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THE SECOND ROMANIAN-GERMAN SYMPOSIUM ON OCCUPATIONAL MEDICINE

Between the 23rd and 25th of June 2004 in Iași was held the second Romanian-German Symposium on Occupational Medicine, organised by:

- The Institute of Public Health Iași, Romania
- The Institute of Occupational Medicine of the the Freie Universität Berlin & Humboldt-Universität at Berlin, Germany
- The German Cultural Centre Iași, Romania

The main topics were:

- **Noise:** Monitoring, Exposure, Health Effects, Evaluation
- **Occupational Cancer:** Hazardous Compounds, Diagnostics, Epidemiology
- **Clinical Occupational Medicine:** Cardiovascular Diseases and Profession, Occupational Lung Diseases
- **Good Quality in Occupational Health:** Education, Training, Qualification, Medical Staff, Technical Staff, Structure of Preventive Examinations for Occupational Health Survey
- **Reference Values, Limit Values:** Health Risk Analysis
- **Specials**

ROUND TABLE: *Risk Insurance Legislation, Legal Basis for Occupational Diseases*

Moderators:

o.Prof. Dr. med. Gustav Schäcke

Director of the Institute of Occupational Medicine of the Freie Universität Berlin & Humboldt-Universität at Berlin, Germany

Dr. Doina Popa, senior researcher

Deputy Director of the Institute of Public Health Iași, Romania

WORKSHOP I: *Meet the Expert/Case Study Presentation & Discussion*

Moderators:

Priv. Doz. Dr. med. Rainer M. Kirchhoff

Institute of Occupational Medicine of the Freie Universität Berlin & Humboldt-Universität at Berlin, Germany

Dr. Irina Anca Popescu

Institute of Public Health Iași, Romania

WORKSHOP II: *Visit of Industrial Units*

ABSTRACTS

Abstracts have been accepted for Oral Presentation Sessions and Poster Discussions. Authors are responsible for the spelling and syntax that appears in their abstracts.

Official opening SHORT CONFERENCE

OCCUPATIONAL HEALTH KEY POINTS IN THE ENLARGING EUROPEAN UNION

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After many years of careful preparation on the 1st May 2004 ten further countries became member states of the European Union.

The founding treaty of the European Coal and Steel Community entered into force on 23 July 1952 for a period of 50 years and expired on 23 July 2002 a significant place amongst the numerous activities in the social and human field of basic scientific research and applied research was given to the field of occupational medicine.

This comprehensive incorporation of health protection for working people at their different workplaces at such an early stage in the development of an economically oriented association of states, is unparalleled anywhere else in the world.

Nowadays, health and safety at the workplace are amongst the most complex and important areas of social policy in the European Union. Since the end of the 1970's, a comprehensive set of regulations has been developed with the aim of raising the minimum standard of health and safety at the workplace.

The newest focal points of these concerns include the quality of the work, together with psycho-mental and psychosocial factors.

The migration of workers will promote the development of comparable bases for health assessment.

Several areas of concentration have been formulated for the future:

Systematic data recording,

Information network on occupational health risk,

Database for the optimisation of working conditions for handicapped people for integration and reintegration into work.

Cure and prevention of occupational diseases has to be intensified.

Occupational medicine must be an obligatory part of medical studies.

The post graduate training to become a specialist in occupational medicine must become harmonized in the European Union on a high level to ensure a good standard of prevention and treatment of work related health disturbances.

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**Session I:
CLINICAL OCCUPATIONAL MEDICINE**

**Chairpersons:
o. Prof. Dr. med. Gustav Schäcke
Dr. Doina Popa, senior researcher**

CARDIOVASCULAR DISEASES AND PROFESSION

**CARDIOCIRCULATORY DISEASES, OCCUPATIONAL DISEASES OR
WORK-RELATED ACCIDENT?**

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In the list of occupational diseases cardiocirculatory disturbances are not shown separately as occupational diseases.

But there can be listed several occupational diseases to which circulatory diseases may be attached (*no. according to the German list of occupational diseases*):

- 1108 Diseases due to arsenic or its compounds
- 1109 Diseases due to phosphorus or its compounds
- 1110 Diseases due to beryllium or its compounds
- 1201 Diseases due to carbon monoxide
- 1303 Diseases due to benzene, its homologues or styrene
- 1304 Diseases due to nitro- or amino compounds of benzene and its homologues or their derivatives
- 1306 Diseases due to methanol
- 1307 Diseases due to organic phosphorus compounds
- 1309 Diseases due to nitric acid
- 1315 Hepatopathies by dimethylformamide
- 2201 Diseases by work in hyperbaric environment
- 3103 Verminosis on miners by ancylostoma or Strongyloides stercoralis
- 4101 Silicosis
- 4102 Silicosis combined with active lung tuberculosis - silicotuberculosis -
- 4103 Asbestosis or asbestos related pleuropathies
- 4110 Chronic obstructive bronchitis or emphysema in underground hard coal miners under proof of the influence of a cumulative dose of as a rule 100 fine dust-years [(mg/m³) x years]
- 4301 Obstructive airway diseases including rhinopathies by allergenic materials forcing to discontinue all activities which are or may be responsible for the genesis, aggravation or the revival of the disease
- 4302 Obstructive airway diseases by chemoirritative or toxic materials forcing to discontinue all activities which are or may be responsible for the genesis, aggravation or the revival of the disease

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But we have to make a very sophisticated differential diagnoses if we are asked to consider cardiocirculatory disturbances as an occupational disease.

If an employee suffers a cardiocirculatory or cerebrovascular attack while working under special working conditions, we have to answer the question if he could have survived such an incidence for at least 12 month compared to work under conditions. If the employee would not survive the incidence or pass away within in period of less than one year after incidence, the employee or his relatives may be compensated for the sequelae of the incidence.

ARTERIAL HYPERTENSION AND PROFESSIONAL EXPOSURE IN AN ENTERPRISE FROM TIMISOARA

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The daily activity in an occupational health unit reveals that the majority of adult workers, more than forty years old, have an increased rate of arterial hypertension.

There were examined at the periodical control 355 workers with heavy professional activities and with exposure at noise or/and respiratory irritants.

We find 56% of cases with increased blood pressure; more than 4/5 of them were in the group with more than 40 years.

Other associated risk factors: 3 shift-work and night activity, obesity, lipid intake, cigarette smoking, alcohol consuming, education and social aspects.

We analyzed the context of the apparition of the AH, the working conditions (different associations), the link between patient and the family physician.

OCCUPATIONAL LUNG DISEASES

OCCUPATIONAL LUNG DISEASES – STATE OF THE ART

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The lung is the main entrance for many hazardous compounds as gas, vapour or particulate matter into the human body. For this reason in the field of occupational medicine occupational lung diseases are of great interest in research and practice.

The updated list of occupational diseases in Germany comprises the following items:

4 Diseases of airways, lungs, pleura, and peritoneum

41 Diseases by inorganic dusts

4101 Silicosis

4102 Silicosis combined with active lung tuberculosis - silicotuberculosis -

4103 Asbestosis or asbestos related pleuropathies

4104 Lung cancer or laryngeal carcinoma

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- combined with - asbestosis
 - asbestos related pleuropathies
 - related to a cumulative asbestos fiber dose of at least "25 fiber years"
((25×10^6 [(Fibres/m³) x years]))
- 4105 Asbestos related pleural, peritoneal or pericardial mesothelioma
- 4106 Diseases of the deep airways and lung by aluminium and its compounds
- 4107 Dust related pulmonary fibrosis by producing and processing carbides - hard metals -
- 4108 Diseases of the deep airways and lung by dust of Thomas slag - Thomas phosphate -
- 4109 Malignoma of airways and lung by nickel or its compounds
- 4111 - Malignoma of airways and lung by coke-oven gases.
- 4110/1 Lung cancer due to polycyclic aromatic hydrocarbons under proof of the influence of a cumulative dose of at least 100 Benzo[a]pyrene-years [($\mu\text{g}/\text{m}^3$) x years]
- 4112 Chronic obstructive bronchitis or emphysema in underground hard coal miners under proof of the influence of a cumulative dose of as a rule 100 fine dust-years [(mg/m^3) x years]
- 4113 Lung cancer due to the influence of crystalline silicon dioxide (SiO_2) under proof of silicosis or silicotuberculosis
- 42 Diseases by organic dusts**
- 4201 Exogenous allergic alveolitis
- 4202 Diseases of the deep airway and lung by dust of raw cotton, raw flax, and raw hemp (Byssinosis)
- 4203 Adenocarcinoma of nasal cavity and paranasal sinus by dusts of oak and beech
- 43 Obstructive airway diseases**
- 4301 Obstructive airway diseases including rhinopathies by allergenic materials forcing to discontinue all activities which are or may be responsible for the genesis, aggravation or the revival of the disease
- 4302 Obstructive airway diseases by chemoirritative or toxic materials forcing to discontinue all activities which are or may be responsible for the genesis, aggravation or the revival of the disease

(17), fumes & organic dusts (2), airway obstruction (1), cancer (3), climate (3).

