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**Title:** RME30 biodiesel exhaust inhalation causes vascular dysfunction

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**Body:** Rationale: Whilst particulate air pollution is well recognized as a contributor to greenhouse gas emissions and thus plays a vital role in global warming, exposure is also detrimental to cardiovascular and respiratory health. The environmental impact of switching to more sustainable fuels is well accepted; however there is little evidence of potential health benefits that may result from such an approach. Here we examined cardiovascular and respiratory effects after inhalation of biodiesel blend and petrodiesel exhaust. Methods: 16 healthy subjects were exposed to petrodiesel exhaust and biodiesel blend (30% rapeseed methyl ester (RME30) blended with petrodiesel) for 1h, standardized for PM mass concentration of 300 µg/m<sup>3</sup>. Vascular vasomotor function was assessed with forearm venous occlusion plethysmography, using acetylcholine, bradykinin, sodium nitroprusside and verapamil. Additional cardiorespiratory measurements were also performed throughout. Results: Infusion of all vasodilators caused a dose-dependent increase in forearm blood flow (P<0.01 for all), which was similar following both exposures (P>0.05 for all), but attenuated as compared to filtered air exposures from previous studies. Conclusions: Diesel exhaust inhalation is known to impair vascular endothelial function, which is linked to an increase in cardiovascular events. This study demonstrates that replacing 100% petrodiesel with RME30, a commercially available mixture, results in similar adverse effects, and suggests there are unlikely to be any health gains in switching from petrodiesel to RME30. We suggest that these adverse health effects should be taken into consideration alongside environmental concerns when assessing future developments.