

# Editorial

## New concept for occupational health development: 3 phases

Compensation for occupational diseases in Korea is rather generous in comparison with that in other developed countries with regard to cerebrovascular diseases, musculoskeletal disorders and cancers<sup>1)</sup>. However, there have been many disputes on compensation for diseases of workers such as leukemia and other rare diseases<sup>2, 3)</sup> in a semiconductor industry and cardiovascular deaths in a tire manufacturing industry<sup>4)</sup>. Workers who have diseases which are known to be caused by occupational exposure or for which the cause is unknown, claim that their diseases were caused by occupational exposure: chemical substances, physical agents, long working hours, work stress, etc. Workers and their relatives believe that these diseases should be compensated because they were caused by occupational exposure. The belief is usually intensified when workers have used chemicals or been exposed to chemicals for which the level of toxicity is not well established.

The justification for compensation is based on the overwhelming belief of work-relatedness. “Work-relatedness” is generally accepted when a disease is related to occupational exposure with the probability of “more likely than not”. Thus, its consequence focuses on the employers’ responsibility. However, justification for compensation is also based on the philosophy of social security developed with the society even though the workers’ compensation system remains the employers’ responsibility regardless of their fault (or no-fault). In a sense, the extent of compensation is related to the social consensus of society concerning work-related diseases.

### Work-relatedness and Compensation

Early on the extent of compensation for work-related diseases was limited to cases proven by a causal-relationship such as pneumoconiosis, acute poisoning, and noise-induced hearing loss. However, as the economy developed so did social consensus about human rights, social justice for inequity, and work-related illness, the result is increasing demand for compensation for diseases for which causal relationship are not well proven. Following the example of some European countries, perhaps all diseases of workers should be included in the social security system regardless

of the causal relationship of the illness or disease. In effect, society has moved toward minimizing the compensation gap between occupational and non-occupational diseases.

Occupational health development in a country can be classified into 3 phases depending on what kinds of occupational diseases the country focuses on. They are External, Internal (or Personal), and Social Environmental Phases. The Phases have developed by stages for several decades in developed countries, while they often come in consecutively or simultaneously in newly industrialized or developing countries. A social conflict occurs when there is an increased demand for compensation of occupational diseases in a society. A transition to the next phase often begins at this moment (Table 1).

### The External Environment Phase

The first (Basic) phase focuses on traditional occupational diseases such as poisoning, pneumoconiosis, noise-induced hearing loss or diseases caused by the exposure to chemicals or physical agents. Characterization of this phase is an external environment, in which poor working conditions expose workers to harmful chemicals or physical agents. Examples of the External Environmental Phase are the exposure to carbon disulfide in a viscose rayon factory<sup>5)</sup> and many other chemical poisonings. The rayon factory, which brought approximately 1,000 cases of carbon disulfide poisoning, did not install a proper ventilation system and failed to maintain a safe work environment.

Early detection of occupational diseases through health examination, mechanical control of poor working conditions and diagnostic criteria development is important in this phase as shown from the case of controlling lead poisoning<sup>6)</sup> in Korea. The most controversial component in the External Environmental Phase is to establish diagnostic criteria so that judgment of some occupational diseases can be more easily determined. More precise and accurate methods of diagnosis are required. The key solution of this phase is the control of working environment to remove or reduce exposure to hazardous agents.

Occupational health in a country must begin by controlling the work environment.

## The Internal (Personal) Environment Phase

The second (Expansion) phase arises with diseases that are usually caused by degenerating mechanisms or personal sensitivity such as cardiovascular diseases, mental disorders caused by work stress, and musculoskeletal disorders caused by repetitive and forceful workload. This phase is characterized by an internal (personal) environment, which means that life-style diseases or degenerative diseases are aggravated or triggered by working conditions or methods. An example of the Internal Environment Phase is the outbreak of sudden cardiac death in a tire manufacturing factory<sup>4</sup>. The result is that the company has not properly managed the workers whose health status was at high risk to cardiovascular disease within the occupational health setting.

Improving personal health status through health promotion or psychological counselling as well as upgrading working conditions are important in this phase. The most controversial component in the Internal Environmental Phase is whether the chronic diseases aggravated or triggered by work are covered as occupational. The range of coverage is different from country to country. The key solution to the problems encountered in this phase is to provide occupational health services to those who have a life-style disease, promote personal health status, boost working conditions such as stress control and provide good ergonomic design within the workplace.