Physicians, who want to execute those preventive occupational health examinations, must have an excellent knowledge in occupational medicine.

Conclusion. The result of such a standardized occupational health survey became evident by a reduction of occupational diseases, a better health protection at the workplace and a reduction of insurance premium for the employer.

THE CRONIC BRONCHITIS – A DISEASE CONCERNING THE JOB

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The research illustrates the professional factors responsible for the appearance or/and the maintaining of the chronic bronchitis in workers exposed to mineral and organic powders.

The studied group was made of 88 sick subjects hospitalized during the last six months in the Occupational Medicine Clinic of Craiova. A representative unexposed control group was selected with 87 subjects.

The variables taken into account were: the dusts exposure; their level and type, the presented symptomatology; the initial beginning of the bronchitis as a primary affection, association or complication of a fibrosis through the same exposure, the therapeutic answer; the characteristic of the spittle, the evolution, the value of the functional ventilator tests. There were taken into account also the etiological factors, like the smoking habit, the repeated respiratory infections etc. In order to assess the contribution of the professional factors, the following criteria have been utilized: the relative risk and the etiological professional fraction.

In the studied group the attack rate of the chronic bronchitis was 42 % compared to 12.7 % in control group, the most affected age segment being between 35 and 45 years old. Over 50 % of the chronic bronchitis cases were accompanied by pulmonary fibrosis induced by mineral dusts, which had a more rapid deleterious effect upon the ventilator function. The ventilator dysfunction of the medium and accelerated obstructive type has been met in 63.6 % of cases. The therapeutic answer at the bronchodilator medication and antibiotic therapy was favorable; the post-acute episodes were present only in 7.2 %cases.

The necessity of the medical active monitoring was signaled regarding these categories of professionally exposed workers.

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Session II REFERENCE VALUES, LIMIT VALUES

Chairpersons:
Dr. med. Geraldine Preuss
Dr. chem. Felicia Grădinariu, senior researcher

SYSTEMIZED AND STANDARDIZED QUESTIONNAIRE IN OCCUPATIONAL HEALTH

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In the growing need of medicine to gather more accurate data from patients in order to improve disease prevention, standardized data acquiring methods are of great importance. Furthermore a high standard for the data gathering is mandatory for a good statistical analysis.

For the developing of a system, which can conduct an anamnesis, it was imperative for the system to reproduce the course of the anamnesis accomplished by the physician. Therefore, in a pilot phase, 10 occupational work anamnesis, have been analysed. By this analysis, standardized steps were recognized, vital for the implementation of an algorithm, which could than be translated into a computer program. A series of approximately 60 standardized questionnaires were analysed in order to extract standardized question and answer types.

With the so gathered data an algorithm was developed. A major characteristic is the dynamic of the process, as the upcoming questions depend on the given answers. Another problem we had to solve was to systemize the work anamnesis. The goal was to accomplish this process according to the ISCO-88 standard, without losing the language independence of the project or to impact on the statistical data. This standard ensures that any given occupation has a code bundled. It was necessary to implement a search engine, which looks up the input from the patient in a standardized database. The input text is also compared with variations of the text and with answers given by another patient. The software returns all plausible matches from which the patient must choose one or start over with a new input. The software was tested on students and on randomly chosen people on congresses.

The main characteristics of the software are:

- Efficient questioning by means of intelligent loops behaviour.
- The content of the questionnaire is divided in levels organized in a tree structure.
- Built in a self-learning search function for standardized questions with a large collection of possible answers.
- Possibility to link several question elements by given conditions.

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- Language independent software; the questioning can be fulfilled in an arbitrary language; the gathered data will be saved in the same database.
- Patient friendly touch screen interface.
- Speech assisted questioning; the actual question is read out to the patient.

As a result we developed a standardised questioning system, primary for the occupational medicine area but with possible application in other fields.

PHILOSOPHY OF LIMIT VALUES IN OCCUPATIONAL MEDICINE AND NEW ASPECTS

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In occupational medicine limit values are of great importance. Under the aspect of prevention limit values must be safe. The main target of limit values is to prevent work related health impairments. To maintain health we have to define the term "health". On the other hand we have to define the manifestation threshold.

In occupational medicine limit values are mandatory not only for hazardous chemical compounds but also for functions of organs and organ systems. Environmental and individual confounding factors have to be considered. An essay to explain this complex network will be presented.

INTEGRATED ENVIRONMENTAL INDEX - A POSSIBLE EXPOSURE ASSESSMENT TOOL FOR URBAN ENVIRONMENT WORKERS

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This paper explores the possibilities of the application of The Integrated Environmental Index (also called Integrated Environmental Exposure Index or Integrated Exposure Index), abbreviated as IEI, for the assessment of the actual and prospective exposures of the people working in the urban environment.

The process of sustainable management for urban development requires a wide range of tools addressing environmental, social and economic concerns. Among these, instruments for reliable health and environment impact assessment play a key role in safeguarding and improving the quality of life of the inhabitants.

In order to elaborate development strategies, local authorities must be provided with reliable indicators to support analysis and decisions. Such indicators must reflect comprehensive evaluations in a concise manner. The IEI is meant as a representation (indicator) of the integrated environmental quality at a certain location. It should illustrate the idea that the environmental pollutants occur together, even if neither exceeds its individual standards. It must be remembered that, if the concentrations of several air pollutants are all close to their standards, the environmental quality is

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much worse than if one pollutant would be present at that level. The legal requirements are fulfilled but the health risk increases. Also, the fact that environmental stressors (e.g. noise and chemical toxicants) are treated separately does not offer the entire picture of human exposure. The environmental health risk assessment must integrate as much as risk factors that can be scientifically allowed.

In general, the construction of an integrated index includes five steps: Identification, Assessment, Summation, Valuation and Aggregation. In this moment, the IEs are still under research.

Session III: GOOD QUALITY IN OCCUPATIONAL HEALTH

**Chairpersons:
Dr. med. Elke Brinkmann
Lecturer Dr. Elena-Ana Păuncu**

EDUCATION

OCCUPATIONAL HEALTH IN MEDICAL STUDIES

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The health of the working part of the population is of great importance for the social income. From there it is inevitable that physicians have a qualified basic knowledge in those diseases, which may be connected with work related stress factors. For this reason it was reasonable that the order for medical studies to become licensed physicians (*Approbationsordnung für Ärzte – ÄappO*) regulates that occupational medicine is a compulsory part of it. Therefore the students have to bring efficiency statements to be admitted to the second federal state examination in medicine. The lessons of “occupational medicine” are placed predominantly in the 5th clinical term. The theme catalogue as well as a learning target catalogue for “occupational medicine” have been mapped by the heads of the university institutes of occupational medicine and was published by the *Deutsche Gesellschaft für Arbeitsmedizin und Umweltmedizin* e.V. (German Society of Occupational Medicine and Environmental Medicine). The theme catalogue considers in addition to the important key aspects the development in the field of occupational medicine. The theme catalogue contains the basics of occupational medicine and health prevention for the medical profession. It also includes the handling of physical and psychological stress and strain on work, determined by means of physical, chemical, psychomental and other types of exposure. An important chapter is dedicated to work-related diseases and legal occupational diseases concerning pulmonary, dermatology, infections and tropical diseases, and especially cancer diseases. A separate section is committed to the chronic patient in profession and basics of rehabilitation, social employment

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protection and basics on occupational medicine expertise. The occupational medicine has implemented the guidelines of the licensure order in the teaching process. The occupational medicine renders a considerable contribution in securing healthcare for employees in Germany. This contribution comprehend the intermediation of attitude, knowledge, abilities and dexterity

- to prevent, recognise and cure work-related disease, as well as promote health;
- to evaluate the work capacity as well as the disability;
- to recognise work-related influence on health;
- to evaluate the physical and psychomental ability of the employees with debased performance and their professional rehabilitation;
- to apply the present social law conventions in safety at work and occupational health protection in Germany and the European Union.

“COMPUTER-ORIENTED CASE-BASED LEARNING” IN OCCUPATIONAL HEALTH

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Medical students learn about the potentially causal relationship between profession and diseases, in order to prevent and recognize occupational diseases. Occupational Medicine is a compulsory subject in the medical curriculum in some countries. There are different aspects that complicate teaching OM in medical schools as well as in CME:

The opportunity of bedside teaching in OM is limited. „Interesting patients” are available only a limited time. Others can refuse to be presented to students, so the young doctors lose some information about a specific or rare occupational pathology. It was recently shown among medical students in Munich, that one possibility to guarantee effective and patient-oriented learning as well as to complete or improve traditional training in OM is computer-oriented case-based learning.

