# Reply to criticism of the paper: Critical reappraisal of Balangero chrysotile and mesothelioma risk by Magnani et al.

*DOI: 10.2427/11448*
*Accepted on July 26, 2015*

Dear Editors,

We respond to the letter from Magnani et al. [1]. As stated in our paper [2] there is no evidence to support the view that Balangero chrysotile produces mesothelioma. The evidence does suggest crocidolite, amosite and tremolite are responsible for the alleged mesothelioma cases The Mirabelli et al. [3] 'assessment' was based on 'incomplete data'; the association was only termed as 'possible'; there was "no access to the individual records of the cohort members alive in 1987"; and "information on exposure (was only) available for 50% of all cases in the RMM". Myriad sources of naturally occurring and commercial amphibole asbestos exist to account for the alleged Balangero cases. There were only two cases with histology and immunohistochemistry and it is impossible on the basis of the information available to exclude other sources of exposure outside Balanagero for either case. Confusion concerning job titles raises the question if any case actually ever worked as 'miners'. The Mirabelli et al.[3] study is not a traditional cohort follow up. It is a retrospectively assembled case series subject to significant sources of bias, analysed entirely without controls or, "true estimates of exposed and unexposed populations". The information provided is incomplete and of doubtful reliability not only for chrysotile and fibrous amphiboles but also for the so called 'amphibole analogues' such as balangeroite considered to have the structural, biochemical and durability characteristics potentially similar to crocidolite. A role for balangeroite has not been excluded. We know that amosite and crocidolite do not occur naturally in the Western Alps and this was never stated in our paper. Lung burden studies (see Pooley and Fornero refs. in [2]) and other facilities near Balangero that used amosite and crocidolite explain their presence. There are zones of tremolite through many areas of the Lanzo Massif. 'Proximity' to a mine location is not an index of geological contiguity. Some Balangero workers did moonlight work in various tremolite asbestos contaminated talc mines near Balangero ([3] cases 15 and 17; a mill outside the mine site that processed Balangero ore also treated tremolite contaminated talc from the local mines (see [3] table 2)). After the mid 1970s, Balangero ore used for railway bed ballast was replaced by other potential tremolite containing serpentinites [3]. The Balangero chrysotile mine has never been sampled spatially or temporally to exclude the presence of tremolite. There are very few published analyses of Balangero chrysotile ore. Only one study used the Addison and Davies TEM – XRD acid digestion method [4] and this revealed tremolite [5]. The samples used by Pooley [6] are from Balangero and were received from Prof Saracci at IARC in 1982. The high lung burden chrysotile levels found by Pooley not surprisingly reflect the extremely high historical exposure conditions. Workers did not "commute" from Balangero to Casale. Some men at Balangero worked for several weeks at Casale during the year when the weather was particularly inclement (Heitz, pers com) and almost certainly lived there. "It was common for workers to commute

to and from Genoa to work in shipyards and steel mills" from northern parts of the province [7]. The consequences of workers taking their "risk factors" from one area to the next is reflected in clusters of mesotheliomas that even reached the Lanzo Valley [7,8]) "Industrial sectors characterised by indirect use of asbestos have also been found to contribute significantly to MM cases in several clusters, namely the non-asbestos textile industry (see Sarnico, Legnano, Cirié, Prato, Dalmine and Padua)" [9-11]. Extreme exposures to women working in factories that used crocidolite near Balangero [12, 13] could have para-occupationally exposed their families. This is suggested by the spatial clustering analysis done by Corfiati et al. [8].

Significant amounts of crocidolite and amosite were used in Balangero and in the surrounding areas. The lung burden data of Pooley and Fornero (see refs in [2]), and their use in nearby factories [13,14] support this. Pira et al´s [15] description of crocidolite at Balangero is vague and imprecise. Terms like "occasionally", "short" and "mainly" are of questionable value. The "high asbestos contamination in the Torino area" obviously arose from the many in-place sources of commercial amphibole in the City. Spatial variation studies did not support the idea that the 1% chrysotile containing ore used for the preparation of roads, rails, tramway foundation beds, and underground lines were not important contributors to the observed mesothelioma excess [7,8]. Also, there was no factory at Balangero. There is no relevancy to the statement "Dust measurements did not show large differences among those working areas". The historical concentrations that caused disease at Balangero were extremely high. Attempts to estimate their actual historical values are guesswork. Frequent "snowfalls" of white powder spread from the mine and the mill and covered the sills of houses and the leaves of the trees around them from 1921 to 1944 [16]. The attendant dust levels around and in the mine and the mill at that in particular time could never have been quantitatively assessed retrospectively with any degree of accuracy despite attempts to have done so in the past by, for example Rubino et al [14] who admit that such efforts had "considerable limitations".

