

PROGRAM:	ERASMUS+
ACTION / SUBPROGRAM:	Key Action 2 / Strategic Partnerships
PROJECT TITLE:	“OSH+ for the European Agriculture sector - Stimulating growth in rural areas through capacity building for providers (and beneficiaries) of occupational medicine and OSH services”
Intellectual Output :	O5 “Course 2 Training Materials - Occupational Physicians”
Module:	13 - Diseases of the eyes and ENT (ear-nose-throat) for employees working in Agriculture

13 Module 13 - Diseases of the eyes and ENT (ear-nose-throat) for employees working in Agriculture

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13.1 Eye disorders

There is a wide range of eye disorders, affecting all parts of the eye (cornea, lens, retina, sclera, optical nerve, etc.). Eye disorders are quite common among the general population.

13.1.1 Introduction to eye disorders

The eye is a biological system that takes, sprays, transmits and integrates visual information. Approximately 80% of environmental information is obtained through the eye. Any damage to the eye has a particular negative impact on the affected worker.

As a sense organ, the mammalian eye allows vision. Human eyes help provide a three dimensional, moving image, normally coloured in daylight. The human eye contains enough complexity to warrant specialized attention and care beyond the duties of a general practitioner, occupational health physician. These specialists, or eye care professionals, serve different functions in different countries. Eye care professionals can have overlap in their patient care privileges: both an ophthalmologist (M.D.) and optometrist (O.D.) are professionals who diagnoses eye disease and can prescribe lenses to correct vision. There are many diseases, disorders, and age-related changes that may affect the eyes and surrounding structures. Sight and vision are important because they allow us to connect with our surroundings, keep us safe, and help maintain the sharpness of our minds.

Pedagogical Objectives

Knowledge related objectives:

The trainee should be able to:

- Define and classify occupational hazards and risks regarding eye disorders
- Understand the process of risk management and risk assessment
- Recognise common occupational hazards relevant for appearance of eye disorders at agriculture workers.
- Be aware of the prevention and eye protection measures within the agriculture workers

Aquiring skills and changing the attitude

The trainee should be able to:

- Identify workplaces with the risk of eye damage
- To pay attention to any changes in the eyes of agricultural workers
- To know the limits of medical intervention at the venue where the event occurs

13.1.1.1 Glossary for eye disorders

Term	Definition
CRYSTALLINE LENS	The eye's natural lens. Transparent, biconvex intraocular tissue that helps bring rays of light to a focus on the retina.
CATARACT	Opacity or cloudiness of the crystalline lens
CONJUNCTIVITIS	Conjunctivitis is an inflammation of the conjunctiva, potential causes by bacterial, viral, allergic or irritating factors. Inflammation of the conjunctiva. Characterized by discharge, grittiness, redness and swelling. Usually viral in origin, but may be bacterial or allergic; may be contagious.
VISUAL ACUITY	Assessment of the eye's ability to distinguish object details and shape, using the smallest identifiable object that can be seen at a specified distance
CONJUNCTIVA	transparent mucous membrane covering the outer surface of the eyeball except the cornea, and lining the inner surfaces of the eyelids
VISION DISORDER	is an impairment of the sense of vision
ASTHENOPIA	Weakness or fatigue of the eyes, <u>usually</u> accompanied by headache and dimming of vision
KERATITIS	is a condition in which the <u>eye's cornea</u> , the clear dome on the front surface of the eye, becomes <u>inflamed</u> . The condition is often marked by moderate to intense pain and usually involves any of the following symptoms: pain, impaired eyesight, <u>photophobia (light sensitivity)</u> , <u>red eye</u> and a 'gritty' sensation
NYSTAGMUS	is a condition of involuntary (or voluntary, in rare cases) <u>eye movement</u> , acquired in infancy or later in life, that may result in <u>reduced or limited vision</u> . Due to the involuntary movement of the eye, it has been called "dancing eyes". There are two key forms of nystagmus: pathological and physiological, with variations within each type. Nystagmus may be caused by congenital disorders, acquired or central nervous system disorders, toxicity, pharmaceutical drugs, alcohol, or rotational movement. Previously considered untreatable, in recent years several pharmaceutical drugs have been identified for treatment of nystagmus. Nystagmus is also occasionally associated with vertigo.
UVEITIS	is the inflammation of the <u>uvea</u> , the pigmented layer that lies between the inner <u>retina</u> and the outer fibrous layer composed of the <u>sclera</u> and <u>cornea</u> . The uvea consists of the middle layer of pigmented <u>vascular</u> structures of the <u>eye</u> and includes the <u>iris</u> , <u>ciliary body</u> , and <u>choroid</u> . Uveitis is an ophthalmic emergency and requires a thorough examination by an <u>optometrist</u> or <u>ophthalmologist</u> and urgent treatment to control the inflammation
AMBLYOPIA	is a disorder of sight due to the eye and brain not working well together. It results in decreased vision in an eye that otherwise typically appears normal. It is the most common cause of decreased vision in a single eye among children and younger adults.
AMAUROSIS	(Greek meaning <i>darkening, dark, or obscure</i>) is <u>vision loss</u> or weakness that occurs without an apparent lesion affecting the <u>eye</u> . It may result from either a medical condition or from excess acceleration, as in flight.
PHOTO-OPHTALMIA	is <u>ophthalmia</u> or <u>inflammation</u> of the <u>eye</u> , especially of the <u>cornea</u> and <u>conjunctiva</u> due to exposure to intense light of short wavelength (as <u>ultraviolet light</u>)

13.1.2 Epidemiological data; eye disorders classified as occupational diseases

The U.S. Department of Labor reports that, for the year 2002, there were 1.4 million injuries and illnesses in the private workplace that required at least 1 day away from work (2). Forty-two thousand of these injuries

involved the eye, accounting for 47% of all head injuries. Eighty-one percent of these occupational eye injuries occurred in men, the majority of which occurred in the 25- to 44-year-old age group.

Ocular foreign body was the most common diagnosis (38%), followed by contusions/abrasions (27%), burns (12%), and dermatitis/conjunctivitis (11%). Penetrating ocular injury occurred in 2.4% of workplace injuries. Only 0.7% required hospitalization. Despite a decrease in the proportion of people employed in agriculture from 41.4% to 12.2% during the subsequent 20 years, 17.5% of eye injuries still occurred in the agricultural sector.

The table of formally recognized (by the OSH legislation) as occupational diseases in Romania includes the following eye disorders and agents that caused them:

Table 13-1 Eye disorders formally recognized as occupational diseases in Romania

No.	Eye Disorder	Agent
1	Accommodative asthenopia	caused by visual strain, in particular in environments with poor lighting, both quantitative and qualitative
2	Cataract	caused by exposure to dinitrocresol, dinitrophenol, ethylene oxide, laser, microwaves, naphthalene, infrared radiation, ionizing radiation, trinitrotoluene, etc.
3	Keratitis	caused by exposure to hydrochloric acid, fluoric acid, ammonia, arsenic and compounds, benzoquinone, chlorine, creosote, cresol, Sulphur dioxide, ethylene dioxide, methyl formate, hydroquinone, hydrogen sulfide, pyridines, quinolones, occupational allergens and irritants, infrared radiation, ionizing radiation, selenium, methyl silicate, streptococcus, carbon sulfide, viruses, etc.)
4	Conjunctivitis	caused by occupational allergens and irritants, infrared radiation, ionizing radiation, viruses, bacteria and others
5	Optic neuritis	allylic alcohol, methyl alcohol, arsenic and compounds, halogenated aliphatic hydrocarbons, mercury, naphthalene, aromatic nitro compounds, pyridines, carbon sulfide, thallium
6	Amblyopia, Diplopia, Amaurosis	methyl bromate, methyl chloride, carbamate anticholinesterase, organophosphorus compounds, phosphates, pyrophosphates, thiophosphates, phosphoramides, Phosphorus hydrogen, carbon monoxide, thallium
7	Nystagmus	caused by improper lighting
8	Uveitis	streptococcus

Records of the National Public Health Institute in Bucharest show that, between 2005 and 2014, 21 occupational eye diseases were reported, of which 17 cases of conjunctivitis, 3 cataracts and one keratitis. No occupational disease relating to working in agriculture was reported. Definitely, many eye disorders are occupational diseases that are not reported as such, that is why it is important to recognize them, including in relation with the risk factors in agriculture.

