

Misrepresentation of the Health Effects of Diesel Exhaust in California by the California Air Resources Board and the Goods Movement Emission Reduction Plan

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1) Background on Diesel Exhaust in California and the Goods Movement Emission Reduction Plan

During the past two years the California Air Resources Board (CARB) has approved and implemented a “Goods Movement Emission Reduction Plan” (GMERP) to reduce the diesel exhaust emissions from diesel trucks and ships. This plan is the result of a determination by CARB that diesel exhaust has major negative impacts the health of Californians. This plan is described in the April 20, 2006 CARB Resolution 06-14 (http://www.arb.ca.gov/planning/gmerp/march21plan/docs/resolution_06-14.pdf) and on a CARB GMERP website (<http://www.arb.ca.gov/planning/gmerp/gmerp.htm>). GMERP has lead to the 2007 “Goods Movement Action Plan” (<http://www.arb.ca.gov/gmp/gmp.htm>). Also, GMERP has led to the 2008 “Strategic Plan for Enforcement of Diesel Emissions Control Regulations” (<http://www.arb.ca.gov/enf/hhla/hhla.htm>). Partial funding for GMERP comes from Proposition 1B, the transportation bond approved by California voters in 2006, which includes one billion dollars to reduce diesel exhaust emissions (<http://www.aqmd.gov/tao/Implementation/Prop1B.htm>). However, a large coalition of California businesses and organizations (<http://drivecleanca.org/>) estimated on May 1, 2008 that applying these new emissions regulations to the estimated 2.3 million diesel trucks that move goods throughout California could cost eight billion dollars or more and could have a profound, negative impact on the state’s economy (<http://drivecleanca.org/news/27.html>).

As a UCLA epidemiologist who has spend the past 35 years conducting research and publishing findings on the most important risk factors that affect the mortality of Californians, I believe that the epidemiologic evidence on the adverse health effects of diesel exhaust in California has been exaggerated by CARB. Further, I believe that the extensive emission reduction regulations currently proposed by CARB are adversely impacting the California economy. Consequently, instead of spending billions of dollars to reduce diesel exhaust emissions in the way CARB has currently proposed, I believe that this money should be used in other ways that would have much greater net benefits for Californians. I believe that an updated and objective evaluation of health effects of diesel exhaust will make it possible to continue improving air quality in California, but in a way that does not adversely impact the California economy and does not contribute to the current state budget deficit.

2) Controversial History Regarding Declaration of Diesel Exhaust as a Toxic Air Contaminant

After about 10 years of intense controversy, diesel exhaust was declared to be a toxic air contaminant (TAC) by the CARB Scientific Review Panel (SRP) on Toxic Air Contaminants on April 22, 1998 (<http://www.arb.ca.gov/srp/mt042298.htm>). A summary of the controversy was given in the April 23, 1998 Los Angeles Times article “Diesel Exhaust Found to Pose Strong Cancer Risk; State must decide whether to declare fumes a toxic threat requiring safeguards. Business leaders attack report” (<http://proquest.umi.com/pqdweb?did=28940780&sid=1&Fmt=3&clie%20ntId=1564&RQT=309&VName=PQD>). Then, on August 27, 1998 the CARB declared diesel exhaust particulate matter to be a TAC. This action was taken after industry groups, including trucking and oil companies, agreed to end years of intense opposition to CARB action on diesel as long as only diesel exhaust particulate matter, not diesel exhaust as a whole, was identified as a TAC. This action was described in an August 28, 1998 Los Angeles Times article “Board Declares Diesel Soot a Cancer-Causing Pollutant” (<http://proquest.umi.com/pqdweb?did=33480494&sid=1&Fmt=3&clie%20ntId=1564&RQT=309&VName=PQD>).

