Author's response to reviews

Title: Firefighters and On-Duty Deaths from Coronary Heart Disease

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PDF covering letter
Phillippe Grandjean, MD
David Ozonoff, MD
Editors, Environmental Health

24 October 2003

RE: Revision: Firefighters and on-duty deaths from coronary heart disease: a case control study.

Dear Drs. Grandjean and Ozonoff:

Thank you for your letter of 2 October 2003 requesting a revised manuscript. We appreciate the reviewers’ suggestions and comments, which have helped us to improve further the paper. We are pleased to submit a second revision of the manuscript that we believe fully addresses the referees’ concerns. Below, I detail, point by point, how we responded to each of the formatting and reviewer comments.

**Formatting**
First, we would like to acknowledge the gracious and invaluable assistance of Ms. Jennifer Pintabone. With her help, we believe the manuscript is fully in accordance with the journal’s formatting requirements.

1) We added the required sections: list of abbreviations, competing interests and authors’ contributions at the end of the text (page 19).

2) We reformatted the title page. The title now includes the study design. We also made the appropriate changes regarding the authors’ affiliations and emails.

3) We reviewed the highlighted references with Ms. Pintabone, which were all institutional reports. She feels that they are cited appropriately.

4) We made sure that punctuation marks follow after the reference in square brackets.

5) In all versions of the manuscript, throughout our text, tables and figures, we consistently use one word for firefighter(s) and firefighting. The authors of some of the literature we cite, however, use “fire fighter” as two words. In the bibliography, we retained the original usage of each citation.

**Reviewer A: Dr. Metcalfe**

1) “Page 7: Active firefighter cardiovascular controls. Is there any chance that some firefighters could have avoided the statewide screen?…”

**Response:** It was not possible for firefighters on these teams to avoid examination, but we appreciate the reviewer’s concern. Therefore, we have clarified this point (last paragraph on page 6 and paragraph 1 on page 7):
“Compliance with the examination program is excellent for two reasons. First, it is mandatory for participation on the regional teams, the Commonwealth withholds salary from firefighters who miss the annual medical examination and continued incompletion results in termination from the regional team. Second, the Commonwealth legally forbids the surveillance program from reporting any results to the municipal fire departments who are the firefighters’ primary employers.”

2) “While the authors may still prefer to present the results for age 45 years or older…” age should be included in the multivariable equation as a continuous variable.

**Response:** We thank the referee for this valuable suggestion given the age distributions of the cases and controls. To control further for the effects of age, we also performed a multivariate analysis that included age as a continuous variable (page 11, paragraph 3). In this model, we found that the OR for hypertension (3.6, 95% CI (1.5-8.9)) and the OR for prior arterial-occlusive disease (11.5, 95% CI (2.5-53.3)) were somewhat attenuated, while the OR for smoking (7.6, 95% CI (2.9-20.1)) increased slightly. All three, however, remained strong independent predictors for on-duty CHD death.

We do still also present dichotomous results for age (<45 vs ≥45 years old) because the Adult Treatment Panel recommendations for cardiovascular screening and risk assessment define age ≥45 years old as a recognized risk factor for men.

3) Is “EMS” defined anywhere?

**Response:** We define emergency medical service (EMS) on page 3, paragraph 1. We have also included EMS in the required list of abbreviations.

4) “Would increased workplace screening be popular among firefighters? Could it be abused by employers? What work options are open to firefighters who are no longer fit for fire suppression?”

**Response:** We agree that these issues are important for future policy discussions. We do now mention in our conclusions (page 18, paragraph 4) some of the obstacles to instituting more widespread cardiovascular screening of firefighters including: “the concerns of firefighters and unions that fitness for duty programs may remove some firefighters from active duty.”

It is beyond the scope of the current manuscript to fully address these questions, however, particularly to speculate what options different fire departments of varying sizes, characteristics and falling under various pension systems would be able to offer firefighters who are determined to no longer be fit for fire suppression.

5) Add a footnote in Table 1 to specify what the p-value for “last job activity” is testing.