13.1.3 Etiological factors of occupational eye diseases; agriculture operations and their related occupational hazards

The etiological factors of occupational eye diseases in agriculture can be:

- prolonged exposure to sunlight, which can cause cataract and photo-ophthalmia, in the absence of protection;
- increased and intense exposure to long-term action of toxic substances (trinitrotoluene, dinitrophenol and others) can cause cataract.

- ultraviolet radiation may cause photo-ophthalmia;
- Irritating toxic substances and irritating powders at the workplace may cause conjunctivitis and kerato-conjunctivitis;
- allergens such as hay powder, hay, animal hair, animal skin squames, feathers, vegetal powders, wood powders, biological agents (bacteria, viruses, rickets, fungi, parasites) may cause allergic conjunctivitis and kerato-conjunctivitis.
- handling various agricultural substances or products increases the risk of occurrence of eye foreign bodies
- straining the eyes for a long period of time (drivers or agricultural equipment/machines, quality controllers) may cause accommodative asthenopia and an aggravation of existing myopia.
- dirty hands or contaminated objects may cause eye infections.
- chemical splashes, in various forms and at various temperatures, may cause eye injuries and eye burns.

On the other hands we may classify by main ethiological factors:

- Exposure to impact related hazards: Abrasions or punctures caused by flying debris or stationary impalements
- Exposure to hazards resulted from Physical Contact: Burns caused by liquid chemicals; Irritation caused by dust; Infection caused by ocular absorption of certain agents-
- Exposure to optical radiation related hazards: Pterygium caused by Ultraviolet light; Cataracts caused by Infrared light; Solar retinitis; Macular degeneration.

The exposure of the eyes to a series of hazards are also very common in the agriculture sector:

- Dust may produce: Irritation, Conjunctivitis, Accidents and loss of productivity
- Liquid Chemicals may produce: Burns from acids and alkalis, Tissue damage from irritants and corrosives, Alcohols cause cornea to crystallise, Pesticides cause: miosis, visual disturbances, eye pain
- Infectious Agents may produce: Viruses, bacteria and fungi can be absorbed through eye tissues, particularly if they become damaged (eg effects of mold – red eye, ear, nose irritation or allergy).

Some operations of agriculture are much more likely to determine exposure to hazards and hence to determine risks for the employees. The most common ones are presented below:

- Gathering and breaking sticks and chopping wood have been demonstrated to be responsible for almost 15% of agricultural injuries.
- Applying fertilizers and pesticides (by the agricultural workers) can cause severe chemical damage to the eye.
- Equipment failure, accidental spill, and spray drift are common reasons for ocular exposure to these agricultural chemicals.
- Emissions of sulfure dioxide – industrial boilers
- Emissions of nitrogen dioxide – from biological process in soil
- Emissions of carbon dioxide, smoke, dust, ash – biomass burning
- Anhydrous ammonia – used in fertilizer
- All pesticides
- Trauma – everywhere in agriculture (steel tools used to hammer other steel objects, wood chips or wood fragments from woodworking machinery.

13.1.4 Eye injuries

13.1.4.1 Eye injuries resulting from exposure to chemicals

Strong alkalis and acids can cause the most severe and damaging chemical injuries to the eye and eyelids. Alkali burns are commonly caused by sodium and potassium hydroxide used as cleaning agents, by calcium hydroxide used in mason's mortar and plaster, and by anhydrous ammonia used in fertilizer. Battery acids

and the strong acids used to clean metal in the electroplating industry are also common causes of severe eye injuries. The corneal endothelium, which is essential for corneal clarity and good vision, is particularly vulnerable to chemical insult. There is often severe damage within the anterior chamber, including the aqueous outflow pathways, leading to glaucoma. Obliteration of the blood vessels of the conjunctiva and sclera can cause severe ischemia of the anterior eye, including the periphery of the cornea and the underlying ciliary body and iris. Ischemia, as well as the associated reduction in blood supply, is one of the major causes of the poor prognosis in patients with severe chemical burns.

13.1.4.2 Thermal burns of the eyes

Thermal burns of the eyelids and upper face may involve the eyes. However, in cases of flash burn caused by a sudden gas explosion, most individuals forcibly close their eyes, and this reflex lid closure usually protects the ocular surface. Direct contact with molten metal or glass can cause severe injury to the lids and even to the open eye. Thermal injury occurs rapidly at the time of contact. Tissue destruction is not progressive, as is the case with some chemical burns.

13.1.4.3 Mechanical injuries of the eyes

Some of the most often encountered MECHANICAL INJURIES are the following: laceration of the eyelid; Injuries of the iris; Injuries of retina; Rupture or lacerated globe; Contusions; Foreign bodies; Injury of the orbit and optic nerve; Injury of the corneal epithelium.

Eye injuries - general aspects

- Impaired vision, or even blindness
- Ocular contusions
- Penetrating or non-penetrating foreign bodies

Modalities of injuries:

- injury by small, rapidly moving objects may penetrate the globe/ large, slowly moving objects may led to contusion or rupture of the globe
- Foreign bodies – ask about the type of material (metal, organic...)
- Chemicals – ask about type – alkali or acid.

Examination at the workplace

Eye examination must follow a few steps:

- EYELIDS – symmetry, lacerations
- ORBITS – palpate the orbital rims
- CONJUNCTIVA – color, integrity

Severity of consequences

- Insignificant: no injury or ill health.
- Minor: short-term impact.
- Moderate: semi-permanent injury or ill health.
- Major: disabling injury or ill health.
- Catastrophic: potentially fatal.

Next, we will present some of the eye disorders that may occur more frequently in agricultural workers.

13.1.4.4 Conjunctivitis

Conjunctivitis is an inflammation of the conjunctiva, the layer of tissue that lines the inner surface of the eyelid and covers the white part of the eye. The conjunctival membrane is thin, transparent and its role is to protect and preserve the humidity of the eye.

Conjunctivitis has a number of potential causes, bacterial, viral, allergic or irritating, the most common of which being:

- Viral infections (adenoviruses, measles virus, herpes virus – the varicella zoster virus);
- Bacterial infections (, staphylococcus, streptococcus, chlamydia)
- Allergens (dust, pollen, feathers, vegetal powders)
- Factors that may cause irritation (chlorine used for water treatment, formaldehyde, detergents, pesticides, herbicides, etc.)

The symptoms of conjunctivitis can be: sensation of foreign body in the eye, burning, itchy or sandy sensation, watery discharges, sometimes rather abundant, congestion (the conjunctival mucous membrane turns reddish), white-yellowish secretion in the conjunctival bag and sometimes the eyelids get sticky (especially in the morning).

Transmission and risk factors. Conjunctivitis caused by viruses and bacteria can be easily transmitted from one person to another, but it poses no major risk of development provided it is diagnosed in due time. *Observing strict hygiene rules* is important (pay attention when somebody else uses your personal items!)

