In the German Mesothelioma Registry,[214] the mean age at the time of diagnosis of peritoneal MM was about 59 years for men, whereas women were on average 4 years younger. The mean survival time was about 1 year, but in six of 38 patients longer survival times of up to 7 years were recorded. The epithelial MMs predominated, but no effect on survival time was noticed. The average latency interval was 36 years.

Latency Intervals Between the Commencement of Asbestos Exposure and the Subsequent Diagnosis of Mesothelioma

In the Australian Mesothelioma Surveillance Program, the mean latency interval was 37 years and ranged up to 75 years,[218] and the corresponding latency interval for cases of mesothelioma certified by the Dust Disease Board (DDB) in New South Wales in 2001/2002 was approximately 42 years. In a study of 557 mesothelioma cases reported in 2001 by Bianchi et al.,[219] the latency intervals ranged from 14 to 75 years, with a mean of ~49 years and a median of 51 years. Some authorities and The Helsinki Criteria[220] specify a minimum latency interval of 10 years, whereas others require a minimum interval of 15 years.

Mineral Fibers and Mesothelioma

This section focuses on the relationship between exposures to mineral fibers and the resultant observations of the development of mesothelioma.[1,2] Pleural MMs are most common,[2] although a study of lung cancer and mesothelioma in the pleura and peritoneum among Swedish insulation workers[210] found that "mesothelioma in insulation workers seems to be situated in the peritoneum more often than in the pleura."

Mesothelioma is widely considered an asbestos "marker disease." The report of the Pneumoconiosis Committee of the College of American Pathologists and the National Institute for Occupational Safety and Health (NIOSH)[221] concluded, "malignant mesothelioma of the pleura and peritoneum either are exceptionally rare or never occur in persons not exposed to asbestos."

In fact, Henderson et al.[222] concluded in an overview of attribution of asbestos-related cohorts in Australia that "no threshold of exposure (in other words a level below which there is no effect) has been delineated for asbestos-related malignancies (mesothelioma and lung cancer), but there is some evidence for a threshold for asbestosis and perhaps diffuse pleural fibrosis."

Fiber Length and Mesothelioma

Mineral fibers other than asbestos have been of concern with regard to possible induction of MM in humans.[223] An appreciable concern for exposure to nonasbestos fibers and the risk of producing disease has been based on exposures using animal models where the exposure to the dust was via intraperitoneal route[224–227] or intrapleural implants.[228,229] The common conclusion in these models is that a comparison of risk for the induction of mesothelioma indicates that on a one-to-one basis, a short fiber is less carcinogenically active than a longer, thinner fiber of the same type. Stanton et al.[228,229] acknowledged that some tested fibers that were shorter or thicker also induced mesothelioma. Pott et al.[224–227] concluded the dimensions of fibers are only one factor that enables a fiber to have the ability of inducing mesothelioma.

The Stanton hypothesis[229,230] argues that carcinogenicity is expressed mainly by long thin asbestos fibers, with lengths >5 μm and especially >8 μm, and in the range of 10 to 20 μm, and diameters <0.25 μm. Shorter fibers appear to be less carcinogenic, although it is doubtful that carcinogenicity is restricted to a critical and precise fiber length or diameter.[38] The Stanton model is supported by evidence derived from animal experiments,[231–234] but it seems likely that biopersistence of amphibole fibers may be more important for MM induction than precise fiber dimensions, and data in humans concerning fiber length and mesotheliomagenicity are equivocal.[230,235] Even so, very short-length fibers (<1 μm) appear to have comparatively little carcinogenic activity.

The majority of the existing data from human studies indicates the fibers that are likely to be relocated from the lungs to extrapulmonary sites where mesothelioma develops are short or thin fibers.[236] In studies by Dodson et al.,[236] some longer fibers (>5 μm) were shown to reach the lymph nodes and pleural areas, but the shorter fibers of chrysotile were the predominant fiber type in pleural plaques. This same observation has been made by Sebastien et al.,[237] and by Suzuki and Yuen.[235,238] Suzuki and Yuen also reported short chrysotile fibers in mesothelial tissue. Dodson et al.[239] reviewed the content of omentum and mesentery tissue from occupationally exposed individuals. While there were some longer fibers in these sites where peritoneal mesothelioma develops, the majority of asbestos burden was found to be in the form of short fibers. Boutin et al.[240] did a comparative study of asbestos burden in lung tissue and "black spots" in the parietal pleura. Their finding in the study group was that there was a prevalence of amphiboles in all sites with 22.5% of the fibers ≥5 μm in the "black spots" of pleural tissue. The authors questioned whether this accumulation of fibers indicated a preferred site for mesothelioma and pleural plaques. In a companion paper, Mitchev et al.[241] evaluated the parietal pleura of 150 consecutive necropsies of urban dwellers. The size and intensity of spots were scored and recorded, as were pleural plaques. The report stated that 92.7% of cases had detectable black spots. The study concluded that "there was no relationship between the