Silicosis 300 years after Ramazzini: Eradication in some countries, increased incidence in others

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“What Diemerbrock has to say about stonecutters who died of asthma ----”:

At autopsy he found that "their lungs were full of lumps of sand so that when he was cutting the pulmonary vesicles with a knife, he thought he was cutting av body of sand".

A stonecutter had told Ramazzini that "when he was working the stone, a dust arose that was so fine it would even penetrate the ox-bladders hanging in the workshop - " --- "the stonecutter believed that this would gradually cause the death of those who did not take sufficient precautions".

1 "De Morbis Artificum Diatriba", in: Christina Cawthra’s translation, Cierre edizioni, 2009, p. 189.
B Ramazzini: Absence of "sufficient precautions" could result in death from stone cutters disease (silicosis).

300 years later:

- What is the situation in the world - concerning the 'stone cutters disease'? Have we - Ramazzini's followers - adhered to his recommendation to prevent the disease through precautions(?); "inhibition of stone dust generation" and - whenever stone dust is still remaining in the work air; personal protection.

- Some countries have been successful, virtually eradicating silicosis - demonstrating that total prevention is possible, while in other countries - the incidence in is still increasing.

Have we - followers of Ramazzini - been successful in preventing?
Slicosis is long known as a major hazard to health

- illustrated by a notice *chalked up* in a foundry in Coventry, UK, in 1934

Join the NAVY and see the world

Become a sandblaster and see the next
Norway: **Industrialization late 19th century** lead to significant exposure to quartz dust:

Hydroelectric **power stations** were developed in the 1890’s and onwards, along with electricity demanding **industries** - developed close to large water falls. **Roads, railways, tunnels were built, coal mines (Spitsbergen) were established; all involving rocks containing quartz.**
Result Norway: high incidence of silicosis and interest on prevention from early 1930’s

Significant interest was elicited among MDs to report on new cases of silicosis, resulting in high numbers notified to the Register for occupational diseases:

1933-37 - 306 new cases
1938-43 - 715 new cases

Over the years 1933-1947, 1,500 new cases of silicosis were notified to the Registry. Total population 2.9 mill as of 1933.

From the early 1950’s and onwards, a gradual reduction in numbers of notified cases took place and approached zero new yearly cases among Norwegians from the mid 1980’s.
To facilitate awareness on work-related diseases and to enhance education -

The Work Inspectorate established as of 1926 a Registry for incident cases of occupational diseases.

Occupational Health Services (OHS) were established in the 1930's. Some heavy industries had already established health services and hospitals.

The director of the Work Inspectorate gave on February 13th, 1932 a widely published presentation - followed by doctors' publications on silicosis.

Doctors published articles on silicosis in local medical journals.

*Participation by exposed workers in prevention was strongly supported in this period, enhancing the workers' consciousness of personal responsibility for their own healthiness.*
The Nordic countries in the lead in terms of preventing silicosis

- My country (Norway) may be considered representative for the other Nordic countries on silicosis:
- Over the past 30 years we have identified no confirmed new cases of silicosis resulting from silica exposure in Norway.
- However, a few “new” cases have been diagnosed after 1984 (next slide), resulting from silica exposure in the 1960- or 1970, as well as odd cases among immigrant workers (exposure prior to immigration).

Warning: We may become self self-content with the achievements - thus loosing the attention on preventing exposure to silica dust:
- Recently, both Sweden and Norway have had one new (possible) case of silicosis each, resulting from recent exposure in each of the countries; the Swedish case even fatal.
- To day, the prime hazards in the Nordic countries is declining knowledge on methods to prevent silicosis and other work-related diseases.
Recent cases of *silicosis* notified to the Work inspectorate, Norway

By courtesy of Dr. A Wannag, Work inspectorate, Norway
Notified cases of silicosis, Sweden, 1980-2001


By courtesy of dr. L Aringer, Work inspectorate, Sweden
Silicosis - Switzerland; successful prevention

**Deaths from silicosis - past**

<table>
<thead>
<tr>
<th>PERIODS</th>
<th>CASES</th>
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<tbody>
<tr>
<td>1930-37</td>
<td>128</td>
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<tr>
<td>1938-42</td>
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<td>1943-47</td>
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<td>1950-52</td>
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<td>1973-77</td>
<td>56</td>
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<td>1978-82</td>
<td>39</td>
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</tbody>
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**Deaths from silicosis - present**

<table>
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<th>PERIODS</th>
<th>CASES</th>
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Silicosis - in an European country
CDC – Asbestosis v. Silicosis Deaths

Year

Asbestosis
Silicosis
Recent disturbing ILO-figures on silicosis in Western countries

