions (ARC 2003).

The pollutant PM10 (i.e. particulate matter less than 10 micrometers in diameter) is of particular concern. The health effects associated with exposure to PM10 include irritation of the nose and mouth (coughs, asthma symptoms, bronchitis), hospitalisation and premature mortality (MfE 2003). A report prepared for the Ministry for the Environment (2003) on the health effects of PM10 in New Zealand estimated that in the Auckland region there are 200 extra hospitalisations each year. This is likely to be an underestimate. It has been calculated that PM10 causes a 4% increase in deaths for every 10 micrograms per cubic metre increase in its average annual concentration (above the baseline level of 7.5mg/m3) (Kunzli et al. 2000). Although there is only a relatively small increase in the risk of death for each individual, the cumulative effects are important because of the large numbers of people exposed to air pollution.

A study carried out for the Ministry of Transport in 2002 (Fisher et al. 2002) applied these known effects of different levels of PM10 to the situation in New Zealand, in order to calculate the number of deaths per year that can be attributed to this type of air pollution. In their calculations, the investigators used available air quality monitoring results for cities and towns from throughout New Zealand together with population data. The calculation, carried out using the best established international methods, showed that 970 people above the age of 30 years already die prematurely each year from exposure to PM10 and 436 of these deaths occur in the Auckland region. In Auckland, almost six out of every ten deaths related to air pollution (253 deaths per year) are due to pollution from motor vehicles.

Another recent study (Scoggins 2003) examined the association between air pollution and deaths in the Auckland region, using nitrogen dioxide as the marker of pollution. The methods used were different, but the estimated number of deaths associated with the levels of pollution currently seen in Auckland was in the same range as that found in the Ministry of Transport study. The methods used in both these studies were deliberately conservative: in other words, it is more likely that the true number of deaths due to air pollution is even higher than the estimates given.

Reducing vehicle emissions

It has been estimated that 60% of Auckland's air pollution problem is caused by vehicle emissions. New Zealand currently has no laws requiring that vehicles meet emissions standards apart from the "ten-second rule". Under the "ten-second rule" vehicles emitting visible smoke for more than ten seconds can be fined and/or required to be repaired. A key priority for our region is to reduce vehicle emissions. Cleaning up vehicle-related pollution has three components:

- Driving less
- Improving vehicle standards and maintenance
- Using cleaner fuels

Driving less

The current Auckland Regional Council "Big Clean-Up" campaign encourages Aucklanders to "reduce your car trips by two a week." The more people who can walk, cycle, carpool, telework, or use public transport instead of using their cars, the less pollution will be released into our air. Short car trips generate the most pollution per kilometre travelled.

Improving vehicle standards and maintenance

New Zealand's vehicle fleet is older than in other developed countries. The on-road remote sensing study showed that older vehicles produce more air pollution than newer vehicles.

The Ministry of Transport is currently consulting on ways to reduce the emissions of the vehicle fleet as a whole. Auckland Regional Public Health Service supports the introduction of standards for vehicles being imported, and some form of ongoing emissions testing for vehicles in the fleet. Such measures are standard in developed countries, and have been shown to improve air quality. Enforcement of the ten-second rule should also be given priority, since the worst 10% of vehicles emit approximately half of all vehicle-related pollution (ARC 2003). Emissions testing and enforcement of the 10 second rule will ensure that these high-emitting cars are identified and repaired.

Cleaner fuels

The introduction of cleaner-burning fuels (those which produce smaller amounts of pollutants than other fuels) allows an immediate improvement in air quality. With cleaner fuel, even older vehicles produce less pollution than they do when using "dirty" fuels. Moreover, the availability of cleaner fuels allows use of the latest engine technology, which further reduces pollution. Diesel vehicles produce much higher particulate emissions than petrol vehicles. Cleaner fuel would allow existing diesel vehicles to be retrofitted with devices (particle traps, NOx converters) to reduce tailpipe emissions.

New Zealand fuel is very high in sulphur, which produces sulphur dioxides and fine particulates – both of which are harmful. The sulphur levels are gradually being reduced, but from a much higher level, and more slowly, than in many other countries. The latest engine technology requires cleaner fuels than we currently have. There is thus a double imperative to improve fuel quality in New Zealand: to gain the immediate benefits of reduced emissions from all vehicles, and to allow the introduction of newer, less-polluting vehicles. Auckland Regional Public Health Service urges the acceleration of improvements to fuel quality.