**Response:** We added the suggested footnote to what is now Table 2 on page 31.
6) Figure 3, explain what the boxes indicate for the “% of CHD decedents <= 50 years old”.

**Response:** As requested, we added explanations for the red and blue boxes in Figure 3.

**Reviewer B: Dr. Robbins**
1) “…it is still not a clear story: why the study, how it was done, what was found…”

**Response:** We respectfully disagree with this comment. We feel that the clarity of the revised manuscript is best described and corroborated by Dr. Metcalfe’s unequivocal summary statement: “This is a well-written paper that describes a thorough analysis of the data available.”

Nonetheless, we did address this concern by making some additional revisions, which make the manuscript even clearer. First, we moved a “why” statement up to the second paragraph of the Background (page 3): “definitive scientific evidence of increased cardiovascular mortality rates among firefighters remains elusive [9-12]. In addition, it remains unclear whether on-duty CHD deaths are work-related and which occupational and personal risk factors increase the risks of on-duty CHD death.” Second, we inserted a “how” statement into the first paragraph of the methods (page 5). We also made changes to the discussion/conclusion in accordance with Dr. Robbins’ comments, which are fully explained below.

2) The limitations of combining volunteer and professional firefighters are problematic, in particular, because estimates of how time is spent were taken from a professional workforce.

**Response:** We recognize this limitation, but feel strongly that it does not affect the basic results of our study regarding CHD fatalities. We found no significant differences in the circadian distribution of volunteer and professional deaths. We also found no significant differences in the prevalence of CHD risk factors between the two groups of decedents and no significant differences in the frequencies of firefighting duties that the volunteer and professional deaths had engaged in prior to death.

In our revised manuscript, we have made several changes, which more fully address the potential concern of combining volunteers and professionals. First, we mention (page 9, paragraph 1) that we found no difference in the prevalence of cardiovascular risk factors or in fire department medical exams between volunteer and professional CHD decedents. We also reinserted Table 1, which fully describes the comparison between professional and volunteer CHD victims.

Second, on page 10, paragraph 2, we now explicitly state: “We found similar distributions of last job activity engaged in prior to death for both professional and volunteer CHD decedents (p=0.60).”
Third, in the discussion of limitations on page 16, paragraph 1, we add that “To the extent that using an urban professional department to estimate the frequency of job activities and emergency responses resulted in overestimates of the extent of fire suppression and other emergency activities for rural and volunteer firefighters, this would have biased our results towards the null hypothesis.”

3) The authors need to address Dr. Robbins’ point (also made in his previous comments) about employers capable of affecting workers’ risks beyond their immediate work activities and that the fire service should actively intervene to protect its workers.

Response: We appreciate this comment and are in complete agreement that more should be done to protect firefighters’ health. Accordingly, we have changed our discussion and concluding statement to address this head on.

On page 12, paragraph 2 of the Discussion, we state:

Importantly, major cardiovascular risk factors are detectable at routine examinations and mostly modifiable. Yet, 75% of the firefighters who died from on-duty CHD in this study had not had a recent fire department medical examination. Therefore, fitness promotion, medical screening and improved medical management could prevent many of these premature deaths, and should be promoted and provided by fire service authorities.

Then, on page 18, we conclude our paper as follows:

“Despite recommendations that all firefighters receive periodic, occupational medical examinations [6, 16, 67], the fire service is failing to provide adequate medical programs to many U.S. firefighters. Major obstacles include the upfront costs of wellness and medical programs, as well as, the concerns of firefighters and unions that fitness for duty programs may remove some firefighters from active duty. More than a typical employer, the fire service affects firefighters’ risk profiles beyond their immediate work activities in areas such as physical training, smoking policies, on-site nutrition and work schedules. Firefighters risk their lives to protect society. Given the preventable nature of CHD, the leading cause of on-duty deaths, fire departments, unions, workers compensation and pension authorities have an obligation to work together to implement adequate medical programs for all firefighters.”

We look forward to your decision on our revised manuscript. Thank you in advance for your careful consideration. Please do not hesitate to contact me with any questions.

Sincerely,
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