Diagnosis and evolution. Clinical diagnosis is based on the signs and symptoms described earlier. Etiological diagnosis is established by testing the conjunctiva, with a view to identifying the etiologic agent (bacteria, viruses, fungi, etc.). There are some particular forms of conjunctivitis, namely those caused by exposure to irritating agents, in which case both diagnosis and treatment have certain particularities. The disease may lead to complications such as:

- Viral conjunctivitis can lead to an inflammation of the cornea (keratitis), usually when caused by adenoviruses.
- Bacterial conjunctivitis can pose a threat to visual acuity, because an untreated infection can cause corneal ulceration leading to perforation.
- Allergic conjunctivitis can develop depending on the season and exposure to various allergens that may cause the disease. Therefore, it's important to avoid contact with such allergens, which can be pollen, dust, vegetal powders, etc.

Treatment for conjunctivitis. People who display signs and symptoms of conjunctivitis must see a specialized doctor in order to benefit from an early diagnosis and treatment. Treatment must start as soon as possible. Local treatment consists in the mechanical removal of conjunctival secretions by using eyewash (saline, boiled and cooled water, special antiseptic solutions). Then, collyrium instillations are recommended. In case of kerato-conjunctivitis, antibiotic and anti-inflammatory collyrium is used, as well as artificial tears. In case of allergic conjunctivitis, the collyrium shall include anti-allergic substances.

IMPORTANT: Eye bandages are not recommended, because stopping secretion might lead to corneal complications!

Conjunctivitis may be mistaken for other eye diseases that have similar symptoms and signs, that is why the patient should neither set a diagnosis for themselves, nor try and treat themselves, because the disease might turn worse and complications are likely to occur. Conjunctivitis must be diagnosed and treated by an ophthalmologist.

Prophylaxis. Recommendations to prevent conjunctivitis: avoid contact with the affected areas, because one eye can infect the other one; a rigorous hands and face hygiene (water and soap, removing conjunctival secretions with sterile cloth, serum, use separately for each eye, then the cloth must be disposed of); a proper hygiene of personal items (towels, pillowcases); avoid the use of personal hygiene products (cosmetics and makeup) and of artificial tears; stop using contact lens throughout the duration of the treatment and only use them after getting the specialist's advice; people with allergy-prone skin should avoid using cosmetics and makeup (except for those products that are recommended by the dermatologist); the use of artificial tears if needed.

13.1.4.5 Cataract

Cataract is a clouding of the lens than may lead to total or partial blindness.

Causes. There are factors that favour the development of the disease, such as: old age (senile cataract); excessive exposure to ultra-violet radiation; diabetes, especially decompensated diabetes (with hyperglycemia); other eye diseases: glaucoma (a buildup of pressure in the eye), chronic uveitis, retinitis pigmentosa (a degenerative disease that affects the rods and cons in the retina) or retinal detachment; traumatic lesions.

Radiant infrared radiation, electric shocks and ionizing radiations are other causes (rare) of traumatic cataract. Traumatic cataract occurs secondary to blunt or penetrating ocular trauma, which leads to posterior axial opacities that may remain focal if small or may progress rapidly to total cortical opacification. Lens dislocation and/or subluxation are commonly found in conjunction with traumatic cataract. Other associated complications include pupillary block, angle recession glaucoma, uveitis, retinal detachment, choroidal rupture, retrobulbar hemorrhage, traumatic optic neuropathy and globe rupture.

Traumatic cataract can expose the ophthalmologist to many medical and surgical challenges. Careful examination and a proper management plan can simplify these difficult cases and provide the best possible outcome.

Symptoms: a clouding of the lens and incapacity to rapidly adjust to various levels of light; there is no pain or redness in the eye.

Other symptoms that may indicate a case of cataract are: photophobia (discomfort due to light exposure); difficulty to focalize distant objects; change in color perception (fading or yellowing of colors); one of the first signs of cataract is increasing difficulty with vision at night; double or deformed vision.

The incidence of cataract in agricultural workers is higher than in the rest of the population and is associated with the sun's UV radiation. Incidence, irrespective of the age group, is higher in the regions where exposure to UV radiation is wider as compared with the regions where the exposure is lower. Studies show that cataract after the age of 65 is directly correlated with the time of exposure to solar ultraviolet radiation. The incidence in this age group is higher than in the rest of the population.

Cataract affects rural populations more than the urban ones. The current level of exposure to UV radiation is also correlated with the number of hours spent outdoors. Studies have shown that people who work outside more than six hours a day are more likely to develop senile cataract. Also, people working in agriculture are three times more likely to develop cataract than the other categories. Unlike those who do not work in agriculture, agricultural workers spend more time outdoors and are therefore more exposed to UV radiation, hence the higher prevalence of cataract and a significant diminishing of vision because of that.

An ophthalmologist will *diagnose* the caract and will establish its characteristics, localisation and spread.

The natural evolution of cataract is towards a progressive loss of vision. In some rare cases the patient also develops glaucoma, characterized by an irreversible damage to the optic nerve and/or uveitis, which occurs because of the inflammation of the uvea. Surgery is the only effective treatment. Surgery involves removing the cloudy lens and replacing it with an artificial lens. To prevent cataract we must avoid exposure to strong light when outdoors. Also, wearing sunglasses with lens that block UV-B radiation may be helpful. Doctors also recommend a healthy diet that includes plenty of fruits and vegetables, which have many antioxidants such as vitamin A (beta-carotene), selenium, vitamins C and E, citrus fruits, spinach, sweet potatoes, carrots, broccoli.

13.1.4.6 Photo-ophthalmia

Photo-ophthalmia is „acute keratitis and conjunctivitis”.

Characteristics:

- Asymptomatic exposure to UV rays;

- 6-12 latency period;
- Foreign body sensation, eye pain (also upon pressure), watery eyes, photophobia, blepharospasm.
- Congestion of bulbar and ciliary conjunctiva, of eyelid tegument, palpebral and facial tegument erythema, sometimes palpebral edema;
- An exaggerated emotional reaction triggered by the fear of permanent damage (risk of blindness);

Usually, the symptoms disappear within 24-48 hours. It can be cured with no after-effects.

Etiology: the main source of ultraviolet radiation is the sun (the sky reflects them, while water vapors, clouds and darker areas absorb them partially), but there are also artificial sources, equipment that reach temperatures of over 1000°C, such as: microwave ovens, quartz lamps, welding machines, etc.

Photo-ophthalmia occurs within 2-6 hours since exposure, the symptoms being eye pain, sandy sensation in the eye, blurred vision, cephalalgia, abundant eye secretion, blepharospasm. As regards prophylaxis, the eyes must be protected from ultraviolet radiation by sunglasses/goggles.

13.1.4.7 Foreign body in the eye

Foreign bodies that hit the eye, depending on their nature, size or speed, can stop at the level of the conjunctiva or cornea, or can get inside the ocular globe or orbit. The action of the foreign body and the prognosis of the disease depend on the size, speed and chemical composition of the body, as well as the entry point and where it remains. Usually, such foreign bodies are in the surrounding environment and too small to avoid. A foreign body that enters the eye can be: powder (dust, pollen, sand, fine woodchips, earth, little stones). Metallic foreign bodies (iron, cast iron, copper) that have not been taken out can lead to an impregnation of the ocular tissues, changing their color. Although not reported, there are many such cases in agriculture, given the nature of the work and the presence of risk factors in the work environment.

Symptoms may vary from a feeling of pressure or discomfort to redness, ocular pruritus, a burning sensation, a sensation that something is in the eye, extreme tearing, and incapacity to keep the eye open, temporary loss of vision. In severe cases, the pain gets worse, accompanied by nausea, vomit (oculocardiac reflex), and sometimes can even lead to fainting. Besides superficial lesions (macular congestion, light bleeding, hard exudates), caused by the foreign body entering the eye and getting through (causing perforations, ruptures, loss of substance, cataract, bleeding, etc.), foreign bodies can cause infectious or chemical complications. Inflammatory lesions may occur right away or later, and can be suppurative or exudative. Suppurative inflammations may lead to iridocyclitis, uveitis and endophthalmitis.

