

Appendix 1: Literature search and grading criteria

1.1: Literature search

The search was conducted by all three medically qualified authors with clinical experience of occupational lung disease (JS, MRC, PC), three qualified academic librarians and an administrator who has undertaken formal training in literature searchers. We searched the following databases using the Web of Knowledge and Weldasearch systems: Cochrane, Current Contents, EMBASE, Medline, Web of Knowledge, Weldasearch and Zetoc.

The following search terms were used: welding + lung function, welding + lung function + longitudinal study, welding + lung function + case control study, welding + lung function + prospective study.

Inclusion criteria: at least two outcome measurements of lung function. We considered articles in any language, where necessary having abstracts translated into English. The references of review articles were also reviewed by hand to ensure that no original published data had been missed in the original search.

Exclusion criteria: single measurements, case series with less than three individuals. A list of citations located and those excluded can be obtained from the authors on request. For articles published in languages other than English, we obtained abstracts translated into English, which were then treated in the same way as original English publications (none fulfilled the inclusion criteria of the study). Conference abstracts identified were also reviewed; all eligible research had been subsequently published in a peer-reviewed journal at a later date so the conference data was not used.

All abstracts were reviewed independently by two reviewers (MC and JS) and disagreements settled through discussion with third reviewer (PC). We contacted original authors where necessary to obtain additional information, (where unavailable in the publication) in an attempt to include all possible studies. One author (Chinn) provided us with a more precise dataset in response to our questions and the data presented in this paper differ slightly from those in the original publication. We received relevant additional data from Christensen. Beckett and Rossignol responded to our query; for both of these studies the original data were no longer available due to the length of time since publication. From 186 articles obtained in the literature search, eight satisfied our criteria; one paper was excluded as it was designed specifically to measure the incidence of occupational asthma.

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1.2 Data coding and classification

The selection of lung function decline in ml/year was based on sound clinical principles related to the conventional reporting of annual decline. Two raters (JS, MC) carried out the data coding in a blinded fashion. Where there were disputes, consensus was achieved using a third reviewer (PC).

Various characteristics of cases and referents were compared for the narrative review but only smoking information was used in subsequent analysis.

1.3 Grading criteria

We based our quality grading criteria on the Newcastle-Ottawa Quality Assessment Scale (NOS) for longitudinal (cohort) studies: criteria and results are shown in Table

2.2 below. A score of five or more, from a possible total of seven, was chosen *a priori* to indicate a high quality study.

Table 2: NOS grading for papers included in meta-analysis

Paper (First author)	Selection			Comparability	Outcome		Total Quality score (7)
	S1	S2	S3	C1	O1	O2	
	Representative Cohort Whole workforce or random sample invited=1 Volunteers or selected sample =0	Selection of controls Same community =1 Volunteers, different community or no controls = 0	Ascertainment of exposure Welding exposure measured 1 No exposure measured (job title only) = 0	Comparability of results Analysis takes into account Age= 1 Smoking = 1 Neither age or smoking =0	Length of follow-up >5yrs =1 < 5yr = 0	Adequacy of follow-up >70% follow-up = 1 <70% follow up = 0	
Mur	1	1	1	1 (Smoking)	1	1	6
Chinn 1990	1	1	0	2	1	1	6
Chinn 1995	1	1	1	2	1	0	7
Rosignol	1	0	1	2	1	0	5
Beckett	0	1	1	2	0	0	5
Erkunjuntii-Pekkanen	1	1	1	2	0	1	6
Christensen	0 (not known)	1	1	2	1	1	6