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To: Marcia K. McNutt <mmcnutt@aaas.org>

From: "James E. Enstrom" <jenstrom@ucla.edu>

Subject: Important Request re AAAS & 'Secret Science Reform'

Cc: Geraldine L. Richmond <richmond@uoregon.edu>, Carlos J. Bustamante <carlosb@berkeley.edu>, Michael Gazzaniga <michael.gazzaniga@psych.ucsb.edu>, Elizabeth F. Loftus <eloftus@uci.edu>, Chris Carter <chris.carter@ucdc.edu>

June 4, 2015

Marcia K. McNutt, Ph.D.
Editor-in-Chief, Science
mmcnutt@aaas.org

Dear Editor-in-Chief McNutt,

On May 28, 2015, [Science retracted](#) the December 12, 2014 paper by Michael LeCour and Donald Green because, in part, the underlying data is not available to independently confirm the paper's findings. Science requires [Data and Materials Availability](#) for the papers that it publishes. Science has written extensively between [July 25, 1997](#) and [August 9, 2013](#) about the use of the relationship between fine particulate air pollution (PM2.5) and mortality to justify costly EPA regulations and the lack of access to the data underlying this relationship.

Because this 'secret science' data has never been available for independent analysis, Congress has introduced the [Secret Science Reform Act](#) to "prohibit the Environmental Protection Agency from proposing, finalizing, and disseminating regulations or assessments that are based upon science that is not transparent or reproducible." However, [AAAS](#) has written at least three letters to Congress raising objections to an act which requires access to underlying data. I request that AAAS reconsider its objections to this act and take a clear position in favor of access to the data underlying the PM2.5-mortality relationship. During the past ten years I have assembled extensive evidence that scientific misconduct has occurred in PM2.5 epidemiology and on December 1, 2014, I submitted [65 pages](#) of such evidence to EPA (<http://www.scientificintegrityinstitute.org/JEECPPI20114.pdf>). On February 17, 2015, I submitted [72 pages](#) of similar evidence to the UCLA Vice Chancellor for Research (<http://www.scientificintegrityinstitute.org/Economou021715.pdf>). My evidence is far more extensive than the [27 pages](#) of evidence that supported the retraction of the LeCour and Green paper.

I request that you and the AAAS Board of Directors examine my evidence, much of which involves UCLA Professor [Michael Jerrett](#), who is at the same university as LeCour. The stakes are high for both scientific integrity and the U.S. economy. The PM2.5-mortality relationship is currently being used as a major justification for many major EPA regulations, most recently EPA's Clean Power Plan. The CPP has been estimated to cost up to \$479 billion over the next 15 years and a strong case can be made that it is not scientifically or economically justified. I will be giving a talk about "EPA's Clean Power Plan and PM2.5-related Co-benefits" on June 11, 2015 at the [Tenth International Conference on Climate Change](#) in Washington, DC. You and others from Science and AAAS are welcome to attend my presentation.

Last Friday I sent the email message below to most of the scientists involved with PM2.5 epidemiology misconduct and no one has yet responded. I hope that Science and AAAS will take my evidence of misconduct seriously. In any case, I am going to use this evidence to support the April 11, 2014 [Lancet Comment](#) of Editor Richard Horton, who stated, in part, "The case against science is straightforward: much of the scientific literature, perhaps half, may simply be untrue . . . science has taken a turn towards darkness."

Thank you very much for your consideration of this important matter.

Sincerely yours,

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Offline: What is medicine's 5 sigma?



Stuart Clarke/Revea Features

"A lot of what is published is incorrect." I'm not allowed to say who made this remark because we were asked to observe Chatham House rules. We were also asked not to take photographs of slides. Those who worked for government agencies pleaded that their comments especially remain unquoted, since the forthcoming UK election meant they were living in "purdah"—a chilling state where severe restrictions on freedom of speech are placed on anyone on the government's payroll. Why the paranoid concern for secrecy and non-attribution? Because this symposium—on the reproducibility and reliability of biomedical research, held at the Wellcome Trust in London last week—touched on one of the most sensitive issues in science today: the idea that something has gone fundamentally wrong with one of our greatest human creations.

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The case against science is straightforward: much of the scientific literature, perhaps half, may simply be untrue. Afflicted by studies with small sample sizes, tiny effects, invalid exploratory analyses, and flagrant conflicts of interest, together with an obsession for pursuing fashionable trends of dubious importance, science has taken a turn towards darkness. As one participant put it, "poor methods get results". The Academy of Medical Sciences, Medical Research Council, and Biotechnology and Biological Sciences Research Council have now put their reputational weight behind an investigation into these questionable research practices. The apparent endemicity of bad research behaviour is alarming. In their quest for telling a compelling story, scientists too often sculpt data to fit their preferred theory of the world. Or they retrofit hypotheses to fit their data. Journal editors deserve their fair share of criticism too. We aid and abet the worst behaviours. Our acquiescence to the impact factor fuels an unhealthy competition to win a place in a select few journals. Our love of "significance" pollutes the literature with many a statistical fairy-tale. We reject important confirmations. Journals are not the only miscreants. Universities are in a perpetual struggle for money and talent, endpoints that foster reductive metrics, such as high-impact publication. National assessment procedures, such as the Research Excellence Framework, incentivise bad practices. And individual scientists, including their

most senior leaders, do little to alter a research culture that occasionally veers close to misconduct.

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Can bad scientific practices be fixed? Part of the problem is that no-one is incentivised to be right. Instead, scientists are incentivised to be productive and innovative. Would a Hippocratic Oath for science help? Certainly don't add more layers of research red-tape. Instead of changing incentives, perhaps one could remove incentives altogether. Or insist on replicability statements in grant applications and research papers. Or emphasise collaboration, not competition. Or insist on preregistration of protocols. Or reward better pre and post publication peer review. Or improve research training and mentorship. Or implement the recommendations from our Series on increasing research value, published last year. One of the most convincing proposals came from outside the biomedical community. Tony Weidberg is a Professor of Particle Physics at Oxford. Following several high-profile errors, the particle physics community now invests great effort into intensive checking and re-checking of data prior to publication. By filtering results through independent working groups, physicists are encouraged to criticise. Good criticism is rewarded. The goal is a reliable result, and the incentives for scientists are aligned around this goal. Weidberg worried we set the bar for results in biomedicine far too low. In particle physics, significance is set at 5 sigma—a p value of 3×10^{-7} or 1 in 3.5 million (if the result is not true, this is the probability that the data would have been as extreme as they are). The conclusion of the symposium was that something must be done. Indeed, all seemed to agree that it was within our power to do that something. But as to precisely what to do or how to do it, there were no firm answers. Those who have the power to act seem to think somebody else should act first. And every positive action (eg, funding well-powered replications) has a counterargument (science will become less creative). The good news is that science is beginning to take some of its worst failings very seriously. The bad news is that nobody is ready to take the first step to clean up the system.

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