LETTER

Author's response to 'Re: Exposure to asbestos and the risk of colorectal cancer mortality: a systematic review and meta-analysis by Kwak *et al*'

We would like to thank Dr Boffetta for his comment on potential overlaps in the selection of cohorts. As we tried to keep the principle of examining all the available publications in the systematic review and avoiding the double count in the meta-analysis, we have re-examined the materials of the study again. Even though different aspects in the follow-ups of five cohorts were noted in the original review of 12 studies, we agree with Dr Boffetta that, on re-examination, there could be a potential of double counting. As for the Italian pool of asbestos worker cohorts,[1] which was included in the original review list of 310 full-text articles for eligibility assessment, we still find it ineligible, as it was a pooled study containing environmental exposures, and therefore did not satisfy the original inclusion criteria.[2]

Based on this re-examination, after excluding seven potentially overlapping studies (table 1 of the letter by Boffetta), we recalculated the pooled SMRs with only the most recent five cohorts kept in the analysis (table 1).[3–7] The weight of the excluded seven cohorts was 15%. However, the overall results from the subgroup analysis were basically the same with only minor changes in the significance levels for some subgroups. Pooled standardised mortality ratio (SMR) of 'miscellaneous type of industry' has changed from a non-significant increase to a significant decrease; that of 'various type of industry' has gained significance; that of 'adequacy of follow-up in study quality' has lost significance. Forest plot of studies included in the meta-analysis was replotted in figure 1. The main results of the increased risk of colorectal cancer mortality in workers exposed to asbestos were almost the same in reanalysis as that of original analysis, and it remained statistically significant even after excluding seven potentially overlapping studies in the reanalysis.

Kyeongmin Kwak [1,2] **Domyung Paek** [1,3] **Kyung Ehi Zoh** [1]

[1]Department of Environmental Health Sciences, Seoul National University Graduate School of Public Health, Seoul, Korea (the Republic of)
[2]Department of Occupational and Environmental Medicine, Korea University Ansan Hospital, Ansan, Gyeonggi-do, Korea (the Republic of)
[3]Institute of Health and Environment, Seoul National University, Seoul, Korea (the Republic of)

Correspondence to Kyung Ehi Zoh, Department of Environmental Health Sciences, Seoul National University Graduate School of Public Health, Seoul 08826, Korea (the Republic of); kezoh@snu.ac.kr

Table 1 Recalculated pooled SMRs of subgroup analysis

	Studies (n)	Pooled SMR	Heterogeneity I² (%)	P value
Study area				
North America (USA and Canada)	13	1.08 (0.90–1.30)	73.0	<0.001
Europe	22	1.21 (1.05–1.38)	34.0	0.061
Australia	1	1.45 (1.09–1.92)	–	–
Asia	3	1.43 (0.78–2.62)	0.0	0.704
Cohort size				
Small (<1500)	18	1.27 (1.10–1.47)	0.00	0.600
Large (≥1500)	21	1.09 (0.94–1.27)	76.4	<0.001
Type of industry				
Mining and milling	4	1.09 (0.72–1.65)	80.4	0.002
Insulation	4	1.49 (1.26–1.75)	4.0	0.373
Asbestos cement	8	1.06 (0.84–1.32)	23.6	0.241
Textile	10	1.19 (0.93–1.52)	49.7	0.037
Miscellaneous	7	0.86 (0.74–0.998)	0.0	0.808
Various	6	1.35 (1.24–1.47)	0.0	0.468
Follow-up duration				
Short (≤30 years)	17	1.07 (0.88–1.31)	46.5	0.019
Long (>30 years)	22	1.20 (1.04–1.38)	68.3	<0.001
Latency				
No latency	24	1.18 (1.03–1.36)	58.0	<0.001
Exist (5–20 years)	15	1.11 (0.91–1.37)	67.0	<0.001
Lung cancer SMR*				
Low (<2)	22	0.99 (0.85–1.16)	70.1	<0.001
High (≥2)	17	1.44 (1.29–1.60)	0.0	0.776
Smoking (ever) prevalence				
Data not available	23	1.20 (1.06–1.35)	43.3	0.015
Low (<75%)	9	1.00 (0.77–1.29)	40.4	0.098
High (≥75%)	7	1.25 (0.90–1.74)	77.2	<0.001
Smoking (current) prevalence				
Data not available	28	1.21 (1.07–1.37)	41.4	0.012
Low (<50%)	7	1.00 (0.75–1.34)	26.6	0.225
High (≥50%)	4	1.05 (0.72–1.53)	90.9	<0.001
Follow-up started year				
Early (1910–1965)	20	1.13 (0.97–1.32)	62.5	<0.001
Late (1966–2001)	19	1.19 (1.01–1.42)	58.7	0.001
Study quality				
Representativeness: representative	29	1.15 (1.02–1.30)	63.2	<0.001
Exposure measurement: formal	21	1.13 (0.97–1.33)	62.0	<0.001
Comparability of groups: standard	38	1.17 (1.04–1.31)	62.9	<0.001
Assessment of outcome: formal	39	1.16 (1.03–1.29)	62.4	<0.001
Adequacy of follow-up: virtually complete	23	1.15 (0.95–1.38)	35.0	0.051
Types of cancer				
Colon or intestine	15	1.18 (0.97–1.45)	70.0	<0.001
Rectum	14	1.17 (0.93–1.47)	34.7	0.097

