

# **Air Quality & Respiratory Health Study**

## **Phase 2 Report: Summary results from 2007**

### **Air Quality & Respiratory Health Study – summary results from the second round of testing**

The Air Quality & Respiratory Health Study (AQRHS) is being conducted to determine whether the effects of changes in air quality arising from traffic-related air pollution are associated with changes in respiratory health in people living around the Lane Cove Tunnel.

The baseline testing (first round) of the survey was conducted during June-Dec 2006, with the second round of testing (first follow-up) conducted in June-Dec 2007. Information on respiratory health was collected by questionnaire from 2989<sup>1</sup> participants living in four zones around the Lane Cove Tunnel:

- Zone 1-        “Predicted decrease” - zone predicted to experience a decrease in exposure to pollution arising from changes in traffic
- Zone 2-        “Predicted increase” – zone predicted to experience an increase in exposure to air pollution arising from changes in traffic
- Zone 3 -        “Stack” – an area encompassing all households within 650m of the eastern ventilation stack of the LCT tunnel
- Zone 4 -        “Control” – a control area in the same general vicinity but where no change in traffic or pollutant exposure is expected

From these participants a sub-group of 381<sup>2</sup> people participated in a symptom diary study. The diary study involves participants recording symptoms and peak expiratory flow readings on a twice daily basis for a nine week period.

Nitrogen dioxide (NO<sub>2</sub>) levels were monitored at about thirty eight sites in the Lane Cove area. Nitrogen dioxide is being used as a marker of traffic related air pollution in this study. The NO<sub>2</sub> readings, together with geographical information, is being used to estimate individual NO<sub>2</sub> levels for each household during the period that the study was conducted.

### **Summary of the response rates for the 2007 survey**

#### **1.     *Questionnaire Survey & Diary Study***

From the respondent households contacted in 2006, 2989 eligible participants were interviewed for the Questionnaire Survey in 2006 and 2205 (74%) were successfully interviewed in 2007 (Table 1).

Of the Diary Study participants in 2006, 319 (83%) took part in a home visit in 2007 (Table 1). The home visit consisted of spirometry to test lung function, a skin prick test to test for atopy (airborne allergies) and collection of a DNA sample. 264 (77%) of participants completed two or more weeks of the nine week symptom and peak flow diary.

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<sup>1</sup> This figures differs from the 2006 baseline figure as subjects were subsequently found to be ineligible due to age or insufficient time spent at home.

<sup>2</sup> This figure differs from the 2006 summary figure as it includes all people approached to be part of the study.

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Approximately half of the participants in the Diary study were children (<18yrs) when recruited in 2006 and half are adults. Analysis of Diary data will take place after the third round of testing (2008) is complete.

**Table 1: Follow-up of participants in the Questionnaire and Diary Studies by zone**

Zone	Questionnaire		Diary study	
	Number of subjects in 2006	No. (%) of subjects followed-up in 2007	No. (%) of subjects followed-up in 2007 with lung function testing	No. (%) of subjects submitting 2 or more diaries in 2007
1 Predicted decrease zone	1031	760 (74)	86 (92)	76 (86)
2 Predicted increase zone	596	426 (71)	80 (81)	60 (71)
3 Stack zone	603	481 (80)	82 (87)	72 (84)
4 Control	768	538 (70)	71 (72)	56 (67)
TOTAL	2998	2205 (74)	319 (83)	264 (77)

## 2. *NO<sub>2</sub> passive sampling*

Nitrogen dioxide (NO<sub>2</sub>) levels were monitored in approximately 38 locations in the local area including within the four zones. This sampling used passive NO<sub>2</sub> samplers, which were placed at the various locations for three separate two week periods during September to December, 2007. Some of these samples were placed by roadways and in parks, and some were placed outside participant households. The purpose of this part of the study was to determine how ambient NO<sub>2</sub> varies within the Lane Cove/Ryde area. NO<sub>2</sub> was measured as a marker of traffic-related air pollution. These NO<sub>2</sub> readings will be used to estimate exposure to NO<sub>2</sub> for each individual household in the study. The study will also

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be using all of the air quality data obtained from the fixed site monitors and has also commissioned emissions modelling by the CSIRO.

Table 2 lists the range in readings obtained from all of the two week samplers for both 2007 and 2006. These include samplers that were placed in general locations (roadways, parks) and those placed outside participants' homes. The highest readings for all sampling periods were found along Epping Road.

**Table 2: Summary statistics for the NO<sub>2</sub> passive sampling**

Round	Ambient sampling, NO <sub>2</sub> (ppbv)*	
	2006	2007
1 Sept- Oct	8.2-26.5 (n=32)	7.9-16.8 (n=37)
2 Oct-Nov	7.9-22.5 (n=34)	8.7-17.4 (n=36)
3 Nov-Dec	6.9-22.0 (n=38)	6.6-15.0 (n=36)

\*ppbv = parts per billion by volume

### Next steps

The LCT opened in March 2007. However completion of the road changes to Epping Road that were originally planned to be in place when the tunnel opened were delayed until March 2008. As a result, the Lane Cove Tunnel Study Advisory Committee (provides scientific expert advice to the study team) recommended that a third and final round of testing be conducted. This view was supported by the Asthma & Airways Cooperative Research Centre who, together with NSW Health, agreed to fund the third round of testing. We are now contacting participants for both the Questionnaire and Diary Study components of the overall AQRHS, to collect information on respiratory health. Each participant will be interviewed and tested as close as possible to 12 months after their original interview date. McNair Ingenuity Research, a market research company, has again been contracted to conduct the questionnaire survey. This involves a face-to-face interview with most participants. The Diary Study involves home visits by members of the AQRHS team to explain completion of the symptom diary, demonstrate peak flow measurement, and to conduct breathing tests at the homes of participants, as well as completion of a nine week symptom diary.

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Three rounds of passive NO<sub>2</sub> sampling will again be conducted during September to December this year.

Analysis of the data will take place in 2009 and final write-up in 2009-2010.