Therefore, it started to create web-based cases at the Institute and Outpatient Clinic of Occupational and Environmental Medicine in Munich in 1999. The cases have been created using the web-authoring tool “CASUS”. The web-authoring tool as well as the case-player is web-based. Therefore, the cases can be created and used at any computer with an internet connection using a standard Internet browser.

Some European countries started to collaborate in a program, “Net-based Teaching of Work-Related Medicine (NeTWoRM)”. Its aim is to set-up a European network for medical training in OM. Within the network, web-based patient cases will be collected and translated into different European languages. These cases will cover the most relevant aspects of occupational medicine.

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QUALIFICATION

STRUCTURE OF POST GRADUATE TRAINING TO BECOME A SPECIALIST IN OCCUPATIONAL MEDICINE

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The goal of the post graduate training (PGT) in medicine is the regulated acquisition of incoming knowledge, experience and dexterity for defined medical activity after the ending of the professional training, i.e. after the licensure as physician or after the admission to practice the medical job. PGT comes in line with perennial professional life under the supervision of PGT authorized physicians on the fundament of the PGT arrangement. Through the PGT in a specific area the physician becomes a medical specialist. The PGT ends with an oral exam in front of an exam committee.

PGT timetable

- 4 years in an PGT site;
- 2 years PGT in internal medicine, of which 1 year in a regular hospital for acute cases. In order to be credited with the 2 years PGT in internal medicine it is possible to perform 1 year PGT in general medicine or surgery or dermatology and gynaecology or neurology or psychiatrics and psychotherapy or orthopaedics or within this year 6 months PGT in anaesthesiology or hygiene and preventive environmental medicine or lab medicine or physiology or six month activity in toxicology. 1 year of PGT can be performed at an established physician;
- 3 months theoretic course on occupational medicine, which may be subdivided into 6 sections at maximum.

Content and goal of PGT

Intermediation, acquisition and proof of incoming knowledge, experience and dexterity in the basics of occupational medicine including work physiology, of occupational medicine precaution and diagnosis, of work psychology and work pathology. Intermediation and acquisition of knowledge social law conventions, work and industrial sociology and rehabilitation.

STRUCTURE OF PREVENTIVE EXAMINATIONS FOR OCCUPATIONAL HEALTH SURVEY

SYSTEMATIC STRUCTURE OF EXAMINATIONS FOR A PREVENTIVE OCCUPATIONAL HEALTH SURVEY – A BASIS FOR EPIDEMIOLOGICAL STUDIES

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The primary target of health promotion at the workplace is to reduce occupationally caused health impairments and even occupational diseases. Around 30 years ago in Germany The Industrial Injuries Insurance Institutes (*Gewerbliche Berufsgenossenschaften*) started together with occupational health scientists and company physicians to organise a standardised examination programme. While the structure of the programme should be uniform the examination procedure is oriented by the different stress factors given by the working material (e.g. asbestos, lead etc.) or by the working procedure itself (e.g. workplaces in compressed air, cold workplaces).

Each of the different working groups prepared one guideline for a specified stress factor. To harmonize the guidelines the working groups met each other twice a year. Each of the guidelines has the same structure:

1. Range of application,
2. Procedure of examination
3. First examination
 - 3.1 General examination
 - 3.2 Special examination
4. Control examination
 - 4.1 Examination interval
 - 4.2 General examination
 - 4.3 Special examination
5. Follow up examination
6. Additional instructions
 - 6.1 Physical / chemical properties
 - 6.2 Occurrence and sources of danger
 - 6.3 Incorporation
 - 6.4 Pathophysiology
 - 6.5 Clinical syndrome
 - 6.6 Legal basis
 - 6.7 Analytical procedure
 - 6.8 Comments
 - 6.9 Bibliography.

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Actually 48 guidelines for hazardous compounds and special workplaces are available: Dust (n=4), metals & metalloids (9), gases, solvents, acids (17), fumes & organic dusts (2), airway obstruction (1), cancer (3), infection & biotechnology (4), physical stresses (1), climate (3), workplaces (3), protective measures (1). Those guidelines include biological monitoring with external quality control. Physicians, who want to execute those preventive occupational health examinations, must have an excellent knowledge in occupational medicine. The result of such a standardized occupational health survey became evident by a reduction of occupational diseases, a better health protection at the workplace and a reduction of insurance premium for the employer.

STANDARDIZED CONTENT OF GUIDELINES FOR PREVENTIVE OCCUPATIONAL HEALTH EXAMINATIONS

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According to the basic law of Germany it is ruled, that everybody has the right for life and intactness of his body. This duty is ruled in working life by the content of the social security code [Sozialgesetzbuch – SGB] and by the duty and insurance of companies. The content of this duty are three guidelines, prevention, rehabilitation and compensation. Except the duty of the companies these guidelines are duty of the occupational health insurances. It is ruled by the social security code VII § 1, that those guidelines have to prevent occupational accidents, occupational diseases and work-related diseases by all means and they have to do everything for rehabilitation, for the workers and their relatives. To be sheltered is the life and health of the workers, third persons and things.

To do this duty there are established some examinations, pre-work examinations, examination for fitness for special duties, special preventive and common preventive examinations. The pre-work examination is not ruled in common, but only for workers in public duty. In private economy there are no rules. Certain information are expected from pre-work examination, immediately beginning disability, diseases which are dangerous for third persons or which can induce a periodically disability, certain fitness, psychomental fitness and addictive illness. Special examinations are required for the assessment of the ability concerning hand-work fitness, fitness for flying, fitness for underground work, fitness for seafaring, diving and work under tropical climate. Health insurance companies have established a lot of special examinations. The duty of these examinations is the early detection of occupational diseases, the recognition of work-related diseases and health care service. To manage this, there are to be done examinations, the pre-work examination, the second examination in certain regular distance of time and after-work examinations. All these should content the anamnesis related to diseases and profession (work), hereditary or suffered damages of health, physical examination, laboratory and chemical

examinations, x-ray, cardio-pulmonary and gastrointestinal diagnostics if necessary and former results. All the examinations except examinations depending on atomic law and infection shelter law are voluntary. There is established a list of examinations for special work affairs by the occupational health insurances containing 45 different examinations. These examinations should give advice for health conditions and risks to the workers, make work conditions better, can early detect health damages, can give results and data for later insurance problems and can control the efficacy of health prevention.

A GUIDELINE FOR PREVENTIVE OCCUPATIONAL HEALTH EXAMINATIONS ON FIRE FIGHTERS

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Aim: Fire fighters have to wear special clothing due to the health risks while executing their professional duties. Those protective measures include mainly fire resistant clothing and heavy respiratory protection. To monitor their service ability fire fighters have to undergo regularly a standardised occupational health survey. Such an examination includes a lung function test and a cardiocirculatory stress testing. The comparison of the results under quasi-practical load and recommended standardised laboratory test procedure showed us that the cardiopulmonary capability almost reached and exceeded the limits of individual ability. The study shows the discrepancy between the recommended stress and the actual stress at the workplace of the professional fire fighters and to deduce from it in a consequent matter a preventive medical check-up which is adapted to the specific demands of the assignment.

Method: 55 male fire fighters, 20-30 years old, were examined by ergometric work on bicycle in sportswear and in fire fighters' full protective clothing including the equipment components of compressed air respirators (n=6). During the examinations we monitored ECG including heart rate, inspiratory flow rate and blood gases. Additionally, on the group of fully equipped fire fighters body temperature was measured.

Results: The results show that under examinations close to reality, the sub maximum heart rate is frequently exceeded. The maximum ventilatory volume at rest has been exceeded under practical stress testing (~10 l/sec). Under the load of the compressed air respirators we observed an increase of the body temperature by 0.3 to 0.6°C (Median 0.5°C); the loss of weight varied between 0.2 and 0.6 kg (Median 0.5 kg).

Conclusion: The results show the necessity to modify the preventive occupational health survey for fire fighters in that way that the demands of prevention are fulfilled.

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These contain:

- The maximum heart rate must reach the age dependent frequency (220-age) by ergometric exercise
- The preventive occupational health survey must include a stress testing by wearing the professional protective clothing.
- A follow up occupational health survey must be executed
 - * after each pulmonary and cardiocirculatory disease, which could have affected the work ability
 - * the regular interval of preventive occupational health survey should not exceed 12 months yearly checking intervals or at least yearly check-ups with an intensified obligatory training with a corresponding consultancy.
- The regular physical training must be programmed.

