

Summary of Radiologic Silicosis in the Clay Brick Industry

Study	No. Of Plants in Study	Workers Examined	No. Of Silicosis Cases
West Virginia Health Department Study, 1939	20	325	15 (4.6%)
Trice, 1941, North Carolina Brick Study	48	1555	0
Keatinge, 1949, English Brick Study	3	73	1 (1.4%)
NIOSH, 1978, North Carolina Brickworkers Study	7	518	0
NIOSH, 1980, NIOSH, North Carolina Brickworkers Study	5	541	0
Rajhans and Buldovsky, 1972, 1974, Ontario Structural Clay Brick Study	10	1116	0
Love, 1999, English and Scottish Brick Plant Study	18	1831	25 (1.4%)
Hessel, 2006, BIA Study	13	701	0

Study of Scottish Coal Miners is Inappropriate for Estimating Risk of Brickworkers

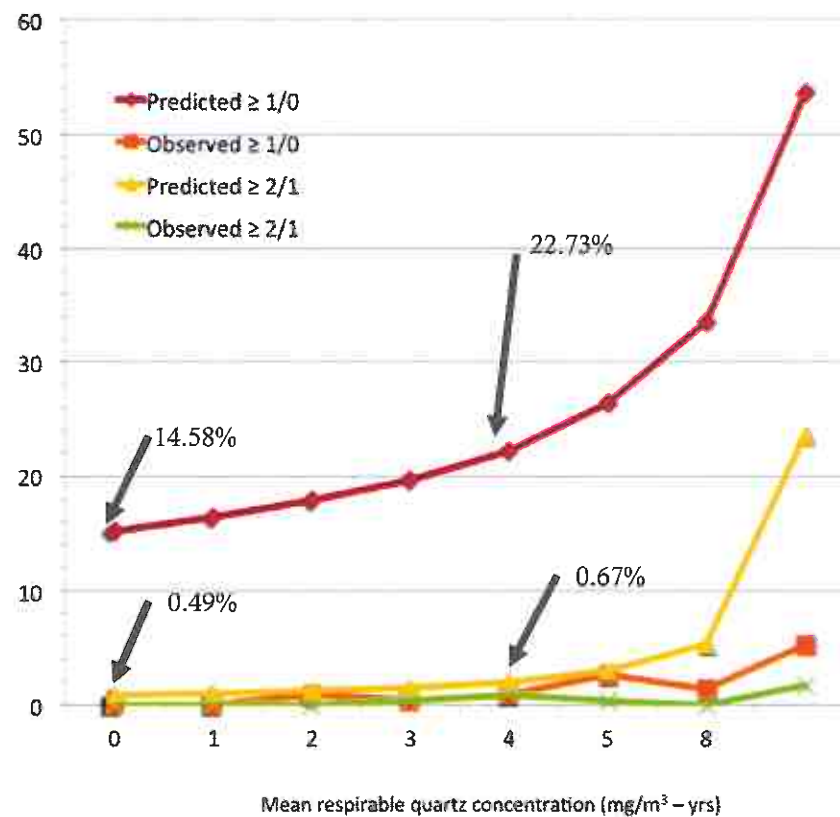
- Studies have shown that equivalent exposure concentrations of silica where silica is in a clay matrix have lower silicosis risk than those with unoccluded quartz.
 - Clearly shown in studies of structural clay brick.
- Miller and Soutar used the risk model developed in the study of Scottish coal miners to predict cases of silicosis and compare to actual observed cases in the UK brickworker studies.
- Employing the coal miner risk model for coal miners the predicted risk for brickworkers was extremely overstated when compared to the actual cases observed.

Scottish Coal Miner Silicosis Study (Buchanan et al., 2001; Buchanan et al., 2003)

- Prediction equations came from a Scottish colliery that had experienced high quartz exposures.
- Follow up study of 547 ex-miners that participated in earlier rounds of examination.
- There were 203 (38%) classified as $\geq 1/0$ that progressed at least one ILO category.
- Of the 203, 128 (24%) of these progressed two or more categories of profusion.
- Prediction equations for a miner aged 60 at the time of follow up with 15-years exposure to an average concentration of 0.3 mg/m^3 would have a risk of 22% of developing an ILO radiologic classification of 2/1.

Predicted and Observed Silicosis in Brickworkers (Miller and Soutar, 2004)

Predicted risks and observed frequencies of radiographic abnormalities, grouped by cumulative quartz concentration.



Predicted and Observed Silicosis in Brickworkers (Miller and Soutar, 2004)

Profusion Category	Quartz Exposure Assumption	Total Risk (# of cases)	
		Predicted	Actual
Cat \geq 1/0	No Latency	468	26
	15 Year Latency	331	
Cat \geq 2/1	No Latency	86	8
	15 Year Latency	31	

Miller and Soutar Conclusion (2004)

- Miller and Soutar commented in the report on the lack of concordance in using the Buchanan study to infer risks of brickworkers (IOM Report TM/04/02, p. 21).
- “These discrepancies cannot be explained by mere statistical variation. It is clear that the observed frequencies of **abnormalities in the heavy clay workers were much lower than the equations of Buchanan *et al* (2003) predict**, suggesting that those predictions are based on formulations of **risk that may not be relevant for the heavy clay industry.**” (emphasis added)

Conclusions

- Medical studies of brickworkers show that the risk of developing silicosis from exposure to quartz in brick clays is insignificant at exposure levels at the current PEL.
- Using the Scottish coal miner equations the predicted risks of silicosis was seriously inflated compared to the actual cases observed in the radiological silicosis studies of heavy clay workers.
- The Love et al. study should be used as a basis for establishing an occupational exposure limit for quartz occluded in a clay matrix.