Industrial Injuries Advisory Council Information Note

IIAC Commissioned Reviews 2010 – Occupational Health in Fire-fighters

November 2010

1. In 2009, following an open competition, a contract to review the epidemiological literature in relation to health effects of working as a fire-fighter was awarded to the Institute of Occupational Medicine (IOM), Edinburgh. The purpose of the review was to summarise available scientific evidence and to help the IIAC formulate a view on the potential for prescription under the Industrial Injuries Scheme. The Council met with and advised researchers from the IOM, both in relation to their bibliographic search and the framework and criteria for prescription. The IOM also considered data that Canadian authorities had relied on when pursuing inquiries relevant to the Canadian compensation system.

2. The review focussed in particular on whether "published epidemiological data were indicative of a significantly increased risk of disease in those employed as fire-fighters, and, if so, whether risks were more than doubled compared to that in the general population", and for which diseases under which circumstances.

3. During the bibliographic search, 678 articles were identified for potential inclusion. These were screened by the reviewers and relevant full publications were obtained. The reviewers collated their data in evidence tables (for full details see: www.iiac.org.uk/reports).

4. Here the Council summarises the main findings in brief and comments on the potential for prescription.

Key findings

5. The main evidence base (34 papers) related to 23 different kinds of cancer. Up to 17 reports were found for some commonly studied tumours such as those affecting the stomach, skin, prostate and brain, and a dozen or more research reports on cancers of the pancreas, bladder, colon, rectum, oesophagus, kidney and blood. The Table summarises the range of estimated relative risks (RR) and the reviewers' judgement on the overall balance of evidence.

6. Although RRs exceed 2.0 in some of these studies, in general the reviewers found little consistent evidence that risks were elevated in fire-fighters for any of the tumours

considered. There were no 'balance of evidence' findings to indicate that risks were as much as doubled, overall or in particular subgroups of fire-fighters.

7. The reviewers identified rather fewer papers which addressed non-cancer health outcomes in fire-fighters, although 9 reports each on coronary heart disease and respiratory health were evaluated. Associations with the former were described as "inconclusive", while for the latter no evidence was found of a more than doubled risk of disabling loss of lung function (as judged by criteria previously applied by the IIAC in deciding the prescription of chronic obstructive pulmonary disease in underground miners – Cm. 2091).

8. A small and limited evidence base was found on hearing loss and on mental health problems, while one study suggested an increased risk of hip and knee osteoarthritis among fire-fighters. The reviewers called for further research in each of these topic areas.

Council's comments and conclusions

9. The reviewers were set the task of identifying circumstances in which the risks of disease were more than doubled in fire-fighters relative to a suitable comparator population. The benchmark of a doubling of risks is not arbitrary: as explained in various IIAC reports, it is used to gauge attribution to occupation on the balance of probabilities, in circumstances where a disease lacks diagnostic features specific to occupation.

10. No such evidence was found. The Council judges that the evidence base for prescription explored by this review is insufficiently compelling to warrant recommendation of prescription in relation to any particular health problem of fire-fighters.

11. The topic of testicular cancer in fire-fighters was considered in a previous IIAC report, Position Paper 21, 2008. Earlier conclusions, against recommending prescription, remain unchanged following this updated review of evidence.

12. Nothing in this information note and the related review should be construed as indicating that the work of fire-fighters is hazard free. Moreover, fire-fighters are selected into their occupation with higher than average levels of fitness, and screened for minimum fitness standards during employment. Potentially, this 'selection bias' makes the study of some health problems, such as cardiovascular and respiratory disease, more challenging. However, from the perspective of the Industrial Injuries Scheme and the evidence before the Council at the present time, the case for prescription is not supported.

Table – Summary of evidence relating to cancer in fire-fighters

Site/type of cancer	Number of reports	Range of Relative Risks	Indicate Relative Risk as judged by the reviewers
Lip, oral cavity, pharynx	8	0.66 to 1.43	1.0 to 1.1
Oesophagus	12	0.40 to 2.04	1.1 to 1.2
Stomach	17	0.42 to 2.02	"...close to 1.0 ..."
Colon	13	0.60 to 1.83	"...around 1.2 ..."
Rectum	14	0.88 to 2.08	"...undoubtedly modest (<1.3) and clearly below 2.0"
Pancreas	16	0.38 to 1.55	0.9 to 1.0
Larynx	9	0.37 to 13.48	"….no apparent positive association"
Lung	19	0.24 to1.42	0.95 to 1.05
Skin	17	0.00 to 2.92	1.3 to 1.4
Breast	3	0.51 to 7.41	"…no consistent evidence of any generally elevated risk"
Cervix	1	5.24	"…the results from a single study must be treated with caution ...need for vigilance"
Prostate	17	0.31 to 2.61	1.2 to 1.3
Testicle	8	1.15 to 8.20	"…an average relative risk of 1.5 would appear reasonable…a value of less than 2.0 would seem appropriate"
Bladder	16	0.23 to 3.16	"…the majority of studies favour a slight excess risk of bladder cancer" [estimated RR 1.25]
Kidney	13	0.23 to 4.14	1.1 to 1.2
Eye	2	1.54 to 5.20	"…with only two papers, no clear conclusions can be derived"
Brain	17	0.58 to 3.78	1.0 to 1.4
Thyroid	5	0.58 to 4.82	"…no consistent evidence to suggest any occupational relationship"
Lymphatic/haemopoietic	8	0.44 to 1.88	"…no consistent evidence to suggest anything more than a possibly modest positive association (1.1 to 1.2)"
Hodgkin's disease	6	0.23 to 2.40	"…no consistent evidence to suggest any elevation of risk"
Non-Hodgkin's lymphoma	13	0.65 to 2.04	"…although early studies appeared to suggest a marked increase in risk ..." <1.2 by current figures
Multiple myeloma	7	0.39 to 1.68	1.4 to 1.5
Leukaemia	12	0.61 to 1.90	Only modest above 1.1"