Lesions will be examined layer by layer, in order to properly establish the nature of the lesion and how serious it is. Such lesions can affect the eyelid (excoriations, ecchymosis, hematoma, wounds), the conjunctiva (blood suffusions), the cornea (epithelial/corneal erosions, superficial wounds), the iris (radial tear, inflammatory processes in the form of post-traumatic iridocyclitis), the pupil (irregularities of the pupil contour), the lens (dislocations, subluxations, opacification), the retina (bleeding, edema, retinopathy – severe prognosis), the choroid (hemorrhage, ruptures, after-effects such as chorioretinitis).

The treatment is highly specialized and consists, first of all, in extracting the foreign body. In order to prevent infection, the patient will take antibiotics and will get an anti-tetanus shot. For the local treatment, antibiotics, mydriatics and sterile bandages will be used, and the patient must bed rest. If the foreign body is a chemical substance (base or acid), corneal burns might occur, so the treatment requires special attention.

The use of safety glasses with 3mm polycarbonate lens is recommended.

13.1.4.8 Corneal abrasion

Flying dust, specks of metal, grains of sand, a fingernail, an animal claw, or other foreign objects can scratch cornea. A minor scratch is called a corneal abrasion. Most corneal abrasions are minor and heal quickly.

Sometimes a corneal abrasion is accompanied by inflammation in the eye. This is called iritis. An infected corneal abrasion can also become a corneal ulcer. These are serious conditions that can develop from a corneal abrasion.

Symptoms: eye pain with tears and rapid blinking, as well as some eye redness

First aid - rinse it with clean water or saline solution immediately. Blinking several times may help remove sand, grit, or other foreign matter from the eye. Do not rub your eye, touch your eyeball, or put any other solutions or substances on the eye.

(<http://www.healthline.com/symptom/corneal-abrasion>)

Treatment:

- First aid:
- Removal of the foreign body,
- Rapid removal of chemicals (rinse it with clean water),
- Calming the patient,
- The urgent request for an ophthalmologic consultation.

13.1.4.9 Contact lenses in the workplace

Controversy exists regarding contact lens use in the workplace. Hard and soft lenses are used commonly by young workers. In some individuals, however, contact lenses have specific visual advantages.

Contact lenses pose specific hazards. Soft contacts especially have an affinity for particulate foreign bodies. Small particles normally removed by the tears may be trapped by a contact lens. Foreign bodies are more commonly trapped under a hard lens than a soft one. Soft lenses are known to accumulate some toxic substances, including gases and fumes. UV and IR radiation can be absorbed by the contact lens. This causes heating of the contact lens, which can injure the cornea.

Contact lenses offer no protective barrier. In fact, the need for protective eyewear is probably increased in the contact lens wearer.

13.1.5 First aid and medical care in case of eye injuries

Recommendations for employers when providing first aid at the workplace:

- Implementing an effective first-aid programme should be a cooperative effort, involving employers, workers and their representatives, occupational health and public health organizations, and the labour inspectorate.
- First aid, including the provision of trained personnel, should be available at every workplace.
- First-aid personnel should be selected carefully, taking into account attributes such as reliability, motivation and the ability to cope with people in a crisis.
- Since it is common for agricultural workers to work in small groups at separate locations, workers should be trained in basic first aid. This training should include the treatment of open wounds and resuscitation.
- First-aid personnel should be trained to provide first-aid treatment safely to those suffering from hepatitis, tuberculosis, HIV/ AIDS and other communicable diseases.
- First-aid training should be repeated at regular intervals in accordance with national law and practice to ensure that knowledge and skills do not become outdated or forgotten.
- First-aid boxes should always be clearly marked, be easily accessible and located near areas where accidents could occur. They should be able to be reached within one or two minutes. They should be made of suitable materials, and should protect the contents from heat, humidity, dust and abuse.
- Near the first-aid boxes have to find an Eye and face wash station – facilities for cleansing and irrigation of the face and eyes – important for chemical burns

- The content of first-aid boxes should be appropriate to the risks to the workers and for the protection of first-aid providers and should be regularly checked and replaced as necessary. First-aid boxes should contain nothing other than first-aid equipment.
- Written instructions about first aid should be displayed by the employer at strategic places at the workplace.

The employer should organize briefings for all workers. The following topics are considered as essential parts of the briefings:

- the organization of first aid at the workplace, including the procedure for access to additional care;
- identification of colleagues who have been appointed as first-aid personnel;
- location of the first-aid box;
- location of the first-aid room;
- what workers should do in the event of an accident; and
- ways of supporting first-aid personnel in their task.

Where medical care is required, such services should be established in cooperation with external emergency services.

13.1.6 Preventive measures for eye disorders

Preventive measures must be applied at several levels:

- MANAGEMENT, by technical and administrative staff
- WORKERS (collective/individual hygiene rules, wear protective equipment, give first aid, recognize the first symptoms of a disease, use hygiene and sanitation products);
- Prevention of ocular diseases can be done by:
 - Specialized examination
 - Use of ppe (safety glasses , respiratory/hearing protection).
 - Eye protection often needs to be worn in conjunction with other protective equipment, It is essential that comfort and fit with other PPE is maintained, Most of the eyewear range can be used in combination with respiratory and hearing protection.

EYE PROTECTION

Spectacles/ over spectacles – when to use

Spectacles for Optical hazards – high or low light / Impact hazards – Mechanical field, chemical (use, dilution, spreading)

- Over spectacles can be used single or in combination with prescription eyewear to protect against same hazards as regular safety glasses

When to use Goggles

- Working with liquid chemicals ,
- Working with gases and vapours, fume or fine dust ,
- Working with solids at medium energy impact

We have to take in account the Contraindications for wearing eye protection: Skin changes due to the frame; Blocking the visual field

- Enlarging or shrinking images
- Vapor condensation on the lens
- Risk of contusion
- Lack of optical correction

EYE SAFETY PROGRAM must answer the following issues:

- What are the possibilities of eye accidents in the workplace?

- What kinds of eye accidents have occurred in the past?
- How can the danger factors be avoided?
- How can the choice and purchase of safety eyewear be best arranged?
- What must the employee do to get shockproof lenses in their personal glasses?
- How is the maintenance of safety eyewear organized?
- What are the duties of employers in preventing eye accidents?
- What are the duties of employees in preventing eye accidents?
- What are the duties of foremen in controlling the usage of safety eyewear?

13.1.7 Conclusions & recommendations for eyes disorders

Occupational health physicians should pay more attention to identifying farming jobs at risk of eye injury. They must be concerned about the correct and complete information of the workers in order to prevent the occurrence of eyes disorders.

It is necessary to assess the fitness in the work, taking into account the visual performances and the consequences that can occur after an ocular incident / accident.

Knowledge of workplaces and of ocular risk factors present at the workplace will improve and increase the quality of occupational health care.