- Further information on air quality is available from the Auckland Regional Council's and the Ministry for the Environment's websites.
  www.arc.govt.nz www.mfe.govt.nz

References

ARC (2003) On-road remote sensing of vehicle emissions in the Auckland Region. Technical Publication No. 198. Auckland Regional Council.

Fisher GW, Rolfe KA, Kjellstrom T, Woodward A, Hales S, Sturman AP, Kingham S, Petersen J, Shrestha R and King D (January 2002) Health effects due to motor vehicle air pollution in New Zealand. Report to the Ministry of Transport. http://www.transport.govt.nz/downloads/niwa_report.doc

Kunzli N, Kaiser R, Medina S et al. (2000) Public-Health Impact of Outdoor and Traffic-Related Air Pollution: A European assessment. In MfE (2003).

MfE (2003) Health Effects of PM_{10} in New Zealand. Air Quality Technical Report No. 39. Ministry for the Environment.

Scoggins SA (2003) Air pollution exposure and mortality in the Auckland Region. MPH thesis, University of Auckland.

Contact details for the Auckland Regional Public Health Service

Central Auckland:
(main contact for the Environmental Health team)

Public Health and Resource Centre
2 Owens Rd
Epsom

Ph 09 262 1855

South Auckland:

Public Health and Resource Centre
Level 2
Westfield Tower
Manukau City Centre

Ph 09 261 1620

North Shore:

Public Health and Resource Centre
Karaka House
9 Huron St
Takapuna

Ph 09 488 2310

West Auckland:

Public Health and Resource Centre
22 Moselle Ave
Henderson

Ph 09 836 6370

Website:
www.arphs.govt.nz

Mosquito surveillance in the Auckland region

The Auckland Regional Public Health Service is funded by the Ministry of Health to provide services in the areas of biosecurity and quarantine throughout the Auckland region. One of our main objectives is to prevent the establishment of exotic mosquitoes in the Auckland Region. The Environmental Health team undertakes surveillance for mosquitoes, investigates mosquito interceptions and incursions and provides educational programmes for port and airport staff.

The Environmental Health team operates two programmes for vector control in Auckland:

- Weekly and bi-weekly monitoring and surveillance at the four international ports in Auckland.
- Regular surveys of areas identified by the ADHB as favourable larval habitats for *O camptorhynchus*. The surveys involve a combination of larval dipping and setting light adult traps to obtain larvae and adults.

In January this year, two species of exotic mosquito *(Aedes Aegypti and Aedes Polynesiensis)* were intercepted at the Ports of Auckland. Live mosquito larvae were found in the barrel of a concrete mixer truck. At this time we believe that these species have not established at the port and that the eradication measures appear to have been successful. These species of mosquito pose a real threat to public health as they are capable of spreading several very serious diseases.

Over the past 6 years the ARPHS have operated an ongoing programme to detect salt-water mosquitoes in the Auckland Health District. Areas where *O. camptorhynchus* have been detected are:

- Kaipara Harbour
- Whitford
- Shakespeare Park

Surveys are timed to coincide with tidal and wet weather events and are subject to change depending on prevailing climatic conditions that are conducive to increased larval activity. The surveys are also prioritised depending upon other high priority public health commitments that arise.

Six staff in the EH Team are specifically trained to undertake the regular survey work to detect the presence of *O camptorhynchus*. All other remaining health protection officers and technical officers, including all those in other teams, are trained to react appropriately to notifications of interceptions of exotics when any are notified at the ports.

For further information contact
John Whitmore or Dick Thornton.
Telephone 09 262 1855.

Short Notes

Early childhood education centre mailing lists

We have recently revised our mailing list of early childhood education centres (ECECs) and in future will use the most up to date Ministry of Education database. This means that ECECs will not need to advise us of changes in contact details. We have also developed a database of early childhood education stakeholders and will include stakeholders in all mailouts for early childhood education centres.

Vivien McGaughey

Vivien McGaughey is a Support Officer who has been working in Public Health for 15 years. She was involved with notifiable communicable diseases for 5 years, followed by 2 years at the Refugee Centre clinic in Mangere, and she has been with the Environmental Health team for 8 years. She is involved with Hazardous Substances licensing and poisoning databases, and has provided input into the national Chemical Injuries Surveillance System being developed by ESR for the Ministry of Health. Her general duties include ordering a varied array of supplies, services and equipment for the Environmental team. She is a member of the Auckland Regional Public Health Service Continuous Quality Group, continuing on from our successful achievement of accreditation with Quality Health New Zealand in 2003.