SCREENING FOR EARLY KIDNEY DAMAGE DETECTION DUE TO OCCUPATIONAL RISK

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A statistical evaluation of data from cross-sectional studies indicates that a raised albuminuria is more frequently detected in groups of workers exposed to various solvents compared to unexposed persons. Therefore a graduated screening method for the detection of early effects on the kidney has been developed. Case reports, case-control studies and cross-sectional studies have given evidence for a relationship between chronic non-neoplastic kidney diseases or progression of already existing diseases (glomerulonephritis) and occupational solvent exposure. After short-term high exposure to different solvents, a number of cases with acute tubular damage have been described. An increased albuminuria has been observed more frequently in groups of workers exposed to various solvents (e.g. toluene, styrene, aliphatic/aromatic hydrocarbon mixtures, chlorinated hydrocarbons) than in control groups. No differences have been found for other markers of kidney damage like transferrin, β_2 -microglobulin, retinol binding protein or N-acetyl- β -D-glucosaminidase. Therefore the determination of albuminuria could be a useful parameter in monitoring of solvent-exposed workers. However, further investigations are necessary to confirm the observed findings. Stix for microalbuminuria can already detect the excretion of 20–299 mg/l. The early diagnosis of solvent-induced effects of the kidney is important for the prognosis and therapy. The examination of

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microalbuminuria should be part of the examination of employees exposed to nephrotoxic substances especially with

- higher concentrations
- mixtures of solvents and metals
- dermal exposure
- risk factors like hypertension, diabetes mellitus, smoking, overweight.

OCCUPATIONAL HEALTH NEW APPROACH IN DIRECTION OF PUBLIC HEALTH M.B.

Liliana Râpaș, Julieta Predut, Doina Stanislav, Yvonne Corha, Maria Cosma, Gabriela Godeanu Vlădoiu, Stela Stanciu
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It's obvious, that our recent changes in legislative framework, the market mechanism, the employers and employees increasing interest for health link with new governmental policy concerning insurance for accidents and occupational diseases will determine improvement of occupational health approach.

Direction of Public Health M.B. represents a part of administrative Ministry of Health's network working through in counties and at the same time a source unit for health indicators and public information.

Our multidisciplinary team, from occupational health office, consists of:

- *occupational medicine physicians
- *occupational psychology specialist
- *technology specialist
- *occupational hygiene nurses with competence in occupational medicine
- *industrial toxicology specialists

and develops studies based on laboratories analyses, medical data, environment agency information.

Our field of intervention is represented by:

1. Technical administrative assistance for acquis program in M.B.
2. National Program for Community Public Health, M.B
3. Regional programs for development in the field of occupational health and safety
4. Training program for:
 - *occupational medicine specialists (6 month)
 - *public health specialists (2 month)
5. Research pilot studies
6. Public Occupational Health Service:
 - *identify and assess the risk
 - *surveillance the hazards
 - *advising on ergonomics
 - *surveillance of health
 - *occupational psychology
 - *information

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*advising in integrate management system (9000/14000/18000/8800 standards)

*participation in workplace health promotion programs

The intervention in health surveillance and insurance for occupational diseases and accidents is represented most of all, by screening programs and national databases for occupational diseases and work-related diseases

We are working to improve financial resources and to develop the technology for data collection and analysis.

The main beneficiary and data providers (medical services, administration, hospitals, clinics, insurance funds, other customers) through INTERNET – portal WEB, under a firewall, develop the databases and classify the information.

There are many communication facilities and one of our challenges represents the databases development in order to produce better analysis in order to establish the priorities in Occupational Health local policy.

We are convinced that our preventive intervention in the field of occupational health will reflect better results in the future and we'll succeed in improvement employee's health and working conditions in relation with lower costs.

MEASURED MAGNETIC FIELD LEVELS IN ELECTRIC LOCOMOTIVES

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Romanian regulations set a limit of 0.5 mT for occupational exposure to 50 Hz magnetic fields, which is based on electric excitation of nervous and muscle tissues. On the other hand, scientific literature provides data concerning possible health effects of low-level magnetic fields, even if such levels are many times below the mentioned limit.

To determine the order of magnitude of the train drivers' exposure to magnetic fields, we investigated magnetic field levels inside electric locomotives. Measurement of the magnetic flux density showed exposure of locomotive mechanics at levels that are lower than the limit set by Romanian regulations, which is the same as the one proposed by ICNIRP guidelines. On the other hand, the levels of magnetic field inside locomotives are higher than the limits set by exposure standards based on precautionary principle, which also take into account subtle effects of long-term exposure to low-level magnetic fields.

We conclude that the magnetic field exposure of the drivers of the electric locomotives we monitored is acceptable and well below the limit set by Romanian regulations and there is no risk of health effects related to electric excitation of tissues. However, based on present knowledge, it is not possible to indicate if there is, or not, any health risk related to subtle effects due to long-term exposure of electric train drivers to moderate levels of magnetic fields.

**Session IV:
OCCUPATIONAL CANCER**

**Chairpersons:
Dr. med. Gertrud Kirchhoff
Dr. Eugenia Dănulescu, senior researcher**

HAZARDOUS COMPOUNDS / EPIDEMIOLOGY

CARCINOGENIC COMPOUNDS AND OCCUPATIONAL DISEASES

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Actually many compounds with evidence of carcinogenicity are classified in the following way:

1. Substances that cause cancer in man and can be assumed to make a significant contribution to cancer risk. Epidemiological studies provide adequate evidence of a positive correlation between the exposure of humans and the occurrence of cancer. Limited epidemiological data can be substantiated by evidence that the substance causes cancer by a mode of action that is relevant to man (n=44).
2. Substances that are considered to be carcinogenic for man because sufficient data from long-term animal studies or limited evidence from animal studies substantiated by evidence from epidemiological studies indicate that they can make a significant contribution to cancer risk. Limited data from animal studies can be supported by evidence that the substance causes cancer by a mode of action that is relevant to man and by results of *in vitro* tests and short-term animal studies (n=118).
3. Substances that cause concern that they could be carcinogenic for man but cannot be assessed conclusively because of lack of data. The classification in Category 3 is provisional.
 - 3A. Substances for which the criteria for classification in Category 4 or 5 are fulfilled but for which the database is insufficient for the establishment of a MAK value (n=12).
 - 3B. Substances for which *in vitro* or animal studies have yielded evidence of carcinogenic effects that is not sufficient for classification of the substance in one of the other categories. Further studies are required before a final decision can be made. A MAK or BAT value can be established provided no genotoxic effects have been detected (n=109).
4. Substances with carcinogenic potential for which genotoxicity plays no or at most a minor part. No significant contribution to human cancer risk is expected provided the MAK value is observed. The classification is supported especially by evidence that increases in cellular proliferation or changes in cellular differentiation are important in the mode of action. To characterize the cancer risk, the manifold mechanisms contributing to carcinogenesis and their characteristic dose-time-response relationships are taken into consideration (n=12).

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5. Substances with carcinogenic and genotoxic effects, the potency of which is considered to be so low that, provided the MAC and BAT values are observed, no significant contribution to human cancer risk is to be expected. The classification is supported by information on the mode of action, dose dependence and toxicokinetic data pertinent to species comparison (n=2).

This very important list of hazardous compounds is not reflected in the list of occupational diseases.

THE ACTIVITY OF GENERAL LABOR INSPECTORATE IN THE FIELD OF PROTECTION OF EMPLOYEES EXPOSED TO THE CARCINOGENIC AND MUTAGENIC RISK

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General Labor Inspectorate (GLI) transposed in General Norms of Labor Protection (GNLP) /2002 the European Directives regarding the prevention of asbestos, carcinogenic and mutagenic risks at work.

In order to inform and make the interested actors aware of those risks, GLI developed some informative tools like: guides, brochures, leaflets, posters, etc. These were officially presented during three meetings and distributed all over the country by territorial labor inspectorates.

Also, French experts trained 30 labor inspectors. Taking into account the main ideas presented there, GLI developed a training support regarding chemical and physical risks, which is to be used in order to train other labor inspectors and other persons involved in implementing occupational health and safety rules in the workplaces.

A national campaign took place in 2003 in order to control the implementation of a series of EU directives. The provisions on chemicals were very much emphasized, as the theme of the European Week for Safety and Health 2003 was “Dangerous substances: handle with care”.

The risks of employees' exposure to asbestos were on the main agenda of GLI even before the transposition of the specific legislation. Thus GLI has started promoting a national campaign in this field since 2001.

To optimize the activity performed in protecting the workers exposed to the dangerous chemicals, especially CMR chemicals, GLI keeps tight connections with the Ministries that have also transposed the specific legislation as well as with all the interested actors but not the last with Public Health Institutions.