Since 1998, diesel exhaust and diesel exhaust particulate matter levels in California and the US have declined substantially. These improved air quality trends are documented in the January 2008 book “Air Quality in America” by Joel M. Schwartz and Steven F. Hayward (http://www.aei.org/books/bookID.918/book_detail.asp). Indeed, tremendous progress has been made in improving overall air quality during the past 50 years and some of this progress has been recently summarized by CARB (<ftp://ftp.arb.ca.gov/carbis/board/books/2008/022808/08-2-8pres.pdf>). In addition, there is substantial new epidemiologic evidence relevant to the health effects of diesel exhaust that was not considered when the 1998 TAC declaration was made. For instance, the 2007 paper by Francine Laden et al. measured death rates during 1985-2000 among 54,000 members of the unionized U.S. trucking industry (*Environ Health Perspect* 2007;115:1192-1196). This cohort, which included 36,000 diesel truck drivers, had death rates from all causes and all cancer that were substantially below the rates among US males. Furthermore, unlike earlier evidence that was used in the TAC declaration, this cohort did not have a substantially elevated lung cancer death rate (<http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1940099&blobtype=pdf>). Relatively low death rates are often found in working populations, most likely due to the “healthy worker effect,” a factor that was not discussed when the SRP declared diesel exhaust to be a TAC. The “healthy worker effect” and the overall low mortality in the trucking cohort was not properly explained in the January 24, 2008 CARB presentation (<ftp://ftp.arb.ca.gov/carbis/board/books/2008/012408/08-1-1pres.pdf>). This new evidence must be considered in an updated assessment of the health effects of diesel exhaust.

3) Exaggerated “Premature Mortality” Calculation in March 21, 2006 GMERP Appendix A “Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California” (http://www.arb.ca.gov/planning/gmerp/march21plan/appendix_a.pdf)

My December 15, 2005 paper, “Fine particulate air pollution and total mortality among elderly Californians, 1973-2002” (*Inhalation Toxicology* 2005;17:803-816), along with a cover letter, was submitted to CARB on January 9, 2006 for consideration regarding the GMERP (http://www.arb.ca.gov/planning/gmerp/dec1plan/gmerp_comments/enstrom.pdf). My paper, which found no relationship between fine particulate matter (PM_{2.5}) and mortality in elderly Californians during 1983-2002, is directly relevant to the “PM-related Mortality” calculation described on pages A-29 and A-30 of Appendix A. Although it represents the most detailed and comprehensive analysis of PM_{2.5} and mortality ever published on a California cohort, my paper (Enstrom, 2005) was not

included in the calculation of premature deaths, apparently because of the claim that “this study has generated a great deal of controversy” However, the nature of the controversy was not specified and no specific justification for exclusion was given. Instead, primary emphasis was given to the November 1, 2005 paper “Spatial Analysis of Air Pollution and Mortality in Los Angeles” by Michael Jerrett et al. (*Epidemiology* 2005;16:727-736), which found an unusually large relationship between PM_{2.5} and mortality in the Los Angeles basin during 1982-2000.

This led to the Appendix A estimate that particulate matter is responsible for 2,400 premature deaths (page A-6), out of the total of about 230,000 California deaths per year. However, the Jerrett results are inconsistent with both my 2005 results and the US map of “fine particles and mortality risk” during 1982-1989 by Daniel Krewski et al. (<http://pubs.healtheffects.org/view.php?id=6>, Part II, page 197). The US map, which is shown at the end of this letter, indicates that fine particles are associated with only “medium mortality” risk in the Los Angeles basin, while the “high mortality” risk is concentrated in the Appalachian states around West Virginia. The geographic variation in mortality risk of PM_{2.5} is supported by a 2007 Johns Hopkins University Working Paper by Scott Zeger et al., which shows no relationship between PM_{2.5} and mortality during 2000-2002 in an elderly Medicare population in the Western U.S. (<http://www.bepress.com/jhubiostat/paper133/>, pages 2, 18, 19, 21). Since the results in my paper, the Krewski US map, and the Zeger working paper indicate that there is no current excess mortality in California associated with PM_{2.5} exposure, the Appendix A calculation must be redone to include this evidence. All available evidence must be objectively evaluated before an estimate is made of the number of premature deaths in California that might be due to particulate matter.

