BIOLOGICAL MONITORING AND HEALTH SURVEILLANCE

Health Surveillance is a generic term which includes any procedure undertaken to assess, review or monitor an individual‟s health in order to identify or detect any significant change from normality.
There are three reasons for health surveillance at work:

- to ensure adverse health effects related to the work are identified at an early stage; sometimes this is statutory, e.g. in the UK in relation to work with lead.
- to ensure continued medical fitness for specific tasks like diving or fire fighting,
- to promote general health.

The purposes of health surveillance are:

- to maintain good health by the early detection of adverse changes attributed to the exposure.
- to assist in the evaluation of the effectiveness of control measures,
- to collect data relevant to the detection and evaluation of hazards to health.

Biological measurements can determine:-

- the content of a toxic material or its metabolite in blood, urine and breath (and in the case of arsenic, hair and nail clippings).
- its effects on enzyme systems or metabolic pathways e.g. haem synthesis is upset by lead exposure and assessed by the urine level of ALA (aminolaevulinic acid).
- early reversible tissue change e.g. gamma GT (gamma-glutamyl transferase)
- physiological changes (e.g.lung function tests)
- immunological changes (e.g.prick tests).

Urine and blood are the most common media tested and levels of a toxic substance or its metabolite in urine or blood are measured, giving a yardstick of absorption into the body of a particular substance e.g. finding cadmium in the urine denotes absorption into the body of cadmium, but protein demonstrated in the urine (not a normal constituent) may indicate kidney damage.

Table 1 Examples of chemicals that can be assessed by biological monitoring

Biological monitoring (measuring the chemical itself)	
In blood	Lead, cadmium, polychlorinated biphenyls
In urine	Cobalt, nickel, 4,4'methylenebis-(2-chloroaniline)
In breath	Tetrachloroethylene, carbon monoxide

Health surveillance is important for:

- detecting ill-health effects at an early stage, so employers can introduce better controls to prevent them getting worse
- providing data to help employers evaluate health risks
- enabling employees to raise concerns about how work affects their health
- highlighting lapses in workplace control measures, therefore providing invaluable feedback to the risk assessment
- providing an opportunity to reinforce training and education of employees (eg on the impact of health effects and the use of protective equipment)

Ergonomic hazard :

An ergonomic hazard is a physical factor within the environment that harms the musculoskeletal system. Ergonomic hazards include themes such as repetitive movement, manual handling, workplace/job/task design, uncomfortable workstation height and poor body positioning.

Ergonomics is the study of how a workplace, the equipment used there and the work environment itself can best be designed for comfort, efficiency, safety and productivity. Often we can improve our levels of comfort and productivity with relatively simple changes.

Although ergonomics is a broad field, the main areas of concern for workplaces and employees will often relate to:

- workstations (sitting and standing)
- equipment layout and operation
- computer systems
- noise
- lighting
- thermal comfort
- maintenance tasks performed on plant items.

The severity of Ergonomic Hazards often depends on the level of exposure over time. Injuries sustained from these hazards can be anything from sore muscles to long-term illnesses. Ergonomic Hazards include:

- Improperly adjusted workstations and chairs
- Frequent lifting
- Poor posture
- Awkward movements, especially if they are repetitive
- Using too much force, especially if it’s done frequently
- Vibration

When Ergonomic Hazards are identified, it may be necessary to redesign aspects of a workspace or employee routine. Anything that could cause employees to experience long or short term strain should be evaluated, and alterations to procedures and workspaces should be considered. If it’s determined that Ergonomic

Hazards cannot be removed from a workplace, controls can help to reduce risks that are involved.

Administrative controls reduce risk by changing work processes and activities in order to make them more safe. Some examples of administrative controls for Ergonomic Hazards are:

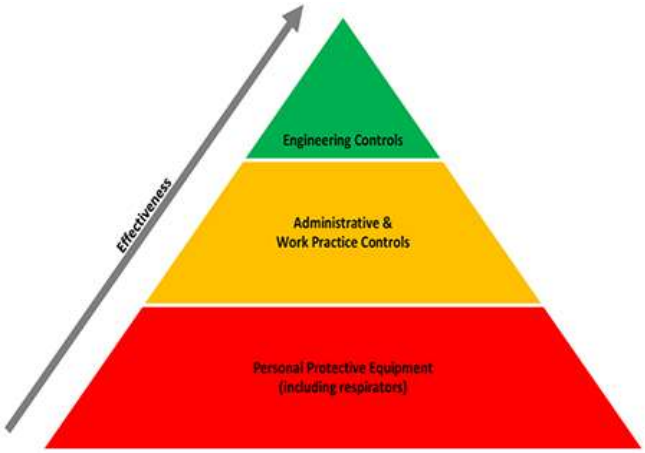
- Provide employees with break periods that help to reduce short-term strain
- Adjusting the pace of work to reduce exertion
- Rotate employees working in repetitive or strenuous tasks, to reduce exposure
- Store objects and tools where employees can retrieve them while maintaining neutral position
- Label any heavy loads with a weight
- Place requirements on weight loads by introducing group lifting policies

Solutions to Control Hazards :

Many industries have successfully implemented ergonomic solutions in their facilities as a way to address their workers' MSD injury risks. These interventions have included modifying existing equipment, making changes in work practices and purchasing new tools or other devices to assist in the production process. Making these changes has reduced physical demands, eliminated unnecessary movements, lowered injury rates and their associated workers' compensation costs, and reduced employee turnover. In many cases, work efficiency and productivity have increased as well. Simple, low-cost solutions are often available to solve problems

Controls for MSD Hazards

To reduce the chance of injury, work tasks should be designed to limit exposure to ergonomic risk factors. Engineering controls are the most desirable, where possible. Administrative or work practice controls may be appropriate in some cases where engineering controls cannot be implemented or when different procedures are needed after implementation of the new engineering controls. Personal protection solutions have only limited effectiveness when dealing with ergonomic hazards.



Type of Control	Workplace Examples
Engineering Controls (implement physical change to the workplace, which eliminates/reduces the hazard on the job/task)	▪ Use a device to lift and reposition heavy objects to limit force exertion ▪ Reduce the weight of a load to limit force exertion ▪ Reposition a work table to eliminate a long/excessive reach and enable working in neutral postures ▪ Use diverging conveyors off a main line so that tasks are less repetitive ▪ Install diverters on conveyors to direct materials toward the worker to eliminate excessive leaning or reaching ▪ Redesign tools to enable neutral postures
Administrative and Work Practice Controls (establish efficient processes or procedures)	▪ Require that heavy loads are only lifted by two people to limit force exertion ▪ Establish systems so workers are rotated away from tasks to minimize the duration of continual exertion, repetitive motions, and awkward postures. Design a job rotation system in which employees rotate between jobs that use different muscle groups ▪ Staff "floaters" to provide periodic breaks between scheduled breaks ▪ Properly use and maintain pneumatic

	and power tools
Personal Protective Equipment (use protection to reduce exposure to ergonomics-related risk factors)	▪ Use padding to reduce direct contact with hard, sharp, or vibrating surfaces ▪ Wear good fitting thermal gloves to help with cold conditions while maintaining the ability to grasp items easily