Reviewer's report

Title: Are passive smoking and air pollution a greater health risk than major radiation incidents?

Version: 1 Date: 22 September 2006

Reviewer: Mark Little

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General
This paper is generally very well written, and persuasively argues that risks from radiation exposure may be comparable with or less than those from more common environmental and lifestyle factors. There is good discussion of the uncertainties surrounding these risk comparisons. There should be more consistency in inclusion of various groups in the Tables, and the statement about the Japanese atomic bomb survivors in the abstract should be corrected. Otherwise I have only minor comments, most of which are inessential (the author may care to include if he wishes).

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

p.2 l.-7-6 The description of exposures by the survivors of Hiroshima and Nagasaki as “extremely high” is questionable. The range of (approximately whole body) doses received by the atomic bomb survivors is in the range 0-4 Gy and the average dose in the proximal (<2.5 km from hypocentres) part of this cohort is about 0.2-0.3 Sv (depending on the organ at risk) (Preston et al., Radiat. Res. 1994;137:S68-S97, Thompson et al., Radiat. Res. 1994;137:S17-S67, Preston et al., Radiat. Res. 2004;162:377-89). In comparison, radiotherapy patients generally receive much higher doses, typically 30 Gy or more to certain tissues.

Tables 2-4 The rationale for presentation of various studies in these Tables is unclear. For example, two different groups of Chernobyl emergency workers are mentioned in Tables 2 and 3, the first apparently all Chernobyl emergency workers (the same average dose is quoted for this group by Cardis et al., J. Radiol. Prot. 2006;26:127-40), and the second some subset of this. A group of bomb survivors exposed within 1500 m of the hypocentres are mentioned in Table 4 (but nowhere else). The use of the “250 mSv dose group” for the Chernobyl workers in Table 3 appears arbitrary, especially as the comparison in this Table is with two other groups not at particularly elevated risk from their relevant exposures; I suggest that the same group as for Table 2 (with 100 mSv average dose) be used. Also, risks for persons exposed to passive (environmental) tobacco smoke are mentioned in Table 3, but not in Table 4, where only risks for active smokers are presented.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

p.5 l. -8-7 The ICRP estimates risks for a general population exposed at ages 0-90, and for a working population exposed at ages 20-64, with follow-up in both groups to age 90 (as far as I can infer). Mention of a life expectancy of 75 may be correct, but is possibly misleading. I would remove this sentence, or replace it by one making these points.

Figures 1-3 I am unsure how informative these figures are. If Figure 1 is retained, it should reflect the latest (DS02) mortality report (Preston et al., Radiat. Res. 2004;162:377-89) rather than this now quite old paper (ref. 40).

Table 1 Most of the useful information from this Table is presented in the text (p.6), and this could therefore be removed.

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Discretionary Revisions (which the author can choose to ignore)

p.5 l.3-4 The ICRP (ref. 5) risk estimates assume a Dose and Dose-Rate Effectiveness Factor (DDREF) of
factor, used to reduce risks derived from acute exposed groups to chronic exposure. This is probably correct for most of these groups. However, for at least some of the Chernobyl emergency workers listed in Tables 2-3 dose rates are likely to be very high, so a DDREF might not be applicable. Perhaps risks could be given with and without a DDREF?

p.5 l. -9-8 As the author points out further up p.5, the ICRP estimate risk both for all age (0-90) and for working age (20-64) populations. It appears from Tables 2-3 that the author may in fact be applying the slightly lower (worker) risk estimate (4% per Sv) to worker groups; this could perhaps be made clear here.

p.8 l.9 A review of tobacco smoking and cancer by Vineis et al. (J. Natl Cancer Inst. 2004;96:99-106), which inter alia also surveys studies of environmental tobacco smoking (and finds persuasive evidence of excess risk), could also be cited here.

p.9 l.5 A more recent review of the Chernobyl epidemiology is given by Cardis et al. (J. Radiol. Prot. 2006;26:127-40) and could also be cited here.

Table 5 NCRP Report 126 (National Council on Radiation Protection and Measurements 1997, Uncertainties in Fatal Cancer Risk Estimates Used in Radiation Protection) could perhaps also be cited here.

What next?: Accept after minor essential revisions

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:
I declare that I have no competing interests.