

Featured Research Studies

Migration of mercury from dental amalgam through human teeth

<http://www.ncbi.nlm.nih.gov/pubmed/18296776?dopt=AbstractPlus>

Harris HH, Vogt S, Eastgate H, Legnini DG, Hornberger B, Cai Z, Lai B, Lay PA.

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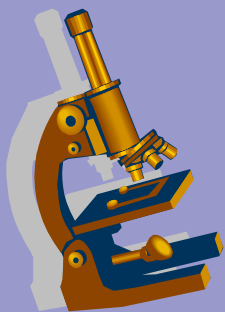
J Synchrotron Radiat. 2008 Mar;15(Pt 2):123-8.

Exposure to mercury from dental amalgams, with possible negative health effects, has generally been considered to occur via either erosion or evaporation directly from the surface of fillings, followed by ingestion.

The aim of this study was to determine the relative importance of the direct migration of mercury through the tooth as an alternative exposure pathway. X-ray fluorescence imaging has been used to determine quantitatively the spatial distribution of Hg, Ca, Zn and Cu in sections of human teeth that had been filled with amalgam for more than 20 years.

X-ray absorption near-edge spectroscopy (XANES) was also employed to gain chemical information on the mercury present in the teeth. Hg (up to approximately 10 mg g⁻¹) and Zn (>100 mg g⁻¹) were detected in the teeth several millimetres from the location of the amalgams. At high resolution, Hg showed higher concentrations in dentinal tubules while Zn was generally evenly distributed. XANES showed that the chemical form of Hg that had migrated into the tooth had been altered from that present in the amalgam. The differing spatial distributions of Hg and Zn suggest distinct transport mechanisms for the two metals, presumably chemical for Zn and initially physical for Hg. Subsequent oxidation of Hg may lead to a loss of mobility or the development of a secondary transport mechanism. Most importantly the detection of Hg in areas of the tooth that once contained an active bloodstream and in calculus indicates that both exposure pathways should be considered as significant.

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Vehicle emissions and consumer information in car advertisements

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Abstract (provisional)

Background

The advertising of vehicles has been studied from a safety perspective but not in terms of vehicle air pollutants. We aimed to examine the content and trends of greenhouse gas emissions and air pollution-related information, in light passenger vehicle advertisements.

Methods

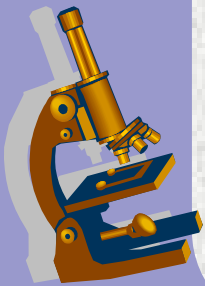
Content analysis of the two most popular current affairs magazines in New Zealand for the five year period 2001-2005 was undertaken (n=514 advertisements). This was supplemented with vehicle data from official websites.

Results

The advertisements studied provided some information on fuel type (52%), and engine size (39%); but hardly any provided information on fuel efficiency (3%), or emissions (4%). Over the five-year period the reported engine size increased significantly, while fuel efficiency did not improve. For the vehicles advertised, for which relevant official website data could be obtained, the average "greenhouse rating" for carbon dioxide (CO₂) emissions was 5.1, with a range from 0.5 to 8.5 (on a scale with 10 being the best and 0.5 being the most polluting). The average CO₂ emissions were 50% higher than the average for cars made by European manufacturers. The average "air pollution" rating for the advertised vehicles was 5.4 (on the same 1-10 scale). The yearly averages for the "greenhouse" or "air pollution" ratings did not change significantly over the five-year period. One advertised hybrid vehicle had a fuel consumption that was under half the average (4.4 versus 9.9 L/100km), as well as the best "greenhouse" and "air pollution" ratings.

Conclusions

To enhance informed consumer choice and to control greenhouse gas and air pollution emissions, governments should introduce regulations on the content of vehicle advertisements and marketing (as started by the European Union). Similar regulations are already in place for the marketing of many other consumer products.



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Mercury (Hg) and lead (Pb) in interior and exterior New Orleans house paint films.

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Pre-1992, latex paint was formulated with mercury (Hg) as phenylmercuric acetate (PMA). Hg vaporizes reducing its content, and lead (Pb) is stable and remains unchanged. The objective of this study is to describe the content of Hg and Pb in existing paint coatings. Forty paint chip samples were collected from both interior and exterior surfaces of homes in metropolitan New Orleans and analyzed for Hg and Pb. The median Hg in exterior paints is 26.9mgkg(-1) (0.8-214.0) compared with 7.1mgkg(-1) (0.03-39.2) for interior paints. The median Pb content is 76603mgkg(-1) (464-317151) and 416mgkg(-1) (24-63313) respectively, for exterior and interior paints. The Spearman correlation coefficients for Hg and Pb are -0.312 (P=0.13) and -0.471 (P=0.07) respectively, in exterior and interior samples. Hg and Pb vary independently with each other in paint films. Median Hg in exterior paints is four times larger than for interior paints. Median Pb in exterior paints is 184 times larger than interior paints. The Pb and Hg content in exterior and interior paint chips are significantly different (Mann-Whitney Rank Sum Test, P0.001 and P=0.006, respectively). Only 1 of the 25 exterior paints contained less than the current 5000mgkg(-1) US standard for Pb, the criteria for exemption from the power-sanding restrictions of the New Orleans Lead Ordinance. Prior to banning PMA in paint, Hg poisonings presented as acrodynia were reported for children living in homes freshly painted with latex paint. Because of the affinity of Hg and Pb for sulfur-containing amino acid proteins, their presence in paint coatings poses an increased hazard when released as dust.

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