

# Will processing nonasbestiform tremolite cause lung disease? (A1714)

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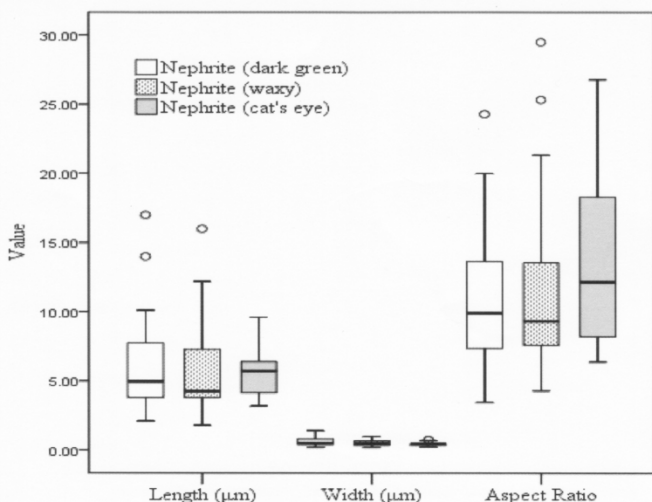
## Background & Objective

Current studies of non-asbestiform asbestos minerals remain inconclusive. Nephrite is a type of non-asbestiform tremolite mineral. The objective of this study was to assess the risk of pulmonary fibrosis in workers who process nephrite.

## Materials & Methods

A cross-sectional study that included 344 stone workers and their families was undertaken in 2010. The diagnostic criteria for pulmonary fibrosis included (1) radiographic fibrosis profusion of 1/1 or greater and (2) audible lung crackles confirmed by physician. The nephrite samples were analyzed using polarized light, and transmission electron microscopy combined with selected-area electron diffraction and energy dispersive x-ray spectroscopy.

## Results



**Fig. 1** The distribution of EMPs length, width, and aspect ratio between different type of nephrite.

### Table 1. Consecutive personal sampling

Procedure	Concentration of fibers (f/cm <sup>3</sup> )	8-h TWA (f/cm <sup>3</sup> )
1. Cutting	0.098	
2. <b>Rough grinding</b>	<b>0.596</b>	<b>0.206</b>
3. Fine grinding	0.049	
4. Polishing	0.051	

After 12 subjects with histories of tuberculosis and previous employment in metal casting and welding were excluded, 328 subjects were analyzed. Processing nephrite increased the risk for pulmonary fibrosis after adjusting for pack-years of smoking and age, and a dose-response relationship between processing nephrite and the disease was observed. Bulk sample analyses revealed that the nephrite was a tremolite-actinolite mineral composed of both asbestiform and non-asbestiform components. The "cat's eye nephrite" had the highest asbestiform fibrous content, and its average EMPs length and aspect ratio were the highest of all the nephrite types. Compared with those processing other types of nephrite, the workers processing "cat's eye nephrite" had the highest risk for pulmonary fibrosis.

### Table 2. Odds ratios for pulmonary fibrosis

Type of stone	Cumulative exposure years	OR adjusted for age and pack-years of smoking	P
Dark green nephrite	≥ 20	8.99 (2.77—29.21)	<b>&lt; 0.01</b>
	10-20	2.95 (0.34—25.89)	0.33
Cat's eye nephrite	≥ 20	12.22 (3.65—40.84)	<b>&lt; 0.01</b>
	10-20	12.42 (1.07—143.74)	0.04
	< 10	1	

### Table 3. Prevalence of pulmonary fibrosis, Chi-squared test for trends

Frequency (times/week)	Never smoked			P
	0	0-1	≥ 1	
Dark green nephrite	3.1%	5.0%	19.1%	<b>0.03</b>
Waxy nephrite	4.1%	0	18.2%	<b>0.05</b>
Cat's eye nephrite	2.9%	20.0%	20.0%	<b>0.00</b>

**Key information:** (1) Destroying nephrite released both non-asbestiform cleavage fragments and asbestiform fibers. (2) Processing nephrite (especially cat's eye nephrite) increased risk of pulmonary fibrosis. (3) The proportion of asbestiform components, EMP length, and aspect ratio are determinants for the risk.

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