PostScript

LETTERS

Environmental tobacco smoke exposure in motor vehicles: a preliminary study

Environmental tobacco smoke (ETS) contains over 3000 chemicals of which at least 50 are known or suspected to be human carcinogens, while over 200 are regarded as poisonous.[1 2] Although passive smoking often occurs in private and public workplaces, with extensive research already conducted in hospitality venues, casinos, airplanes, airports and homes, to our knowledge there are insufficient data (if any) published on motor vehicle secondhand smoke (SHS) levels and no comparisons have been made with other areas where people are involuntarily exposed to ETS.

Measurements of airborne respiratory particles under 2.5 μm ($RSP_{2.5}$) in diameter were made using the TSI SidePak AM510 Personal Air Monitor during March 2005 in Crete, Greece. Respiratory particles of this size are not specific to tobacco smoke, since background levels arising from cooking or vehicle fumes are also of this size, but elevated levels of such particles can be attributed almost solely to ETS and are used to measure it.[3–5] To reduce background environmental pollution, all measurements took place in rural areas of Crete with low baseline $RSP_{2.5}$ measurements (baseline measurements 0.013 mg/m^3). During the measurements, the inlet of the machine was placed at the base of the passenger front seat headrest, approximately 0.7 m above the seat and the cigarette in the car's ashtray.

Real-time measurements were taken every 10 seconds representing the average measurements of the 10-second intervals. In each test a cigarette was left to burn inside the vehicle until it extinguished itself, usually between 10–20 minutes, depending on air circulation. In all cases all windows other than the driver's were closed, outdoor wind was not noticeable and the heating/air-conditioning fan was turned off. Weather conditions were similar during all tests.

SHS exposure was found to vary according to the vehicle's interior passenger cabin volume (PCV) and air circulation (table 1).

In all three study vehicles, SHS exposure varied according to the driver's window status. When windows were closed so as to simulate driving in a cold and/or rainy day, $RSP_{2.5}$ levels were higher than when the windows were left half or fully open, allowing air to circulate ($p < 0.001$). Lower $RSP_{2.5}$ values found in the city car (with window open), compared with those of the smaller PCV utility car, could be attributed to the larger windows in the city car and therefore to larger air exchange rates. Under all other conditions and for all cars tested, $RSP_{2.5}$ levels varied according to PCV size.

Motor vehicle SHS levels of exposure are much higher than the levels found, for example, in hospitality venues such as casinos, bars and restaurants in New York and Delaware in the United States, and in pubs and bars in the United Kingdom—up to 112 times higher than the mean levels found in the smoking areas of UK pubs and bars, and 55 times higher than the levels found in venues in Delaware, before smoking was banned.[3 4 6]

The main limitation of our study is the fact that all measurements were taken with the car stationary, thus resembling driving with the windows closed or in very heavy city traffic. It is most likely that under normal driving conditions the measurements would differ according to air circulation, which we could not measure. Secondly, we were unable to measure mainstream smoke emitted from cigarettes, and PCV was estimated without taking into account interior seating or plastics. Even though further studies are needed to evaluate SHS exposure taking into consideration such parameters, our findings demonstrate that under the above conditions motor vehicle SHS poses a significant threat to public health.

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Stopping smoking: carpe diem?

A study published in *Tobacco Control*[1] reported 52% of attempts to stop smoking were unplanned and that unplanned quit attempts were more successful than planned attempts. This latter finding contradicts the traditional wisdom that many smokers fail because they do not plan adequately for their quit attempts.[2] Importantly, these two results have been replicated in a second study.[3] The *Tobacco Control* study concluded ''don't plan dates; look for quit opportunities'' and that planning quit dates ''may be hindering, rather than assisting successful smoking cessation''. In contrast, the second study concluded their findings ''do not necessarily imply that planning quit attempts is counterproductive''.

We believe that whether it is better to have smokers act immediately on impulses to stop smoking or to have them set a later quit date and spend time formulating a clear plan for quitting is unclear. Both of the above studies recognised that their association of impulsive quitting and increased success is based on retrospective reports of self-selected methods of quitting and could be due to confounding factors. For example, it is possible that smokers who make a spontaneous quit attempt are less dependent, more motivated smokers and it is these characteristics, not the acting on an impulse, that increases success. Both articles suggest a randomised controlled trial (RCT) is needed to clarify this. One RCT compared abrupt versus delayed smoking but both strategies involved some planning, the sample size was very small, and other confounds occurred, such that no definitive conclusions could be drawn.[4] The optimal RCT to test abrupt versus delayed quitting may be difficult to implement in that it would need to recruit those who have made a sudden decision to quit

Table 1 Concentration of $RSP_{2.5}$ particles (mg/m^3)

	Fully open window	Half open window	Closed window	
Vehicle type	**Mean (SD) (n)***	**Mean (SD) (n)***	**Mean (SD) (n)***	**p Value§**
Two-door pick-up utility vehicle PCV = 1.4 m^3	4.57 (1.43)† ‡ (90)	4.89 (2.06)¶ (76)	12.77 (7.53) (99)	<0.001
Three-door small city car PCV = 2.5 m^3	1.33 (0.76)† ‡ (82)	5.32 (3.00)¶ (86)	13.15 (6.59) (45)	<0.001
Five-door station wagon PCV = 3 m^3	5.28 (1.80)† ‡ (72)	12.15 (3.63) (80)	12.37 (5.63) (68)	<0.001
Baseline measurement	0.013 mg/m^3			

*n, number of measurements; †fully open window versus half open (Mann—Whitney test, $p<0.05$); ‡fully open window versus closed (Mann–Whitney test, $p<0.05$); §Kruskal–Wallis test; ¶half open window versus closed (Mann–Whitney test, $p<0.05$); PCV, passenger cabin volume; SD, standard deviation.