References

- 1) World Health Organization. Global initiative for the elimination of avoidable blindness: action plan 2006–2011. Geneva: World Health Organization; 2007.
- 2) Midelfart A.. Ultraviolet radiation and cataract. *Acta Ophthalmol Scand.* 2005;83:642–4. 10.1111/j.1600-0420.2005.00595.x [[PubMed](#)] [[Cross Ref](#)]
- 3) Wang Y, Yu J, Gao Q, Hu L, Gao N, Gong H, et al. The relationship between the disability prevalence of cataracts and ambient erythemal ultraviolet radiation in China. *PLoS One.* 2012;7(11):e51137. 10.1371/journal.pone.0051137 [[PMC free article](#)] [[PubMed](#)] [[Cross Ref](#)]
- 4) Javitt JC, Taylor HR. Cataract and latitude. *Doc Ophthalmol.* 1994–1995;88(3 4):307–25. [[PubMed](#)]
- 5) Age-Related Eye Disease Study Research Group. Risk factors associated with age related nuclear and cortical cataract: a case-control study in the Age-Related Eye Disease Study, AREDS Report No. 5. *Ophthalmology.* 2001;108:1400–8. 10.1016/S0161-6420(01)00626-1 [[PMC free article](#)] [[PubMed](#)][[Cross Ref](#)]
- 6) Asbell PA, Dualan I, Mindel J, Brocks D, Ahmad M, Epstein S. Age-related cataract. *Lancet.* 2005;365:599–609. 10.1016/S0140-6736(05)17911-2 [[PubMed](#)] [[Cross Ref](#)]
- 7) Sasaki H, Jonasson F, Shui YB, Kojima M, Ono M, Katoh N, et al. . High prevalence of nuclear cataract in the population of tropical and subtropical areas. *Dev Ophthalmol.* 2002;35:60–9. 10.1159/000060806[[PubMed](#)] [[Cross Ref](#)]
- 8) Todea A, Ghidul medicului de medicina muncii privind stabilirea aptitudinii în muncă (210 profesii și ocupații), Ed.Fundatiei României de mâine, 2007 , pag. 55, 107, 121, 147, 149, 160, 241, 271, 289, 342, 410, 491
- 9) Aristotel Cocarla – Medicina Ocupationala, Editura medicala universitara “Iuliu Hatieganu”Cluj Napoca – pag 152
- 10) Fodor F., Pop de Popa Doina, Oftalmologie, editura didactică și pedagogică 1991, pag. 14, 85, 93, 174-193, 213, 261, 304-314.
- 11) www.emedicine.medscape.com/article/1211083
- 12) <http://www.emutom.eu/>
- 13) Safety and health in agriculture. ILO code of practice. International Labour Office-Geneva: ILO, 2011.
- 14) Environmental and Occupational Medicine FOURTH EDITION - William N. Rom,Editor; Steven B. Markowitz, Associate Editor, 2007

13.2 Ear, nose and throat diseases

13.2.1 Introduction to ear, nose and throat diseases

ENT disorders are common in all areas of professional activity. The extremely diverse etiology, the very complex pathology of the diseases, their large spread make this area of interest very necessary in the training of doctors of occupational medicine. This is why the ENT disorders are found in most chapters.

It is an alarm signal that wishes to alert health care practitioners who have a health surveillance activity of farm workers on the frequency and importance of this pathology.

Pedagogical Objectives

Knowledge related objectives:

The trainee should be able to:

- Define and classify occupational hazards and risks regarding ENT disorders
- Understand the process of risk management and risk assessment
- Recognise common occupational hazards relevant for appearance of ENT disorders at agriculture workers.
- Be aware of the prevention and ENT protection measures within the agriculture workers

Acquiring skills and changing the attitude

The trainee should be able to:

- To effectively integrate three components: promoting health at work, ways to supervise health, the possibilities of medical intervention
- To diagnose the condition, to initiate the first medical aid
- To engage in the recovery of the emerging disorders and to ensure the adaptation of the working conditions according to the overdue changes occurring at the ENT level

13.2.1.1 Glossary for ear, nose and throat diseases

Term	Definition
NIHL	Noise induced hearing loss noise-induced hearing loss - hearing loss that is caused either by a one-time or repeated exposure to very loud sound(s) or sounds at various loudness levels over an extended period of time.
AUDIOGRAM	Graphical representation of hearing sensitivity for pure tones, with detection thresholds plotted in decibels hearing level versus audiometric test frequency (thresholds are reported in dB HL as a function of frequency in Hz) Pure tone audiometry - Measurement of hearing sensitivity across a range of test frequencies using a standardized test method that specifies the procedure for threshold determination, the range of test frequencies and presentation levels, and the way thresholds are presented graphically, including the symbols used
Occupational noise-induced hearing loss (ONIHL)	is a hearing loss caused by excessive noise exposure in the workplace. Within Alberta, the occupational exposure limit (OEL) for noise is 85 decibels (dBA) averaged over an eight-hour day. This means that for limited periods, a worker can be exposed to noise levels higher than 85 dBA as long as the average exposure over

	eight hours does not exceed 85 dBA. Continuous noise exposure tends to be more damaging than interrupted exposure to noise which permits the ear to have a period of rest and recovery. Noise exposure can be reduced through the use of a variety of hearing protection devices such as earplugs and earmuffs. The risk of occupational noise-induced hearing loss (ONIHL) is low at exposure levels below 85 dBA (eight-hour time-weighted average) but increases significantly as exposures rise above this level.
DECIBEL	unit that measures the intensity or loudness of sound
TINNITUS	sensation of a ringing, roaring, or buzzing sound in the ears or head; often associated with various forms of hearing impairment.
PRESBYCUSIS	is a slow and progressive deterioration of hearing that is associated with aging and not attributable to other causes

13.2.2 Hearing disorders; types of disorders, etiological factors, investigation methods, recommendations and prevention measures

Agricultural activities may generate a high level of noise. Various studies suggest that long-term exposure to loud noises affects hearing in all age groups (1). It is difficult to estimate the number of agricultural workers who suffer from such problems. The most frequent are occupational hypoacusis and deafness, both chronic occupational diseases, which must be reported as such.

13.2.2.1 Etiological factors and types of disorders

Sound is a vibration that propagates as a typically audible mechanical wave of pressure and displacement, through a medium such as air or water. Noise (Unwanted Sound) is an occupational noise. Sound which can result in hearing impairment or be harmful to health or otherwise dangerous. It is probably the most frequent physical hazard present in the working environment is a complex of sounds, of variable intensities and pitches, having different characteristics, rhythmic or rhythm less, produced continuously or discontinuously by machines, tools, devices, means of transportation, the human voice, etc, during the performance of the professional activity.

Decibel (dB) is a logarithmic unit used to express the ratio of two values of a physical quantity.

- 0 dB is the threshold of Hearing,
- 130 dB is the threshold of pain.

A noise at 110dB is ten time louder than a noise at 100 dB. The border between sound & noise is 85 dB(A).

The main cause of hearing disorders is the occupational exposure to noise in the workplaces. And particularly in the agricultural sector the exposure is widely spread for employees; the usual sources of noise are agricultural equipment such as tractors, trimmers, harvesters, cereal dryers, fodder harvesters, chainsaws.

Long-time exposure to noise in the agricultural environment can lead to permanent deafness, unless protection measures are taken. The main consequences are hypoacusis and occupational deafness.

According with Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise), the exposure limit values and exposure action values in respect of the daily noise exposure levels and peak sound pressure are fixed at:

- (a) exposure limit values: $LEX,8h = 87 \text{ dB(A)}$ and $p_{peak} = 200 \text{ Pa(11)}$ respectively;
- (b) upper exposure action values: $LEX,8h = 85 \text{ dB(A)}$ and $p_{peak} = 140 \text{ Pa(12)}$ respectively;
- (c) lower exposure action values: $LEX,8h = 80 \text{ dB(A)}$ and $p_{peak} = 112 \text{ Pa(13)}$ respectively.

When applying the exposure limit values, the determination of the worker's effective exposure shall take account of the attenuation provided by the individual hearing protectors worn by the worker. The exposure action values shall not take account of the effect of any such protectors.

13.2.2.2 Diagnosis of hearing disorders

Hearing Loss: The process of losing auditory sensitivity, there are different types of hearing loss: Noise Induced Hearing Loss is a condition that results from failure of the hair cells in the cochlea to respond fully to sound intensities having frequencies within the human speech range. The Health Effects are: tinnitus, buzzing sound, difficulties in sleeping.

We may observe AUDITORY EFFECTS (Acute as tinnitus, acoustic trauma, or Chronic as hypoacusia, Noise Induced Hearing Loss - NIHL) and/or NON- AUDITORY EFFECTS as sleep disturbances, general effects (cardiovascular, metabolic changes), and behavioural effects.