Occupational health in a country cannot advance without addressing workers' health status including life-style diseases.

## The Social Environment Phase

The third (Welfare) phase provides for the extension of coverage of rare and serious diseases possibly arising from work such as cancers or degenerating diseases. The major characterization of this phase is the social environment, which addresses whether a society can absorb the financial burden of workers who have a serious disease within a

social security system. The system must cover sick-leave benefit as well as medical. Otherwise, workers who suffer from a serious disease will be encouraged to claim workers' compensation if there is any chance of possible work-relatedness.

Leukemia and other rare diseases in the semi-conductor industry is an example of this stage<sup>2</sup>. Findings showed no statistically significant increase and no clear exposure to carcinogenic substances. Due to lack of evidence and the uncertainty within high-technology industry, workers and their relatives even including occupational professionals, often believe that the diseases may be caused by chemical exposure or unknown causes. The problem is compounded by the high economic burden because society does not have a social security system designed to cover income loss from a disease of workers not accepted as occupational diseases.

It is important to implement a social security system which includes sick-leave benefit as well as medical insurance in this phase. The most controversial component of the Social Environmental Phase is whether diseases less possibly arising from work can be covered by the workers' compensation system. Most European countries where the social security system is secured provide a sick-leave benefit for serious diseases regardless of work-relatedness. On the other hand, countries where the system is incomplete have limited or no social support for the workers who have a serious disease less possibly arising from work. Thus, the key solution to the problems of this phase is expanding coverage within the social security system. However, this coverage is less likely to happen in developing countries because of the financial strains on government resources. Therefore, developing a social security system should be a governmental agenda which requires discussion with stakeholders beyond the boundary of occupational safety and health.

Occupational Health in a country cannot be achieved without implementation of a holistic socially conscious social security system.

**Table 1. Three Phases of occupational health development**

Phase	Related event	Core problem	Solution
Basic (External environment)	Carbon disulfide poisoning Many chemical poisonings	Poor working environment Occupational disease diagnosis	Occupational disease control (Work environment control)
Expansion (Personal environment)	Cerebro-cardiovascular diseases Sudden cardiac deaths in a tire factory	Life-style disease Work ability	Occupational health service Person-job fit
Welfare (Social environment)	Leukemia in a semiconductor factory	Uncertainty of cause Income loss by ill health retirement	Risk communication Sick-leave benefits

## References

- 1) Kang SK, Kim EA (2010) Occupational diseases in Korea. *J Korean Med Sci* **25** Suppl, S4–12. [[Medline](#)] [[CrossRef](#)]
- 2) Lee HE, Kim EA, Park J, Kang SK (2011) Cancer mortality and incidence in korean semiconductor workers. *Saf Health Work* **2**, 135–47. [[Medline](#)] [[CrossRef](#)]
- 3) Yoon C (2012) Much concern but little research on semiconductor occupational health issues. *J Korean Med Sci* **27**, 461–4. [[Medline](#)] [[CrossRef](#)]
- 4) Kim EA, Park J, Kim KH, Lee N, Kim DS, Kang SK (2012) Outbreak of sudden cardiac deaths in a tire manufacturing facility: can it be caused by nanoparticles? *Saf Health Work* **3**, 58–66. [[Medline](#)] [[CrossRef](#)]
- 5) Kim EA, Kang SK (2010) Occupational neurological disorders in Korea. *J Korean Med Sci* **25** Suppl, S26–35. [[Medline](#)] [[CrossRef](#)]
- 6) Lee BK (2011) Occupational health management in the lead industry: the korean experience. *Saf Health Work* **2**, 87–96. [[Medline](#)] [[CrossRef](#)]

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**Abstract:** Occupational health development in a country can be classified into 3 phases as External, Internal (or Personal), and Social Environmental Phases. Occupational health usually focuses on work environment, but it cannot advance without controlling workers' health and cannot be achieved without a complimentary understanding of the social security system. Society may continue wasting social costs for determining whether a disease of workers is caused by or arising from work. In order to understand the status of occupational diseases in a country, one must know about the comprehensiveness of the social security system in that society.

**Key words:** Occupational health development, Work-related disease, Work environment, Cardiovascular disease, Health promotion, Leukemia, Semiconductor industry, Social security