SMR, standardised mortality ratio.
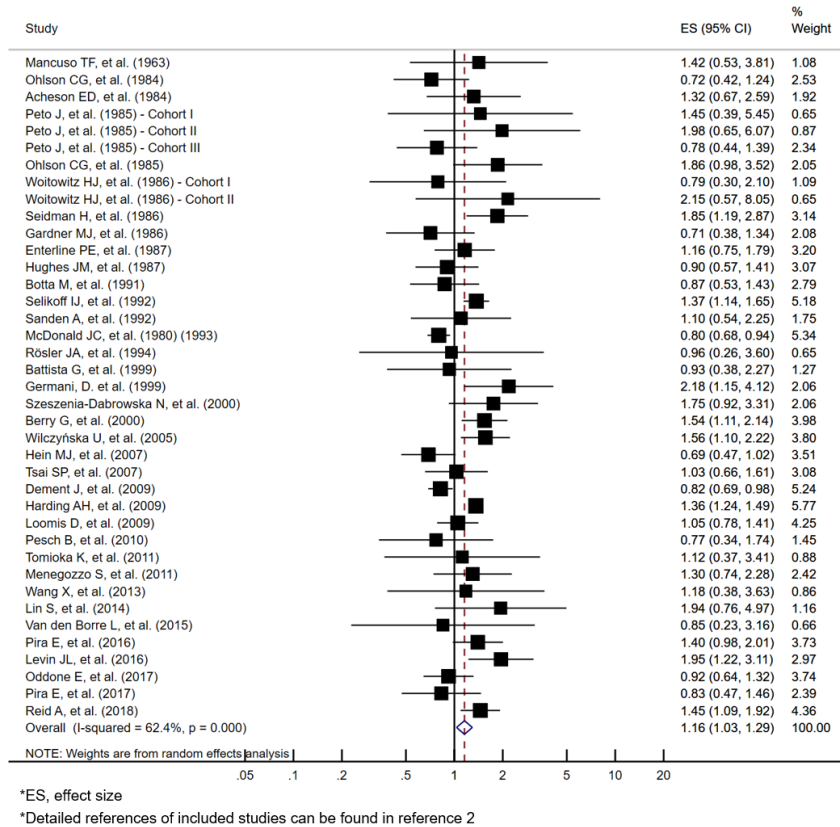
Figure 1 Revised forest plot of studies included in the meta-analysis of exposure asbestos and the risk of colorectal cancer mortality.

► http://dx.doi.org/10.1136/oemed-2020-106588

ORCID iDs
Kyeongmin Kwak http://orcid.org/0000-0001-6296-8058
Domyung Paek http://orcid.org/0000-0003-4510-6362
Kyung Ehi Zoh http://orcid.org/0000-0002-2821-070X

REFERENCES

1 Ferrante D, Chellini E, Merler E, *et al*. Italian pool of asbestos workers cohorts: mortality trends of asbestos-related neoplasms after long time since first exposure. *Occup Environ Med* 2017;74:887–98.

2 Kwak K, Paek D, Zoh KE. Exposure to asbestos and the risk of colorectal cancer mortality: a systematic review and meta-analysis. *Occup Environ Med* 2019;76:861–71.

3 Seidman H, Selikoff IJ, Gelb SK. Mortality experience of amosite asbestos factory workers: dose-response relationships 5 to 40 years after onset of short-term work exposure. *Am J Ind Med* 1986;10:479–514.

4 Reid A, Merler E, Peters S, *et al*. Migration and work in postwar Australia: mortality profile comparisons between Australian and Italian workers exposed to blue asbestos at Wittenoom. *Occup Environ Med* 2018;75:29–36.

5 Harding A-H, Darnton A, Wegerdt J, *et al*. Mortality among British asbestos workers undergoing regular

medical examinations (1971-2005). *Occup Environ Med* 2009;66:487–95.

6   Pira E, Romano C, Donato F, *et al*. Mortality from cancer and other causes among Italian chrysotile asbestos miners. *Occup Environ Med* 2017;74:558–63.

7   Lin S, Wang X, Yano E, *et al*. Exposure to chrysotile mining dust and digestive cancer mortality in a Chinese miner/miller cohort. *Occup Environ Med* 2014;71:323–8.