Occupational hypoacusis is the permanent drop of the threshold of hearing, at a frequency of 4000 Hz, by over 30dB including, after applying the correction of presbycusis, of the bilateral and symmetric perception type without without the interest of conversational frequencies, of professional etiology (2).

Occupational deafness is the permanent drop in the threshold of hearing, at conversational frequencies, by over 25dB including, after applying the correction of presbycusis, of perception type, bilateral and symmetrical, of professional etiology

Occupational acute hypoacusis (acute acoustic stress) occurs as a work accident when is the result of exposure to loud noises (explosion, siren, artillery, etc.) Consequences may be: eardrum rupture, ossicular chain disruption, irreversible degeneration of stria cells in the organ of Corti (small area/full). Deafness occurs immediately, and is accompanied by anxiety and memory loss.

Presbycusis. The audiogram shows moderate to severe down-sloping sensorineural hearing loss. Note that the hearing threshold at 4000 Hz is better than at 8000 Hz, a pattern suggestive, but not diagnostic, of an aging change rather than exposure to noise.

Presbycusis is an age-induced hearing loss. Presbycusis is a slow and progressive deterioration of hearing that is associated with aging and not attributable to other causes. Presbycusis is associated with a variety of inner ear pathologies. Other features that occur histologically include atrophy or degeneration of central auditory pathways and possibly mechanical changes in the cochlear duct affecting movement of the basement membrane. Usually the hearing loss is a gradual, symmetric, progressive, high-frequency sensorineural loss associated with gradually deteriorating speech discrimination.

An audiogram shows the mix character (perception – transmission of deficit)

If the problem develops, it can lead to irreversible deafness or recovery that may take months or even years (11).

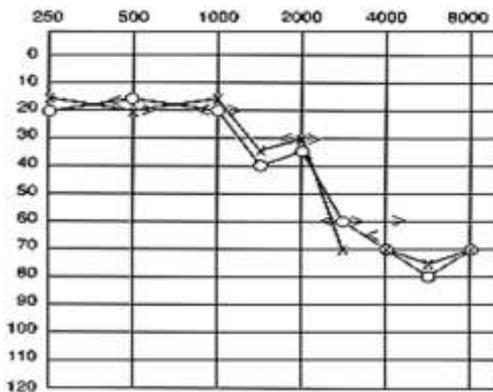


Figure 1 NIHL (perception)

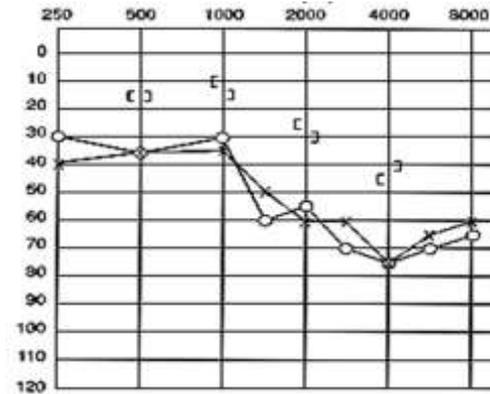


Figure 2 NIHL (mixt – perception/transmission)

A positive diagnosis of an occupational hypoacusis/deafness is based on:

- establishing occupational exposure to noises whose intensity exceeds 87 dB(A).
- clinical symptomatology: progressive loss of hearing (hypoacusis) until the conversational area is affected; then permanent deafness occurs; Patients with NIHL frequently complain of gradual deterioration in hearing. The most common complaint is difficulty in comprehending speech, especially in the presence of competing background noise. Because patients with noise-induced hearing loss have a high-frequency bias to their hearing loss, they hear vowel sounds better than consonant sounds. This leads to a distortion of speech sounds when they are listening to people with higher-pitched voices (e.g., women and children). Background noise, which is usually low frequency in bias, masks the better-preserved portion of the hearing spectrum and further exacerbates the problems with speech comprehension. Noise-induced hearing loss frequently is accompanied by tinnitus. Most often patients describe a high-frequency tonal sound (ringing), but the sound is sometimes lower in tone (buzzing, blowing, or hissing) or even nontonal (popping or clicking). This sensation may be intermittent or continuous and usually is exacerbated by further exposure to noise. Tinnitus is usually most bothersome to patients when there is little ambient noise present. Therefore, some patients may complain of inability to fall asleep or to concentrate when in a quiet room.
- clinical year/nose/throat examination and tone audiometry;

Assessment of Impairment: The normal range of speech reception threshold is between 0 and 20 dB, with losses of 20- 40 dB termed *mild*, 40-60 dB termed *moderate*, 60-80 dB termed *severe*, and greater than 80 dB termed *profound*.

Differential diagnosis:

- transmission deafness: burns of the external ear canal, eardrum perforation, ossicular chain dislocation, barotraumas, etc.
- perceptive deafness: gas embolism, perceptive deafness with a different aetiology, traumatic brain injury with fractured temporal bone; poisoning – exposure to ototoxic chemicals: CO, carbon sulphide, trichloroethylene, HG, benzene, etc.

Table 13-2 Examples: sources and levels of noise in agriculture

Source of noise	Sound intensity
Tractor mounted trimmer	91.1 dB(A)
Tractor mounted crusher	90.4 dB(A)

Tractor with cabin	73 – 90 dB(A)
Tractor without cabin	91 – 99 dB(A)
Maximum load tractor	120 dB(A)
Chain saw	103.9 dB(A)
Cereal dryer	93.4 dB(A)
Beet harvester	7 dB(A)

Exposure to farm equipment or animal production is the principal source of noise-induced hearing loss in agriculture. Large machinery cause a lot of noise. Lawnmower operating – 98 dB. Acute noise: metal-on-metal impact noise, the sudden burst of an explosions.

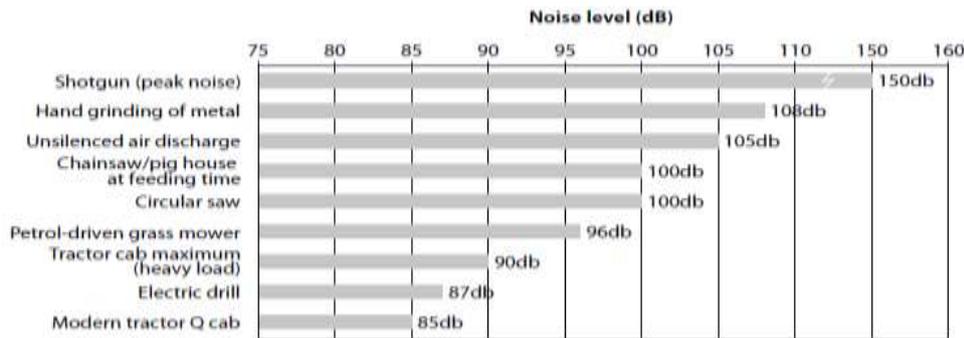


Figure 3 Noise levels in selected agricultural activities

The treatment: ceasing exposure to noise and, if necessary, using an ear prosthesis.

Medical prophylaxis:

- acknowledging the risk of developing occupational hypoacusis and deafness
- medical consult upon employment and regular check-ups
- hearing rest, protection measures

13.2.2.3 Prognosis, recommendations, and preventive measures

Hearing in patients with NIHL generally will stabilize if the patient is removed from the noxious stimulus. If not, hearing will continue to deteriorate, ultimately resulting in severe hearing impairment or, in extreme cases, total deafness. Although adequate noise protection is essential and always should be recommended, other factors also may play a role in the patient's prognosis.

