

Findings of Epidemiological Survey on Semiconductor Manufacturing Workers

- KOSHA announced the findings from a longitudinal survey on cancer incidence and mortality risk ratio for the past 10 years (2009 thru 2019) in order to overcome the restrictions on past epidemiological surveys, such as insufficient observation data, and procure sufficient observation data ever since conducting an epidemiological survey at workplaces of semiconductor manufacturers in 2008 following the outbreak of leukemia among semiconductor manufacturing workers in 2007.
- The epidemiological survey analyzed the cancer incidence and mortality risk ratio targeting approximately 200,000 former and current workers at the workplaces of 6 semiconductor manufacturers.
- Unlike the survey in 2008, this longitudinal survey compared the cancer incidence and mortality risk ratio of semiconductor manufacturing workers with the entire workers* as well as the general public in order to attain more accurate assessments.
 - * Because the worker group represents a group more likely to be relatively healthy than the general public, more accurate assessment on the cancer incidence and relative mortality risk ratio can be obtained through comparison with the worker group.
- Based on the epidemiological survey, it was found that female semiconductor manufacturing workers carry higher risks for hematologic malignancy (leukemia, non-Hodgkin lymphoma) than the general public and entire workers as shown below:
 - With respect to leukemia, it was learned that the incidence

risk of female workers concerned is 1.19 times* and 1.55 times* higher than the general public and entire workers respectively, and their mortality risk is 1.17 times* and 2.3 times* higher than the general public and entire workers respectively.

- Regarding non-Hodgkin lymphoma, it was revealed that the incidence risk of female workers concerned is 1.71 times* and 1.92 times* higher than the general public and entire workers respectively, and their mortality risk is 2.52 times* and 3.68 times* higher than the general public and entire workers respectively.

* Statistically not significant; Please refer to the details separately attached for more information.

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- Specific causes contributing to the incidence of hematologic malignancy were not identified; however, it appeared that the working environment may have affected its onset when the followings are accumulated.
 - The onset risk of hematologic malignancy was higher from female operations at the age between 20 and 24.
 - Operators and engineers who work at clean rooms tended to show higher onset or mortality ratios of hematologic malignancy, and females employees hired prior to 2010, whose exposure level to harmful substances was higher than that of today's workers, displayed higher onset ratio of hematologic malignancy.
 - Other studies on semiconductor manufacturing industry in Korea also reported health disorder in female reproduction organs as well as increasing onset of similar cancers.

* Jin-ha Yoon, et al: Study on Onset of Disease through Construction of Big Data-based Occupational Cohort, 2017; OSHCI
Eun-a Kim, et al: Epidemiological Study on Reproductive Health of Workers (1), 2015; OSHCI

- In the meantime, the onset risk ratios of stomach cancer, breast cancer, kidney cancer and some rare cancers* were also high in addition to hematologic malignancy.

* Neurocutaneous melanomatosis, testicular cancer, pancreatic cancer, major salivary glands cancer, bone/joint cancer, adrenal carcinoma, nasopharyngeal cancer (fatality), etc.

- Additional examinations need to be conducted whether stomach cancer and others were found more from the semiconductor workers than the general public because they were given relatively more opportunities for cancer screening; and with rare cancers, additional observation is required due to the lack of relevant cases.

- The report on epidemiological survey suggested that the health and working environment of workers at worksites of semiconductor manufacturers need to be continuously managed and additional studies on health impacts of the semiconductor industry also need to be conducted.

- Consequently, KOSHA plans to **monitor** semiconductor manufacturing worksites for self-regulatory safety/health activities as well as to operate risk management systems, such as **chemicals exposure monitoring system** by given duties, for the electronics industry including subcontractors and small-and-medium-sized businesses by establishing the **Electronic Industry Safety & Health Center**.

- President Park of KOSHA said, "With the findings from the latest epidemiological survey, I expect to be able to manage cancer incidences in Korean semiconductor manufacturing

businesses and also to bring tremendous assistance for establishment of active prevention policies.”

○ “KOSHA aims to enhance the innate function of epidemiological surveys detecting risks prior to the outbreak of diseases by vitalizing epidemiological surveys on risk groups by occupations in the future,” Park announced.

□ The entire text of the report on epidemiological survey is scheduled to be posed at the KOSHA’s official website (<http://oshiri.kosha.or.kr>). (END)