CUMULATIVE EXPOSURE TO CHEMICAL NOXIOUS INCLUDING THE CARCINOGENIC AGENTS

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The study assessed the work conditions and simultaneous occupational exposure to benzene and other many chemical agents: aromatic and chlorinate hydrocarbons and their derivatives, cyanic and vinyl compounds, isocyanates, amines in a research institute of macromolecular chemistry. There were revealed the poor personal and collective protective measures and lack of medical monitoring of the occupational group made of 168 subjects: 87 (51.7%) women and 81 (41.2%) men with average length of service of 19.72 ± 7.41 years. The clinical and anamnestic examinations detected 5 cases with neoplasia in evolution, with chemical and radio-therapy (Hodgkin's lymphoma, non-Hodgkin's lymphoma, and mammary cancer) and no treated ovarian neoplasia and facial basocellular carcinoma. Their etiopathogenic relation with carcinogenic agents was difficult to quantify. The hematological examination (number and peripheral morphology of blood cells) found out 26 cases (15.4%) with anemia: number of red cells under 4 mil/mm^3 (23 women and 3 men) with the average length of service of 21.22 years (10 cases with significant exposure to benzene 16.01 ± 5.2 years). A number of 9 subjects (5.3%) had leukopenia ($<4500/\text{mm}^3$ at 7 subjects and up to $4000/\text{mm}^3$ at 2 subjects and among these, 5 subjects had over 5 years of exposure to benzene). The simultaneous decrease of red and white blood cells appeared at 5 women subjects (average age = 41.42 years). The benzene-induced hematotoxicity was difficult to assess without dynamical changes of group biomonitoring (exposure biomarkers) and without exposure monitoring (air concentration, personal absorption). A retrospective study about death rate caused by cancer (1984-2004) among the employees (revealed 12 cases with cancer) comparatively to general population and a prophylactic campaign (medical agenda 2004 "Health, safety for all" has been initiated together with authorities of this institute).

BLOOD OXIDATIVE STRESS MARKERS IN ASPHALT PREPARING WORKERS

Felicia Grădinariu, Doina Hăvârneanu, Daniela Constantinescu, Mirela Ghițescu, Carmen Croitoru

Institute of Public Health Iași, Romania

Aim: we intended to determine some blood oxidative stress markers in asphalt preparing workers in order to evaluate the influence of bitumen fumes exposure upon antioxidant system defence mechanisms.

Material and methods: the 31 subjects (19.3 % women) were investigated by a complex protocol including sputum cytology, peripheral lymphocytes flow-cytometry, assays of blood immunoglobulines and oxidative stress markers (SOD, TBARS). The results were compared with a matched-control group. Occupational risk was assessed by biological exposure indices and workplace air analyses.

Results: Blood SOD and TBARS showed significantly higher levels in exposed than in controls ($p < 0.001$). Ig E and the number of T helper cells correlated directly to each other and with smoking habit ($p < 0.01$). The number of peripheral CD3+HLA-

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DR+ cells was significantly higher in workers with type II sputum cells, than in the rest of the group ($p < 0.01$).

Conclusions: Smoking habit and lifestyle can influence significantly organism's response to occupational stressors. That is why it is hard to identify the real professionally-induced health effects.

CERTAIN ASPECTS CONCERNING THE USE OF CYTOLOGIC BIOMARKERS IN OCCUPATIONAL CANCER RISK MONITORING

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The paper is aimed to present the micronucleus test of oral squamous cells as an indicator of genotoxic occupational exposures.

Exfoliated cells hold strong potential as a tool for biomonitoring human populations exposed to genotoxic agents because epithelial tissues are in immediate contact with inhaled and ingested genotoxic agents and also because they can be easily collected from the mouth by noninvasive procedures. In addition, more than 90% of cancers arise in epithelial tissues; in many cases, these tissues are the actual targets of carcinogens, as indicated by the sites of exposure-related cancers.

Increases in the MN frequency in exfoliated cells were observed as a result of exposure to formaldehyde, pesticides, benzene, neoplastic drugs, radiotherapy, smoking, arsenic in drinking water.

In the standard procedure applied in our laboratory, exfoliated cells are collected from oral mucosa (swabbed with a spatula) and slides are prepared by smearing the cells onto the slide manually. The cells are fixed and stained according to the May-Grünwald-Giemsa method. The minimum number of cells scored in order to stabilize accuracy is between 1500-2000 cells.

Although the research projects performed until now generated undoubtful results, additional studies are needed to compare spontaneous and induced MN in different epithelial tissues, standardize protocols, and validate the induction of MN in epithelial tissues as biomarker of cancer risk.

DIAGNOSTICS

EARLY DETECTION OF COLON CANCER – A SUBJECT OF PREVENTION IN OCCUPATIONAL HEALTH

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The gastrointestinal system is of great importance in medicine. More or less invasive examinations help to detect more and more at an early stage functional disturbances and a great number of symptoms of the small intestine. In 39% of the cases we have

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practically no symptoms. Leading symptoms may be: weight loss (14%), diarrhoea (13%), bleeding (8%) and digestion disorders (13%). All these symptoms may be more or less typical symptoms of malignant diseases of the gastrointestinal system and should be followed by further investigations. Diseases of the gastrointestinal tract and their symptoms are known since long time especially in connection with conditions in profession, but there is still a great shortage of documentation and research, while gastrointestinal diseases are of great importance for health insurances and companies, because this group of diseases generates a great amount of absenteeism by disability. The most cases to be cured concern persons in the first half of their professional career. This fact seems important because factors of profession could be a reason for the gastrointestinal manifestation. Gastrointestinal disturbances belong to that group of diseases, which are not well represented in occupational medicine. They are practically not documented and mentioned in the list of occupational diseases. The registration of a great number of gastrointestinal cancer diseases according to § 9 paragraph 2 SGB VII and the small number of other gastrointestinal diseases, which are very frequent in the general population must be scrutinised. The highest range of representation of symptoms of the large bowel is reported in the list of occupational diseases due to metals, metalloids, and other chemical compounds. It seems to us quite important that a certain number of these substances are known to be more or less carcinogenic. But we do not know enough details on the origin of cancer in the gastrointestinal system except that about 2-5% depends on hereditary reasons. The importance of colorectal cancer is great. In 1999 57,000 persons suffered in Germany from colorectal cancer and 29,800 patients died. Therefore occupational medicine obliged to collect systematically facts about the development of gastrointestinal cancer, to establish projects for early detection and programs for education of workers. These diseases are a highly important problem in the health statistics of companies, cause a great amount of costs and diminish the rear material health and knowledge in the companies.

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POSTER SESSION

Moderators:

Priv. Doz. Dr. med. Rainer M. Kirchhoff

Dr. Răzvan Dănulescu, senior researcher

NOISE

THE AUDITORY AND NON-AUDITORY EFFECTS OF "MUSICAL NOISE"

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Objectives: The aim of this transversal clinical and epidemiological study was to assess the prevalence of auditory and non-auditory effects caused by exposure to musical instrumental and vocal noise that exceed PEL.

Material and methods: The anamnestic and clinical examination by a questionnaire filling up (NQ-MSDs; 12 items - neuropsychic overexertion and psychosocial relationships; 6 items - general health state), the working conditions assessment, "musical noise" level measuring, auditory testing (audiotest, tone liminary audiograma). A group of 75 instrumentalists (49 men; 65.3%) with average age of 41.48±12.15 years (20-63 years) and length of service of 19.84±12.75 years (1-35 years) and a group of 71 lyrics: 29 men (40.8 %) and 42 women (59.2%) with average age of 36.14±11.11 years (20-58 years) with the average length of service of 13.3 ±11.21 years.

Results: The bilateral hearing loss at high frequencies (4-6 KHz) up to 30 dB was found (audiotest, audiograma) at 25 instrumentalists (32.9%) and 9 lyrics (12.7%). The spread of hearing loss in the conversational area (corrected mean with presbiacusic factor), over 25 dB, being a bilateral and perceptive type was diagnosed only for 2 instrumentalists (2.2%). The noise level emitted during rehearsals (symphony orchestra) was between 92-96 dB (A). The irritability state was identified at 12 instrumentalists (16.0 %) and 13 lyrics (18.3%), sleep disorders at 16 instrumentalists (21.3%) versus 14 lyrics (19.7%), headache and anxiety at 12% instrumentalists and 13 (18.3%) lyrics, mental fatigue at 6.7% instrumentalists and 4 (5.6%) lyrics. Personal history of cardiovascular diseases treated with antihypertensive drugs at 14 instrumentalists (18.7%) and 15 (21.1%) lyrics. Stage fright syndrome (palpitations, trembling, and perspiration) was identified in 20 cases from both groups (13%).

Discussions: The neuropsychic symptoms and signs have been interpreted taking into account the noise exposure, the great number of rehearsals (15-20 hours/week) and concerts (over 100/year, 25% of which were abroad), psychosocial relationships and lack of autonomy and control over work with time stress (autoevaluation 1 to 10

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scale, the average of both groups was $5.22 \pm 2,8$). A number of 18 instrumentalists and 7 lyrics (9.9%) declared an average consumption of alcohol and cigarettes.