- USA: about 1 million exposed; 10% may develop silicosis.
- Japan: 1,000/year incident cases reported.
- Germany: 1990's; 3,000-3,500 incident cases a year.
- France: About 300 notified cases of silicosis yearly.
- Australia: 1,000 yearly cases predicted.
- UK 2002: 1,162 incident cases of pneumoconiosis.
What about small Asian countries?  
e.g. Mongolia

There was a limited amount of mining in Mongolia from the 1950’s and onwards, while a significant number of major mines have been opened in the country over the past 20-25 years, mining now being the second largest industry in the country.
Mongolia is becoming a mining nation; here
Nariin Sukhait - 40 km to the Chinese border
Workforce in Mining in Mongolia 2003-13 $\times 10^{-3}$

By courtesy of Dr. Dalaijamts, National Centre for Public Health, Ulaanbaatar.
Mongolia: Decline in cases of silicosis

By courtesy of Dr. Dalaijamts, National Centre for Public Health, Ulaanbaatar.
Is the declined observed incidence real?

• Though the observed incidence seems to decline, the real incidence may still be rising -
  • a) due to increasing numbers in mining and “stone industries”;
  • b) exposure to low levels of quartz dust my lengthen the development time of silicosis.
Silicosis, PR China

- He F. Occupational medicine in China. IAOEH 1998;71:79-84. Dr. He stated that “The prevalence of pneumoconiosis was estimated to be among 6% among coal miners”.
- Estimates from the Ministry of Health in year 2000 showed that (Source: Mekong Region OSH Work shop, November 2000) showed that the number of pneumoconiosis victims in China is 550,000, and that there were “15,000-20,000 new cases occurring each year”.

China example:

“Accelerated Silicosis in Workers Exposed to Agate Dust in Guangzhou, China”.

Thirty-two men involved in processing agate stone were examined. The mean (SD) age was 29.8 (4.9) years and the mean (SD) duration of exposure was 3.5 (1.7) years. Fifteen cases (47%) were diagnosed as accelerated silicosis. Up to September 1999, three had died from respiratory failure and five were in critical condition.

Vietnam*

- Silicosis was first recognized as a compensated occupational disease in 1976. Since then Silicosis has been the most common occupational disease in Vietnam.
- Until 2003, silicosis accounted for 75.7% of total compensated work-related diseases in the country.
- Approximately 1 million workers silica exposed, especially who involve with coal and rock. Up to 2006, the cumulated number of cases were 17,642.
- During 2000-2005; +/- 1000 cases/year.
- Cases in 2006-2008 were 434, 884, and 428, respectively, and in 2009 2,141, the highest since 1991.

* Information is provided by professor Y Kusaka, Department of Environ. Health, University of Fukui, Fukui, Japan
India, silicosis*

The number of worker at risk are 3,000,000. This number does not include numbers of workers in construction industry, unorganized, and self employed sectors which are estimated much more than this.

- The prevalence of Silicosis in slate pencil industry, agate industry, stone quarry, and mica processing industry were 54.6%, 39.8%, 22.4%, 6.23%, respectively.

- A study among slate pencil workers revealed that 50% of workers suffered from silicosis were below 25 years of age and mean age at death was 35 years.

* Information is provided by professor Y Kusaka, Department of Environ. Health, University of Fukui, Fukui, Japan
Recent ILO figures on silicosis: Large countries

♣ China:*  
- Incidence 15-40,000  
- Prevalence (1998) 542,041  
- In 2002 – 10 mill exposed - ± 5,000 deceased {4 mill coal workers?}

♣ India:  
- about 5 mill exposed to silica dust; prevalence up to 55%.

♣ Brazil:  
- 6.6 mill exposed.

♣ S. Africa:  ±600,000 former miners with silicosis.

The Collegium fellows: have we failed in facilitating prevention of silicosis in the world?

- I know than one of our Japanese members - present here today - is doing a formidable job - along with another Japanese colleague whom I have referred to - to prevent pneumoconiosis among Asian workers.

- As silicosis was more or less eradicated in the Nordic countries at the time the Collegium was established, me and my Nordic CR-member colleagues have only to thank our predecessor for the silicosis eradication.

- However CR members carry a huge responsibility to assist colleagues - occupational health experts - in all countries, to adhere to Bernadini Ramazzini’s in avoiding exposure to quarts dust among stone workers, hence preventing silicosis.
Concluding remarks

► Some countries have eliminated silicosis. Hence - *global elimination is feasible*.

► The use of relatively simple and inexpensive devices, i.e., dust control and personal protection - available for decades - does prevent silicosis.

► *Colleagues of ours in all countries, have the knowledge necessary to prevent silicosis.*

► Still, external support to colleagues may sometimes be desirable to facilitate implementation of prevention.

► *Multidisciplinary programs for silicosis prevention may be the least expensive and most cost-effective preventive interventions available.*
Thank you for your attention