Also, my paper has been omitted from CARB Board Meeting Health Updates posted during 2005-2008 (<http://www.arb.ca.gov/research/health/healthup/healthup.htm>). In particular, it was omitted from the March 23, 2006 CARB Staff Presentation, “Stronger Relationship Between Particulate Matter (PM) and Premature Death” (<ftp://ftp.arb.ca.gov/carbis/board/books/2006/032306/06-3-1pres.pdf>). Slide 14 of this presentation cited eight major studies, including both the Jerrett and Krewski studies, but it omitted my California-specific study entirely and made no mention of the California-specific results in the Krewski US map. Then slides 15-23 described only the Jerrett study, with no mention of any other evidence. Inclusion of all relevant evidence, particularly California-specific evidence, is critical because the estimation of premature deaths involves great uncertainty. For example, the November 2005 GMERP Appendix A, which did not rely on the Jerrett study, calculated that there were only 750 premature deaths per year (see pages A-5, A-40, and A-41). The November 2005 Appendix A is available on my website (<http://www.scientificintegrityinstitute.org/GMERPAppA120205.pdf>). Keep in mind that the Appendix A analyses done CARB staff have not been subjected to the same kind of independent critical evaluation that the peer reviewed Enstrom and Jerrett papers have received.

An excellent overview of the particulate matter controversy has been presented by Robert Phalen in his 2002 book “The Particulate Air Pollution Controversy: A Case Study and Lessons Learned” (http://www.amazon.com/gp/reader/1402072252/ref=si3_rdr_ty). CARB has not been citing his book, although Phalen has run the UC Irvine Air Pollution Health Effects Laboratory for the past 30 years (<http://yosemite.epa.gov/sab/SABPEOPLE.NSF/5f93eb584370e03c8525715c00760c8d/bb514879d503a7a785257368006f34b8!OpenDocument>). A massive review is the 669-page “Health Assessment Document for Diesel Engine Exhaust” done by the U.S. Environmental Protection Agency in 2002 (<http://cfpub.epa.gov/ncea/cfm/recorddisplay.cfm?deid=29060>). Although it documented a relationship with lung cancer, this review made no finding that diesel exhaust caused premature mortality.

4) The California Health and Safety Code and Appointments to the Scientific Review Panel
(<http://caselaw.lp.findlaw.com/cacodes/hsc/39670-39671.html>)

California Health and Safety Code (CHSC) Sections 39670-39671 define the CARB Scientific Review Panel on Toxic Air Contaminants and the specific way in which the nine members of the panel are to be appointed (<http://caselaw.lp.findlaw.com/cacodes/hsc/39670-39671.html>). In particular, each panel member is appointed “for a term of three years” and “the terms of three members expire each year.” However, although I have been receiving CARB listserv messages continuously since 2005, I have never seen any announcement requesting nominations or applications for new panel members. Indeed, based on a comparison of the April 22, 1998 SRP transcript (<http://www.arb.ca.gov/srp/mt042298.htm>, page ii) with the 2008 CARB list of SRP members (<http://www.arb.ca.gov/srp/public.htm>), five SRP members have served for at least ten years. From information currently posted about prior SRP meetings (<http://www.arb.ca.gov/srp/srpmeetings.htm>), four current SRP members have served for at least 17 years, and other evidence indicates that two of these four have served for at least 22 years. I believe that the clear intent of the CHSC is timely turnover on the SRP, not repeated reappointment of the same panel members. Lack of turnover, as specified in the CHSC, has denied many other qualified California scientists an opportunity to be on the SRP and to provide new perspective and expertise on the important issues related to TAC assessment. Although one group of California scientists determined that diesel exhaust was a TAC based on 1998 evidence, another group of equally qualified California scientists might not make that same determination based on current evidence. That is one important reason why there should be timely turnover on the SRP, as provided for in the CHSC.

Conclusions and Requests to CARB

As a UCLA epidemiologist who has spend the past 35 years conducting research on important risk factors related to the health of Californians, I believe that the mortality effects of diesel exhaust on Californians have been exaggerated by the April 22, 1998 SRP decision and by the March 21, 2006 GMERP Appendix A. Furthermore, I believe that the GMERP is having an adverse impact on the California trucking industry, as stated above (<http://drivecleanca.org/news/27.html>). Also, I believe that the GMERP is largely responsible for the recent efforts to establish a new port in Baja California because of the environmental regulations and constraints on development associated with the existing ports in Southern California, as described in the March 25, 2008 Los Angeles Times (<http://articles.latimes.com/2008/03/25/news/fi-mexport25>). Finally, I believe that the GMERP is the primary reason environmental activists have threatened to sue the Port of Long Beach in order to force a reduction in diesel emissions, as described in the February 7, 2008 Los Angeles Times (http://www.latimes.com/news/science/environment/la-me-port7feb07_0_3674984.story).

In response to my above points, CARB and the California Legislature should make sure that appointments to the SRP are consistent with the provisions of the CHSC. In this regard, CARB should promptly post announcements soliciting new candidates for the three SRP positions that expire at the end of 2008. Furthermore, CARB should undertake objective updated assessments of the relationship between fine particles and mortality in California and of the overall health effects of diesel exhaust in California. At a time when the California economy is facing major challenges and the state budget has a large deficit, there should be a proper prioritization of the most important needs in the California, with the GMERP assigned a priority that is consistent with the actual health risks of diesel exhaust.

Map reprinted from Krewski et al (2000) (<http://pubs.healtheffects.org/view.php?id=6>, Part II, page 197) or (<http://www.scientificintegrityinstitute.org/IT060106.pdf> , page 513)

Fine Particles and Mortality Risk

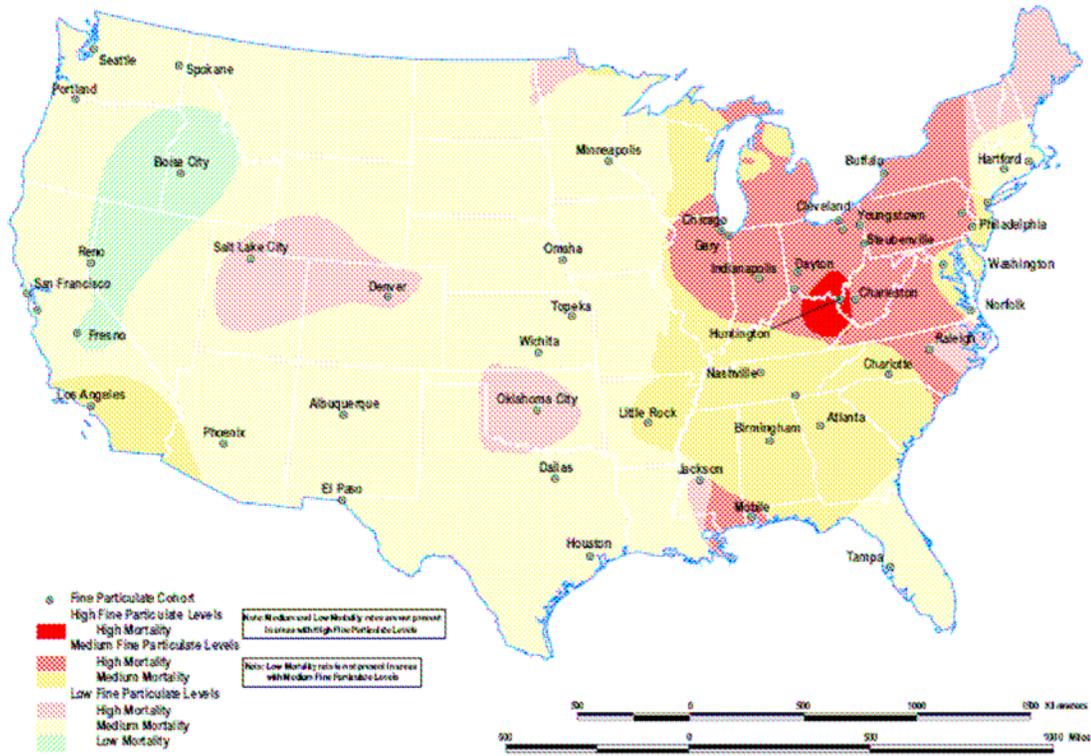


Figure 21. Spatial overlay of fine particle levels and relative risk of mortality. Interval classifications for fine particles ($\mu\text{g}/\text{m}^3$): low 6.99–17.03; medium 17.03–25.07; high 25.07–33. Interval classifications for relative risks of mortality: low 0.502–0.711; medium 0.711–0.919; high 0.919–1.126.

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D. Krewski et al.