Conclusions: The prevalence of occupational hearing loss and deafness (quantitative criteria according to definition) in instrumentalists was low (2.2%). The neuropsychic symptomatology having an average prevalence of 18.6% and cardiovascular diseases (hypertension, chronic ischemic cardiopathy) may be related to etiopathogenesis and professional musical noise that exceeds admissible limits in both groups.

THE PLOUGH RAKER EFFECTS OF THE IMPULSIVE NOISE IN A KNITWEAR FACTORY

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The purpose of the paper was to investigate the hearing function in people exposed to noise which exceeds the maximum admitted limit, high frequencies noise, having an impulsive character, in order to formulate prophylactic, ergonomic and medical measures.

The research was made in two knitwear sections, upon 125 employees working on knitwear machines model "TELAI".

The methodology used included: the work analysis, noise measurements (level, characteristics, spectral analysis), the investigation of the hearing function using the audiometry, the clinical general examination, recording the subjective symptomatology, the analysis of health's level taking into account the temporary incapacity of work. The results were compared to a matched-control group.

The results emphasized the important psycho-sensitive stress, determined by the occupational complex of factors (the work conditions, the work content and its distribution) with special reference to the manifestations of the tiredness.

The virulence of the noise was noticed and it exceeded the admitted limits, the impulsive characteristic of the noise and the high frequencies having a serious impact over the hearing function. This fact was illustrated by the 10 % of the low hearing function found and by the 12.5 % cases of professional deafness.

The length of exposure was a less important factor than the noise characteristics and high frequencies. In 3% of the subjects the evolution of the hearing deficit was much faster.

There have been formulated technical, managerial prophylactic measures, insisting on the ergonomic ones.

OCCUPATIONAL EXPOSURE TO NOISE IN ROMANIA – GENERAL ISSUE 2003

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In the year 2002, 892 cases of noise-induced occupational diseases (hypoacusia and deafness) were declared in Romania. These occupied the first place in the hierarchy

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of general occupational morbidity. Consequently, there was the necessity of elaborating the „general issue” which should represent „the image of occupational exposure to noise in Romania” for the year 2003. The occupational medicine services from the Public Health Directions in all Romanian districts including Bucharest received complete questionnaires concerning the number of general population, the number of active subjects, the number of working people exposed to different noxious and also to noise and concerning the possibility of assessing noise risk (integrative sonometers) and of hearing loss (audiometers).

The answer rate was 81 % (34/41 for the districts + Bucharest). 20 out of 34 were completely filled in.

Data showed that 1 out of 5 subjects exposed to noxious is noise exposed. Data processing revealed the poor equipment with modern devices for noise risk assessment as well as a great variety of possibility to diagnose the occupational hypoacusia and deafness.

The study showed the necessity of joint efforts of the Ministry of Health and Public Health Institutes in monitoring and controlling the occupational noise exposure.

EVALUATION OF OCCUPATIONAL EXPOSURE TO NOISE IN 2003 IN MOLDAVIA REGION

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Aim: The authors aimed to set up a survey concerning the 2003 occupational exposure to hazardous noise conditions in the 8 districts of Moldavia Region.

Methods: We built-up a data - base concerning the evaluation of occupational exposure to noise as the first step in drawing up a coherent programme for hearing conservation that was started in Moldavia Region. We collected information about some aspects such as:

- the number of workers in all Moldavia Region
- the number of workers exposed to occupational hazards
- the number of workers exposed to occupational noise
- the number of factories with occupational exposure to noise

Results: The number of 20 - 60 years old people represents 62% of the entire population and the number of working people is 20 % of the first one. 47 % of the working people is exposed to occupational hazards and a quarter of them is exposed to hazardous noise conditions. The occupational exposure to noise is the first occupational hazard in Moldavia Region. Galați District is the first district concerning the number of workers exposed to noise and the number of factories with such of exposure. Taking into account the levels of noise, the most exposed fields of activity are: furniture industry, metallurgical industry, machine manufacturing industry etc.

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Conclusions: The survey concerning the occupational exposure to noise in Moldavia Region is a base for the hearing conservation programme that has to develop in the factories with higher levels of hazardous noise conditions.

SOME ASPECTS CONCERNING NOISE INDUCED OCCUPATIONAL DISEASES IN MOLDAVIA REGION

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Aim: this paper analyzes the noise-induced occupational diseases (NIOD) in Moldavia Region during 2000-2003.

Methods: The authors collected information about some aspects such as:

- every year whole number of occupational diseases (OD);
- every year frequency of NIOD and their importance among all OD compared to the number of workers professionally-exposed to noise;
- the situation of NIOD in every district of this region;
- the existing audiometers in every district;
- the fields of activities that induced most frequently these diseases:

Results: the number of OD increased in 2002 and 2003 and decreased in the last year. Every year NIOD frequency represented about 1/5 of all OD and the number of workers professionally-exposed to noise was about a quarter of those exposed to occupational hazards. Galați and Suceava districts had the highest number of workers exposed to professional noise. In Galați, Iași and Neamț districts NIOD were the most frequent OD every year. Only Vrancea district had not audiometer and there were not registered any NIOD. The most exposed fields of activities were: furniture, metallurgical, machine manufacturing industry etc

Conclusions: analyzing NIOD in Moldavia Region is an important motivation for the hearing conservation programme that has to be developed in the factories with higher levels of hazardous noise conditions.

CLINICAL OCCUPATIONAL MEDICINE

THE FREQUENCY OF ARTERIAL HYPERTENSION IN WORKERS OCCUPATIONALLY EXPOSED TO DIFFERENT NOXIOUS SUBSTANCES

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Introduction: arterial hypertension is an affection that decreases the working capacity of the workers exposed to different occupational noxious substances.

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Materials and methods: We determined the blood pressure in 1526 workers exposed to different noxious substances as a way of biological monitoring.

Results and discussions: The frequency of arterial hypertension: in a furniture factory was 6,9%, in metallurgical factory 8,8%, in a factory of agricultural fertilizers 9,0%, in a knitwear factory 10,77%, in a leather factory 14,1%, in a factory of synthesis of hexavalent chromium: 14,25, in a hammer mill factory 16,2%, and in a factory of synthesis of calcium carbide 16,3%.

Conclusions: we can observe a positive correlation between exposure to the mentioned noxious substances and the frequency of arterial hypertension, with maximal frequencies in the case of exposure to carbon monoxide and intense impulsive noise.

CARDIAC PERFORMANCES AT THE 55-77 AGING POPULATION OF DOLJ COUNTY IN DIFFERENT PSYCHO-SOCIO-PROFESSIONAL CONTEXTS

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Starting from the hypothesis that both pathological changes frequently added to the physiological age involution and the characteristic features of the work process involve outstanding changes in cardiac performances, the authors checked these performances at the 55-70 years old populations of Dolj District. This will be useful to the evaluations of the work capacity of this population, because in our district these are some reasonable potentialities embodied by this sample of populations that could be turned to good account. 60 subjects being 55-70 years old were recently studied. They work in: agriculture (25%), industry (25%), education (25%), health (25%). The results revealed the alteration of cardiac functions reflected in: cardiac capacity during the effort, cardiac arrhythmia and myocardic ischemia. By linking cardiac arrhythmia with myocardic ischemia and with their highest cardiac frequency (C F) reported to theoretical maximum frequency we observed a higher gravity of the cardiac dysfunctions in industrial workers: We found here most of subjects suffering of alterations of all the parameters and also a lower number of persons with a normal reactivity. A lower alteration of cardiac functions was noticed in subjects working in education: Thus we didn't observe here any person with abnormal reactivity concerning the 3 studied parameters; the number of normally functional subjects was the highest here. On the other hand, men of age of 60-64 years showed a highest gravity of cardiac dysfunctions.

OCCUPATIONAL CANCER

FLOWCYTOMETRIC ANALYSIS OF PERIPHERAL BLOOD SUBPOPULATIONS IN ASPHALT WORKERS - PRELIMINARY DATA

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Background: International epidemiological studies revealed that haematological malignancies represent an important cause of morbidity and mortality in asphalt industry workers.

Aim: To characterize the lymphocyte phenotype in asphalt workers in order to detect possible early alterations of immune cells populations.

Materials and methods: The immune status of 27 asphalt workers aged between 19 - 53 years (mean age: 41.6) was characterized by measuring the surface antigens of peripheral lymphocytes. The workers were exposed to polycyclic aromatic hydrocarbons during hot mix paving and asphalt mixing operations; the mean exposure period was 10.6 years. The immunophenotyping of cells from heparinated peripheral blood was performed after incubation with various fluorescent monoclonal antibodies, followed by red cell lysis. The blood samples were examined flow-cytometrically using a FACS Calibur device.