***COMPETING INTEREST***

*Edward B. Ilgren, Independent Consultant, has acted as consultant to companies in asbestos litigation.*
*Frederick D. Pooley, Emeritus Professor, University of Cardiff, has acted as a consultant to asbestos companies.*
*John A. Hoskins has attended and spoken at several meetings on behalf of the Chrysotile Institute.*
*Yumi M. Kumiya has no conflicts of interest.*

## References.

[1] Magnani C., Mirabelli D, Barone-Adesi F et al. Letter to the Editor. EBPH, 2015; etc.

[2] Ilgren EB, Pooley FD, Kumiya YM, Hoskins JA. Critical reappraisal of Balangero chrysotile and mesothelioma risk. EBPH 2015;12(1): e10125 – 1-9.

[3] Mirabelli D, Calisti R, Barone-Adesi F, Fornero E, Merletti F, Magnani C. Chrysotile in Balangero, Italy. Excess of Mesotheliomas after Exposure to Chrysotile in Balangero, Italy. Occup Environ Med 2008;65:815-819.

[4] Addison J, Davies, L. Analysis of amphibole asbestos in chrysotile and other minerals. Ann Occup Hyg 1990;34:159 – 175.

[5] Butler M. The physical and chemical characteristics of serpentine rocks and miners. Ph.D. Dissertation. Department of Mineral Exploitation, University College, Cardiff, UK. (1980).

[6] Pooley F. 'Investigation of the importance of tremolite in the production of asbestos related disease and its relevance as a long term indicator of chrysotile exposure'. Prepared for the Health and Safety Executive [HSE] of the UK. (1990).*

[7] Maule M, Merletti F, Mirabelli D, La Vecchia C. Spatial variation of mortality for common and rare cancers in Piedmont, Italy, from 1980 to 2000: a Bayesian approach. Eur J Cancer Prev 2006;15:108-16.

[8] Corfiati, M, Scarselli, A, Binazzi A, et al. Epidemiological patterns of asbestos exposure and spatial clusters of incident cases of malignant mesothelioma from the Italian national registry. BMC Cancer 2015; 15:286.

[9] Barbieri PG, Somigliana A, Caironi M, Migliori M. The epidemiologic surveillance of malignant mesothelioma in the Lower Iseo Lake area. Epidemiol Prev 2007;31(s1):16–22.

[10] Paci E, Zappa M, Paoletti L, et al. Further evidence of an excess of risk of pleural malignant mesothelioma in textile workers in Prato (Italy). Br J Cancer 1991;64:377–378.

[11] Mensi C, Macchione M, Termine L, et al. Asbestos exposure in the non-asbestos textile industry: the experience of the Lombardy Mesothelioma Registry. Epidemiol Prev 2007;31(4 s1):27–30.

[12] Rubino GF, Scansetti G, Donna A, Palestro G. Epidemiology of pleural mesothelioma in North-western Italy (Piedmont) Brit. Br J Ind Med 1972;29:436-42.

[13] Pira E, Pelucchi C, Buffoni L, et al. Cancer mortality in a cohort of asbestos textile workers. Br J Cancer 2005;92:580–586.

[14] Rubino, GF, Piolatto G, Newhouse ML, Scansetti G, Aresini GA, Murray R. Mortality of chrysotile asbestos workers at the Balangero Mine, Northern Italy. Br J Industr Med 1979;36:187-194.

[15] Pira E, Pelucchi C, Piolatto PG, Negri E, Bilei T, La Vecchia C. Mortality from cancer and other causes in the Balangero cohort of chrysotile asbestos miners Occup Environ Med 2009;66:805-809.

[16] Calisti R, De Giuli P, Ghione GL. An update of cancer mortality among chrysotile asbestos miners in Balangero, northern Italy. Br J Ind Med 1992;49:144.

* *unpublished report available as supplemental material*

*