Presbycusis can add to the noise-induced loss as the patient grows older, and preexisting noise-induced hearing loss also will cause the patient to be more susceptible to the adverse effects of ototoxic substances such as aminoglycoside antibiotics, loop diuretics, and antineoplastic agents used in the treatment of other disorders

According to Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) the employer shall give particular attention, when carrying out the risk assessment, to the following: (a) the level, type and duration of exposure, including any exposure to impulsive noise; (b) the exposure limit values and the exposure action values...; (c) any effects concerning the health and safety of workers belonging to particularly sensitive risk groups; (d) as far as technically achievable, any effects on workers' health and safety resulting from interactions between noise and work-related ototoxic substances, and between noise and vibrations; (e) any indirect effects on workers' health and safety resulting from interactions between noise and warning signals or other sounds that need to be observed in order to reduce the risk of accidents; (f) information on noise emission provided by manufacturers of work equipment in

accordance with the relevant Community directives; (g) the existence of alternative work equipment designed to reduce the noise emission; (h) the extension of exposure to noise beyond normal working hours under the employer's responsibility; (i) appropriate information obtained following health surveillance, including published information, as far as possible; (j) the availability of hearing protectors with adequate attenuation characteristics.

Common problems - key issues are:

- Lack of Hearing Conservation Programs
- No accurate assessment of noise levels
- Workers not trained on how & when to wear hearing protection
- Workers cannot clearly communicate while wearing hearing protection
- Hearing loss is often a chronic condition that occurs over years and immediate impact is often not recognized.
- Ineffective communication in noisy environments can lead to reduced worker productivity.

For hearing conservation it is important to have two elements:

- Detection -Sound Level Meter (The sonometer is composed of: a microphone for capturing sounds from work; a measuring device: transforms the sound into electrical signals and on the device dial appears directly in dB (decibels)- for *noise surveys to identify potential risk*
- Protection - *Identify employees that may require hearing protection*
*How can we protect from noise? Using **technical measures**: Reduces the noise at the source: E.g.: isolation ; change the device; Reduces the noise between the source and receptors: isolation , change the device; Reduces the noise at at the worker level: isolation (special cabin), individual equipment protection (ear plugs or ear muffs)-*

According with Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise), preventive measures should be taken to avoiding or reducing exposure, taking account of technical progress and of the availability of measures to control the risk at source, the risks arising from exposure to noise shall be eliminated at their source or reduced to a minimum. The reduction of such risks shall be based on the general principles of prevention: (a) other working methods that require less exposure to noise; (b) the choice of appropriate work equipment, taking account of the work to be done, emitting the least possible noise, including the possibility of making available to workers work equipment subject to Community provisions with the aim or effect of limiting exposure to noise; (c) the design and layout of workplaces and work stations; (d) adequate information and training to instruct workers to use work equipment correctly in order to reduce their exposure to noise to a minimum; (e) noise reduction by technical means: (i) reducing airborne noise, e.g. by shields, enclosures, sound-absorbent coverings; (ii) reducing structure-borne noise, e.g. by damping or isolation; (f) appropriate maintenance programmes for work equipment, the workplace and workplace systems; (g) organisation of work to reduce noise: (i) limitation of the duration and intensity of the exposure; (ii) appropriate work schedules with adequate rest periods.

- **Medical measurements:** pre-employment examination; periodical examinations; audiometric testing; Risk assessment/ Risk management. A worker whose exposure exceeds the upper exposure action values shall have the right to have his/her hearing checked by a doctor or by another suitably qualified person under the responsibility of a doctor, in accordance with national law and/or practice. Preventive audiometric testing shall also be available for workers whose exposure exceeds the lower exposure action values, where the assessment and measurement provided indicate a risk to health. The objectives of these checks are to provide early diagnosis of any loss of hearing due to noise, and to preserve the hearing function.

Where noise levels routinely exceed 85 dba workers need to wear hearing protection.

An engineering control means: Employers should establish programmes to reduce such exposure to the lowest levels practicable. Such exposure should not exceed the limits established by national and/or international laws and standards. In the case of new machinery and equipment, employers should:

- specify low noise emissions as a condition of purchase from their suppliers, so that machinery and equipment conform to relevant national or international laws and standards, such as ISO standards (see Appendix III); and
- arrange the workplace layout and job assignments so as to minimize workers' noise exposure.
- If workers' noise exposures are still higher than those determined by national laws and standards, employers should reduce such exposures through other engineering means as far as practicable, such as by fitting sound-proofed enclosures or using other acoustic materials.
- Employers should maintain machinery and equipment as part of a planned programme of maintenance, since worn components may increase noise levels. Worn out equipment and tools should be removed from use and replaced with new technology.

Employers should ensure that such workers are trained in:

- the effective use of hearing protectors;
- identifying and reporting new or unusual sources of noise that come to their attention;
- the role of regular audiometric testing.

13.2.3 Occupational laryngeal cancer

Most of the times, laryngeal cancer is associated with smoking and alcohol consumption. However, the incidence of laryngeal cancer associated with exposure to certain working conditions has been growing. Occupational laryngeal cancer is an occupational disease that must be reported as such.

Carcinogens that can be found at the workplace: asbestos, wood powders, nickel, ashes, tar, furnace fumes, polycyclic hydrocarbons, pesticides. Also, it has been proven that laryngeal cancer may be caused by exposure to free silicone dioxide, cotton powders, fumes (4). Agricultural activities entail major exposure to various carcinogens, pesticides in particular (5).

Risky jobs in agriculture: wood processing, use of pesticides. According to Finish studies on the food sector, people working in the milling industry are also faced with a high risk of developing laryngeal cancer (6).

Intake into the body: mainly through inhalation, aggravated by air pollution and improper mouth hygiene.

Effects on health: 15-20 years latency.

A positive diagnosis of professional laryngeal cancer is based on the level of exposure to the incriminated carcinogen, clinical symptomatology and para-clinical exams.

Clinical symptomatology is characterized by: dysphonia, dyspnoea, pain, dysphagia, irritating cough, moderate haemorrhage.

Clinical examination required: direct laryngoscopy, indirect laryngoscopy, biopsy, histopathological examination, palpation of cervical lymph nodes, X-ray, CT scan (7).

Radical treatment includes surgery – partial or total laryngectomy – and radiotherapy, which is indicated for all the patients that have undergone cancer surgery.

Medical prophylaxis:

- quit smoking
- avoid excessive consumption of alcohol
- avoid the overuse of the vocal chords
- referring patients with benign pathologies and pre-cancerous conditions to otolaryngologists and oncologists;
- medical check-up upon employment and regular check-ups

13.2.4 Sinusitis, laryngitis and pharyngitis in the agricultural environment

Sinusitis, laryngitis and pharyngitis are diseases whose development can be caused or aggravated by the work environment. Occupational laryngitis is an acknowledged occupational disease that must be reported as such.

Occupational laryngitis is an acute or chronic inflammation of the voice chords, which can be specific or non-specific.

Etiologic agents such as flour, cereal and plant powders have been incriminated as being triggers or aggravating factors in laryngitis with an occupational component (8). Other favouring factors, which are most common in the agricultural environment, are cold, humidity and voice over-exertion (9).

In case of occupational laryngitis, a positive diagnosis is established by taking into account the degree of exposure to trigger factors, clinical symptomatology and para-clinical investigations. Clinical symptomatology in such cases is represented by dysphonia, irritating cough, local sourness. Laryngoscopy is the main investigation needed for establishing the right diagnosis.

Usually, the treatment is symptomatic and mainly consists of non-steroid anti-inflammatory drugs, antipyretics and cough medicines.

Medical prophylaxis entails voice rest, avoiding exposure to cold, to wet environments and air pollutants, as well as a proper diet, which should not include condiments and sparkling drinks (9).

Sinusitis is inflammation of the lining of the paranasal sinuses. Several studies have described the occupational factor as an aggravating factor in the agricultural environment, through exposure to cereal dust, dairy products and swine (10).

A positive diagnosis can be established by taking into account clinical symptomatology and para-clinical investigations. In sinusitis, the pain occurs at the level of the face and head and is characterized by a sensation of pressure in the sinuses, sometimes pulsating, which grows stronger when the head is bent, takes sudden moves or when sinus points are pressured.

Other symptoms: runny nose, nasal obstruction, vision problems, fever, asthenia, loss of appetite.

An objective examination reveals skin swelling, sensitive pressure points.

The paraclinical investigations required include: rhinoscopy (anterior and posterior), radiological examination, sinus puncture and a bacteriological testing of secretions.

Treatment: antibiotics, anti-inflammatory drugs, pain-relief drugs, drainage of the sinuses.

Medical prophylaxis entails prophylactic examinations, avoiding exposure to cold, to moist and pollution.

Pharyngitis is acute or chronic inflammation of the pharynx, which can be infectious or toxic. Spoiled air, excessive consumption of tobacco and alcohol, a poor diet, occupational dusts and fumes are some of the factors that favour the development of pharyngitis.

A positive diagnosis is established by taking into account the clinical symptomatology (dysphagia, throat sourness, foreign body sensation) and an objective examination: inflamed mucous, fibrinous exudates and para-clinical investigations (mouth-pharyngoscopy)

Treatment: disinfectants, vitamin therapy, aerosols, inhalations, warm mouthwash.

13.2.5 Occupational rhinitis in the agricultural environment

Occupational rhinitis it is acute or chronic inflammation of the nasal mucosa. Etiological factors are: pollen, fungi, actinomycetes (silos), legumes, woody essences (oak, cedar, rose), green coffee, tea leaves, mites, red sprouts, large animal antigens.

Pathogenesis.

A. Allergies are an overreaction of the body's natural defense system that helps fight infections (immune system). In an allergic reaction, the immune system starts fighting substances that are usually harmless (such as dust mites, pollen, or a medicine) as though these substances were trying to attack the body. This overreaction can cause a rash, itchy eyes, a runny nose, trouble breathing, nausea, and diarrhea. An allergic reaction may not occur the first time the workers are exposed to an allergy-producing substance (allergen). For example, the first time when the workers are stung by a bee, they may have only pain and redness from the sting. If they are stung again, they may have hives or trouble breathing. This is caused by the response of the immune system. Allergic reactions can range from mild and annoying to sudden and life-threatening. An allergic reaction is more serious when a severe allergic reaction (anaphylaxis) occurs, when allergies cause other problems (such as nosebleeds, ear problems, wheezing, or coughing). Allergens, also called antigens, are substances that can trigger an allergic reaction. Having allergies means that the body reacts to allergens as a harmful foreign substance.

Allergens may be:

- Inhaled in the form of pollens, mold, chemicals, material from the stools of cockroaches and house dust mites, or animal dander and saliva. Animal dander is dead skin cells from an animal, such as a cat or dog. Animal hair or fur is not an allergen.
- Eaten or taken by mouth.
- Touched, such as plants, soaps or detergents, chemicals, metals, or latex (causing skin or contact allergies).
- Applied to the skin
- Injected under the skin, such as venom from the bites or stings of bees, yellow jackets, hornets, or other insects.

B. Endotoxins are not secreted but are released only when the cells are disrupted; In large quantities they produce hemorrhagic shock and severe diarrhea; smaller amounts cause fever, altered resistance to bacterial infection, leukopenia followed by leukocytosis, and numerous other biologic effects.

Clinical picture: sneezing, nasal / pharyngeal / auricular pruritus, nasal obstruction, headache.

Paraclinical investigations required include: Serum IgE determination, nasal secretion analysis, skin tests, nasal tests. The most faithful is the on-job testing.

Prophylaxis: technical measures, medical measures, risk recognition, recruitment selection, periodic medical examinations.

13.2.6 Conclusions & recommendations for ear, nose and throat diseases

Occupational health physicians should be actively / practically involved in supervising the health status of agricultural workers, especially to promote preventive measures.

Occupational health physicians should pay more attention to identifying farming jobs at risk of ENT injury. They must be concerned about the correct and complete information of the workers in order to prevent the occurrence of ENT disorders.

The assessment referred to these occupational diseases shall be conducted on the basis of all available information including:

- recognition and classification of risk factors which are or may be a hazard to human health;
- recommendations from a competent authority in order to protect workers' health when workers are or may be exposed to such an agent as a result of their work;
- information on diseases which may be contracted as a result of the work of the workers;
- potential allergenic or toxigenic effects as a result of the work of the workers;
- knowledge of a disease from which a worker is found to be suffering and which has a direct connection with his work.

Appropriate measures shall be taken by the employer to ensure that workers

and/or any workers' representatives in the undertaking or establishment receive sufficient and appropriate training, on the basis of all available information, in particular in the form of information and instructions, concerning:

- (a) potential risks to health;
- (b) precautions to be taken to prevent exposure;
- (c) hygiene requirements;
- (d) wearing and use of protective equipment and clothing;
- (e) steps to be taken by workers in the case of incidents and to prevent incidents.

It is necessary to assess the fitness in the work, taking into account the physical performances and the consequences that can occur after an incident / accident.

Knowledge of workplaces and of ENT risk factors present at the workplace will improve and increase the quality of occupational health care.

References

- 1) Todea A, Ghidul medicului de medicina muncii privind stabilirea aptitudinii în muncă (210 profesii și ocupații), Ed.Fundatiei României de mâine, 2007 , pag. 55, 107, 121, 147, 149, 160, 241, 271, 289, 342, 410, 491
- 2) <http://www.emutom.eu/>
- 3) Murphy DJ, Robertson SM, Harshman W, Noise induced hearing loss in agriculture, College of Agricultural Sciences Agricultural and Biological Engineering, 1st Edition 01/07 www.abe.psu.edu/ash
- 4) Toma I et all Medicina Muncii. Craiova: Syrtech 2014, pp455
- 5) Noise in Agriculture and Forestry, European Agency for Safety and Health at Work, <http://www.beswic.be/en/sector/agriculture/noise>
- 6) [Elci OC](#), [Akpınar-Elci M](#), Occupational exposures and laryngeal cancer among non smoking and non-drinking men, [Int J Occup Environ Health](#). 2009 Oct-Dec;15(4):370-3.
- 7) Morshed K, Szymański M, Siwiec H, Gołębek W, Laryngeal cancer in farmers from Lublin Region of Poland, [Ann Agric Environ Med](#) 2008, 15, 13–19
- 8) Laakkonen A, Kauppinen T, Pukkala E. Cancer risk among Finnish food industry workers. [International Journal of Cancer](#). 2006;118:2567–2571.
- 9) Cotulbea S, Oto-Rino-Laringologie, Timișoara, LITO U.M.F.T. 2004
- 10) [Sala E](#), [Hytönen M](#), [Tupasela O](#), [Estlander T](#). Occupational laryngitis with immediate allergic or immediate type specific chemical hypersensitivity. [Clin Otolaryngol Allied Sci](#). 1996 Feb;21(1):42-8.
- 11) Baschir AS, Curs ORL, Arad, Vasile Goldis University Press, 2011, pp 112
- 12) [Sundaresan AS](#), [Hirsch AG](#), [Storm M](#), [Tan BK](#), [Kennedy TL](#), [Greene JS](#), [Kern RC](#), [Schwartz BS](#). Occupational and environmental risk factors for chronic rhinosinusitis: a systematic review. [Int Forum Allergy Rhinol](#). 2015 Jun 16. doi: 10.1002/alr.21573.
- 13) Păuncu Elena et al., Zgomotul și sănătatea ocupațională, 2008, Editura ARTPRESS, Timișoara
- 14) *Safety and health in agriculture. ILO code of practice*. International Labour Office - Geneva: ILO, 2011.
- 15) *Current Occupational & Environmental Medicine* – fourth edition – Josep Ladou- 2006