Results: The percentages of white blood cells subpopulations were compared with the normal values described for adults of a corresponding age. Lymphopenia was found in 44% of the workers. Increased cytotoxic T lymphocytes CD3+CD8+ population was found in 14% of the studied group, with a subunitary CD4/CD8 ratio.

Conclusions: Exposure to asphalt fumes can induce slight alterations of the normal peripheral blood picture. Flowcytometry is a sensitive method of monitoring people at risk to develop haematological malignancies.

CYTOGENETICALLY INVESTIGATIONS RESULTS ON WORKERS OCCUPATIONALLY EXPOSED TO MINERAL FIBERS VERSUS CONTROL GROUP

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Cytogenetically investigations upon 25 workers occupationally exposed to mineral fibers (6 workers as interventionists; 19 workers as chemical operators) vs. 31 subjects control group were performed. Chromosome aberrations test by Moorhead method was applied in peripheral blood lymphocytes cultures. One hundred metaphases for each person have been read.

Chromosome aberrations test emphasizes in exposed group numerical aberrations, structural aberrations and cellular dividing mechanism perturbations. Numerical

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aberrations are represented by polyploidy in $0.64\% \pm 0.9$ in exposed group, vs. 0% in controls. Structural aberrations observed consisted of chromatidical and izo/chromatidical lacunas, acentrically fragments exchanges. Percentage of structural aberrations in exposed group was 1.34 ± 1.38 vs. 1.26 ± 1.5 in controls (statistically non significant increases).

Distribution by work length showed a slight increase of chromosome aberrations percentage in workers with 20-28 years length of work ($1.7\% \pm 1.15\%$) compared to workers with 7-17 years length of work ($1.13\% \pm 1.6\%$).

Structural aberrations percentage was founded as follows: $1.66\% \pm 1.36$ in interventionists and $1.26\% \pm 1.55$ at chemical operators.

Presence of polyploidy, detachment, sticky chromosomes, abnormally distribution in metaphase board of binuclear and multinuclear cells indicated that workplaces chemical agents caused changes in dividing mechanism without affecting significantly the chromosome structure.

RADIATION EXPOSURE IN WORKERS IN PHOSPHATE INDUSTRY AND COAL FIRED POWER PLANTS

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The aim of this study was to assess the exposure of workers in two non-nuclear industries due to work activities involving naturally occurring radioactive materials (NORMs). Our research intended to provide a better knowledge of working practices and sufficient meaningful information regarding the estimated workers exposure to NORM in these industries, focusing in particular on the regulatory aspects relating to naturally occurring radioactive materials.

The workers involved in the production of energy in Coal Fired Power Plant (CFPP) and in fertilizer production in Phosphate Fertilizer Plant (PFP) are subject to radiation exposure (through internal and external pathways), in excess of the exposure due to natural radiation and it involves some risk. We must carefully consider the complexities of the problems that occur for these workers, since they are also exposed to a noxious mixture of chemicals, which may be involved in the increase of cancer risk.

The results showed that for workers employed in the CFPPs, the higher risk is associated with the intake (via inhalation) of thorium-232, while in PFP the higher risk is associated with the intake (via inhalation) of radium-226 and uranium-238.

The occupational radiation doses for some workers reach relevant levels compared to protection limits in the nuclear industry. These individual dose levels therefore should be carefully measured, controlled and registered. We consider that in PFP there are work activities that must be subject to control. Optimized techniques to reduce individual and collective doses in the phosphate production should be established.

GOOD QUALITY IN OCCUPATIONAL HEALTH

IMMUNOPHENOTYPIC DISCRIMINATION OF THE PERIPHERAL BLOOD CELLS FROM INDIVIDUALS OCCUPATIONALLY EXPOSED TO LOW-FREQUENCY ELECTRIC FIELDS – PRELIMINARY DATA

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Background: During the last two decades, occupational exposure to electromagnetic fields was reported to have various effects on human health. Most frequently it was associated with a high relative risk to develop haematological malignancies and brain tumours.

Aim: To detect alterations of peripheral white blood cells, in a preclinical stage and, eventually, to propose new means of monitoring the occupationally exposed people, in order to prevent future exposure.

Materials and methods: The health status of 19 electric engine drivers was evaluated by interview and complete clinical examination. The immunophenotyping of cells from heparinated peripheral blood was performed after incubation with various fluorescent-labeled monoclonal antibodies, followed by red cell lysis. The blood samples were examined flow-cytometrically using a FACS Calibur device.

Results: Increased cytotoxic T lymphocytes CD3+CD8+ population was found in 4 people out of 19, with a CD4/CD8 less than 1. Lymphocytosis was found in 1 worker. No monocytosis was found.

Conclusions: Immunophenotyping is a valuable and complex means of monitoring subclinical haematological alterations of workers exposed to low frequency electric fields. Further investigations are required in order to assess the role of these radiations in inducing blood cells abnormalities.

SCORES METHOD UTILITY IN CLINICAL HEALTH EVALUATION AT WORKERS OCCUPATIONALLY EXPOSED TO JUTE DUST, WOOD DUST AND ORGANIC SOLVENTS

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Objective. The paper underlines the score method utility in clinical general health evaluations in jute dust, wood dust and organic solvents occupational exposures.

Material and method. Studied groups characteristics: group I = 55 workers with jute dust; group II = 37 workers with wood dust; group III = 35 workers with organic solvents; controls = 106 office workers. Age average = 37.56 ±8 years; work length

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average = 18 ± 10 years. *Scores method* was applied as follows: every sign and symptom considered was noted with a mark; the result of the sum of the marks constitutes a score; the score multiplied by a correction coefficient constitutes an index.

Results. The index values for respiratory system were as follows: 832.95 for the exposed to jute dust, 342.87 for the exposed to wood dust, 318.41 for the exposed to organic solvents vs. 47.24 for the controls. The index values for locomotor apparatus were as follows: 458.15 for the exposed to jute dust, 166.49 for the exposed to wood dust, 191.31 for the exposed to organic solvents vs. 84.62 for the controls. The index values for cardiovascular system were as follows: 310.29 for the exposed to jute dust, 215 for the exposed to wood dust, 114.34 for the exposed to organic solvents vs. 71.7 for the controls. The index values for digestive system were as follows: 125.36 for the exposed to jute dust, 64.7 for the exposed to wood dust, 115.89 for the exposed to organic solvents vs. 226.1 for the controls. The index values for endocrine system were as follows: 38.4 for the exposed to jute dust, 24.4 for the exposed to wood dust, 17.9 for the exposed to organic solvents vs. 30.3 for the controls. The index values for skin involvement were as follows: 51.29 for the exposed to jute dust, 19.78 for the exposed to wood dust, 19.35 for the exposed to organic solvents vs. 4.9 for the controls.

Discussions. The great total index is noted for the exposed to jute dust (1816.44), followed by the index registered in subjects exposed to wood dust (833.24) and by the index registered in those exposed to organic solvents (777.2) vs. the index noted in controls (464.86). The workers exposed to jute dust registered the major index out of respiratory system followed by locomotor's and cardiovascular systems. The workers exposed to wood dust and organic solvents registered the main index out of respiratory system. The main index registered in controls was out of digestive apparatus.

Conclusions. Scores method allows an evaluation of the general status health. The method helps to evaluate qualitative data in digital manner.

SPIROMETRY ASSESSMENT BY SCORES METHOD IN OCCUPATIONALLY EXPOSURE TO JUTE DUST, WOOD DUST AND ORGANIC SOLVENTS

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Objective. The paper emphasis the utility of scores method of spirometry parameters evaluations in workers occupationally exposed to jute dust, wood dust and organic solvents.

Material and method: Work groups: group I = 55 workers with jute dust; group II = 37 workers with wood dust; group III = 35 workers with organic solvents; controls = 106

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subjects; average age = 37.56 ±8 years; work length average = 18±10 years. *Scores method* was applied as follows: spirometry parameters values below 80% in steps by 5% were considered. Each step is noted by a mark; the sum of marks results a score; score multiplied by a correction coefficient shows an index which magnitude is increased by number of steps in descendent sense. In order to compare the results, *Chi² test* was applied in comparisons with controls. FEF25-75, MEF50 and MEF25 were considered.

Results. The index values for the spirometry parameters considered are presented below:

FEF25-75: in workers exposed to jute dust the values registered for index was 20.88 and p values of 0.0001; in workers expose to wood dust the values registered for index was 16.45 and p values of 0.002; in workers exposed to organic solvents the values registered for index was 5.28; the index value in the controls was 0.79.

MEF50: in workers exposed to jute dust the values registered for index was 10.75 and p values of 0.03; in workers expose to wood dust the values registered for index was 10.24 and p values of 0.006; in workers exposed to organic solvents the values registered for index was 3.23; the index value in controls was 3.36.

MEF25: in workers exposed to jute dust the values registered for index was 47.94 and p values of 0.02; in workers expose to wood dust the values registered for index was 32 and p values of 0.03; in workers exposed to organic solvents the values registered for index was 37.62 and p values of 0.05; the index value in the controls was 17.4.

Conclusions. Index magnitudes in exposed groups vs. controls signalize distal airways involvement in the studied exposure, data comparable with *chi² test*. Score method underlines differences between exposed vs. controls even the *chi² test* is not statistically significant.

REFERENCE VALUES, LIMIT VALUES

ALGORITHM AND SOFTWARE IMPLEMENTATION FOR THE OMPUTER-AIDED ANAMNESIS IN THE OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

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For a good differential diagnosis in general, all medical disciplines need a quite high number of parameters to be recorded and analysed. While the paper & pen method is cost and time-consuming, the goal of this study was to develop an algorithm, which can be implemented in software to conduct the anamnesis in the occupational and environmental medicine.

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To detect standardized steps, the course of the physician anamnesis was analysed. In addition about 60 standardized questionnaires were subject of our analysis. The goal was to extract all the different question types and the associated answer types. From this work steps, an algorithm was developed which describes the process of the anamnesis.

Another necessity was to implement dynamic question elements such as loops. The questioning process must be language independent in order to gather data from different people and still be able to conduct statistical analysis.

It was also mandatory to construct a system that can look up a selection of appropriate answers so that the interviewed people can have the choice of the true answer. The same procedure is necessary, for example, to conduct the anamnesis, in which the patient can choose between 368 different occupations. To solve this problem, a self-learning search engine was programmed. The programming was conducted with Borland C++ with additional help tools from TMS Software.

The anamnesis algorithm contains typical sequences, which are based on simple functions like: input fields, multiple choice and simple choice. As a specific element a conditional question-answer-question structure was identified and implemented.

In the test phase it became clear that the patient must have the opportunity to change the ergonomic controls like font size or colour. For elderly people, with little or no experience with a mouse and keyboard a touch screen operation was implemented. The system also “speaks” with the patient, as the current question is read aloud.

On the fundamentals of gathered demands the software “e-Anamnese 2003” for performing computer assisted anamnesis was developed. The software can be used for any type of questionnaire. The hereby-generated database is language independent, as it is compatible with any translation of the questionnaire. These characteristics are useful when the software is applied in international context. In complex exposure contexts in work and environmental medicine the software helps the process through the high standards and the deep information gathered from the anamnesis.

SPECIALS

EFFECTS OF THE DITHIOCARBAMIC FUNGICIDE THIRAM ON FEMALE REPRODUCTIVE FUNCTION - EPIDEMIOLOGICAL AND EXPERIMENTAL STUDIES

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Aim: The assessment of the effects of chronically exposure to thiram on the female reproductive function through epidemiological and experimental studies.

Method: Epidemiological study: five years cohort study on 132 women occupationally exposed to thiram, in the synthesis industry, compared to matched

controls. Exposure evaluation comprised GC measurements of thiram in workplaces air and biological exposure tests. Complex fertility questionnaires were used. Experimental study: the effects on fertility as well as the genotoxic, embriotoxic and teratogenic potential of thiram were assessed in chronic experiments on Wistar female rats by using three doses.

Results: High concentrations of thiram in the workplaces air, and important levels of its metabolite in urine were found.

The epidemiological research has shown a significant decrease of the fertility, a higher frequency of spontaneous abortions (OR=3.52, 95%CI: 2.25-5.50), and a significantly increased risk of congenital malformations among the exposed women (OR=11.57, 95%CI: 2.13-66.86). The mutagenetic investigations indicated a significant increase in the number of chromosomal aberrations (p=0.004) and micronuclei (p=0.05)

In chronic experimental administration, the highest dose (1/3 LD₅₀) determined a significant increase of the tardive resorption rate (p=0.0044) and also a high proportion of major malformations (p=0.0001); medium dose (1/9 LD₅₀) and low dose (1/27 LD₅₀) generated a high rate of foetal loss. These results are confirmed by high rates of structural chromosomal aberrations and also micronuclei high rates.

Conclusion: Epidemiological and experimental studies support the hypothesis that high exposure to thiram determines a significant fertility decrease and the qualitative impairment of offspring.

RISK ASSESSMENT IN SMALL AND MEDIUM ENTERPRISES

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Aim: exposure risk assessment and statements referring to the importance given to the issues of occupational security in small and medium enterprises (SMEs).

Material and methods: in the period 2000 - 2003 we evaluated the working conditions in a group of 16 SMEs in Iasi, Botosani and Neamt counties from different activity fields: construction materials, paints, metal-chemical products, glass and porcelain, self-adhesive labels, sanitary materials, painting workshops, tailoring, scenery decor making.

In order to assess the occupational exposure risk we performed 218 measurements of the chemical hazards concentration in air (total and respirable dusts, solvents, carbon monoxide and nitrogen, naphthalene, formaldehyde, aliphatic hydrocarbons, heavy metals, free crystalline silicon dioxide, air microflora), 69 evaluations of the microclimat and 922 exposure and biological effect tests (COHb, acetonuria, blood lead, blood cadmium, DAL acid, sulphate index, -SH groups). The results of the biological monitoring were interpreted by comparing them with the tolerable

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biological limits as well as with those of a control group. The results were statistically analyzed through usual methods (χ^2 -test).

Results and discussions: in most of the SMEs, which result from privatised state enterprises, we found out exceeding of the chemical hazards concentrations in the workplaces air compared to the admitted exposure limits. Only in two recently set up medium enterprises (from the sector of construction materials and self-adhesive labels printing respectively), the air quality was better than that of the ambient air. The biologic markers presented higher values than the tolerable biologic limits in a statistically significant higher rate for the exposed subjects compared to the controls. Risk management and occupational health issues are of prime importance to SMEs, but most of them are too small to justify setting up an in-house occupational health risk facility. This state of occupational safety and health in SMEs could be caused by the lack of awareness about the causes and results of occupational hazards, the lack of knowledge about ways to eliminate occupational hazards, the relatively small number of employees and the personnel mobility that makes the monitoring for occupational health and security more difficult, the lack of possibilities (including financial ones) to apply measures for preventing occupational hazards.

Conclusions: Small enterprises differ from large enterprises in many respects but, one of predominant dissimilarity is that health and safety are still low on their agenda. Only a few owners of small businesses are convinced of the potential benefits of investing in health and safety at work. Occupational health and risk assessment for SMEs is not an option; it is a legal requirement.

ELECTROCARDIOGRAPHIC FINDINGS RELATED TO OCCUPATIONAL EXPOSURE TO LOW FREQUENCY ELECTROMAGNETIC FIELDS

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Aim: to put in evidence possible electrocardiographic (ECG) and cardiovascular (CV) effects of occupational exposure to low levels of low frequency magnetic and electric fields

Method: two years cohort study has been done. Exposure evaluation included magnetic and electric field measurements and ergonomic analysis. Health status assessment was focused on cardiovascular system and comprised detailed occupational anamnesis, clinical and biochemical examinations, computerised ECG and CV function tests.

Results: the studied group included 58 electricians, 89 electric train drivers, vs. 93 controls. The measured electric and magnetic fields did not exceed permissible levels. Health status assessment revealed ECG changes. Arrhythmias were found in train drivers (OR=3.11, 95%CI: 1.14-8.76) as well as in electricians (OR=3.2, 95%CI: 1.08-9.77). Conduction disturbances were found in train drivers (OR=3.57, 95%CI:

1.15-13.06) and in electricians (OR=9.99, 95%CI: 3.28-35.90). There is a difference between electricians and drivers: OR=2.8, 95%CI: 1.21-6.51. Myocardial ischemia changes were found in train drivers (OR=5.4, 95%CI: 2.18-5.84) and in electricians (OR=5.18, 95%CI: 1.93-14.24). We found some correlations with exposure levels and length of service, especially for conduction disturbances.

Conclusions: the study of CV effects in low frequency electromagnetic fields exposure, revealed significantly frequent ECG changes: Arrhythmias, conduction disturbances, and myocardial ischemia changes. The electromagnetic fields occupational exposure seems to be a CV risk factor and it appears the possibility of these fields involvement in the genesis of complex changes of myocardial excitability and conductivity, as well as in the ischemia pathogenesis.

OCCUPATIONAL DERMATOSES FROM INSULATION WOOL

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Introduction: insulation wool can cause acute symptoms such as irritation and itching of the eyes, nose, respiratory tract and the skin. Skin reactions are generally transient and superficial; the rash is an irritant response to mechanical micro traumatism, arising from the relatively large (irrespirable) fiber fraction (over 4 to 5 microns diameter). