Toluene diisocyanate induced asthma: outcome according to persistence or cessation of exposure

Sir,—We read with interest the article by Pisati *et al* (1993;**50**:60–4) regarding outcome according to persistence or cessation of exposure to toluene diisocyanate. In a recent analysis of asthma compensation claims in Ontario, we have also found (data submitted for publication), as have some of the other reports referenced by Pisati *et al*, that duration of symptoms before leaving exposure and initial pulmonary function measures were important predictors of outcome.

In explaining the poor state of group A who were still exposed, is it possible that Pisati *et al* could further sort out the role of continued exposure to toluene diisocyanate *v* the initial circumstances such as long duration of exposure and long duration of symptoms before diagnosis? In particular, among the non-improved subjects within group B (subgroup III) who were no longer exposed, the baseline PD_{15} of 424 was similar to that among group A who were still exposed (425). Moreover, as the authors point out, subgroup III had a long mean duration of exposure (15·9 years), and mean duration of symptoms before diagnosis (5·4 years), again similar to those among group A (25 and 6·3 years, respectively). The baseline FEV_1 was somewhat lower, however, among group A than subgroup III (86·8% *v* 94%).

The authors indicated that it was not possible to analyse group A in this way (because no subjects recovered). Whereas removal from exposure is probably the only effective way of preventing deterioration, it would be of interest if the authors could look at subgroups or examine the relative importance of duration of exposure and symptoms before diagnosis *v* persistent exposure as predictors of outcome in comparing group A and subgroup III, as they were similar at baseline.

GARY M LISS
Ontario Ministry of Labour
SUSAN M TARLO
The Gage Research Institute, Toronto, Ontario, Canada

Authors' reply

We are grateful for the opportunity to reply to the letter from Liss and Tarlo and thank them for their interesting comments on our paper.[1]

Within group A (patients who had carried on working exposed to toluene diisocyanate), the 13 subjects who had deteriorated after five years of further exposure and the four subjects who were found stable had similar duration of exposure to toluene diisocyanate and symptoms before diagnosis, as well as baseline lung function tests, PD_{15} methacholine, and severity of bronchoconstriction induced by the toluene diisocyanate inhalation challenge. Therefore, it was not possible to predict what factors affect the different outcome of these toluene diisocyanate asthmatic subjects on persistence of exposure.

As Liss and Tarlo suggested, we compared group A and group III (non-improved subjects within group B, who had stopped exposure) at the time of diagnosis and at the follow up visit. At diagnosis, several clinical and functional indices of the two groups (symptom score, medication score, FEV_1, PD_{15} methacholine, and duration of symptoms before diagnosis) were similar. At follow up, group A was significantly more symptomatic ($p = 0·01$ by unpaired *t* test) and required more medication ($p = 0·005$) than group III (table). Because at diagnosis, however, the mean duration of exposure to toluene diisocyanate of group A was significantly longer than that of group III (25 *v* 15·9 years; $p = 0·007$ by unpaired *t* test), comparing the two groups of patients is of no use in further sorting out the role of persistence of exposure *v* the mean duration of exposure to toluene diisocyanate before diagnosis.

Clinical details of the 17 subjects with persistent exposure to toluene diisocyanate and the 21 non-improved no longer exposed subjects, at the time of diagnosis and at follow up

Characteristics	*Group A (n = 17) Still exposed mean (SD)*	*Group III (n = 21) Non-improved, no longer exposed mean (SD)*
Symptom score:		
At diagnosis	1·7 (0·8)	1·9 (0·9)
At follow up	2·3 (1·1)*†	1·5 (0·7)
Medication score:		
At diagnosis	1·4 (1)	1·2 (0·6)
At follow up	2·8 (1)**†††	1·6 (1·4)
FEV_1 (% predicted):		
At diagnosis	86·8 (22·5)	94 (17·7)
At follow up	72·9 (19·4)††	82·7 (29)
FEC_1/VC (%):		
At diagnosis	66·4 (11·7)	71·4 (11·3)
At follow up	60·1 (13·5)†	68·5 (14·5)
PD_{15} methacholine (μg):		
At diagnosis	425 (608)	424 (304)
At follow up	301 (610)†††	501 (571)

*p = 0·01; **p = 0·005 (unpaired *t* test between groups).
†p < 0·01; ††p < 0·005; †††p < 0·001 (paired *t* test between initial and follow up examination).

1 Pisati G, Baruffini A, Zedda S. Toluene diisocyanate induced asthma: outcome according to persistence or cessation of exposure. *Br J Ind Med* 1993;**50**:60–4.

Semen quality in welders exposed to radiant heat

Sir,—The report by Bonde (1992;**49**: 5–10) further illuminates the issue of radiant heat as a reproductive risk for men who weld. It calls to mind an earlier concern of ours over similar risks to reproduction from *convective* heat exposures among divers who inhabit hyperbaric chambers for long periods. These chambers are pressurised to 30–60 times normal atmospheric pressure. The breathing medium is nearly pure helium with just enough oxygen to maintain a physiological content of oxygen in alveolar gas and arterial blood. Because helium thus compressed has a heat capacity equal to that of water, it is necessary to provide an ambient temperature around 32°C to insure thermal comfort and homeostasis.[1 2] Such high ambient temperatures are maintained for many days, because decompression proceeds at only 100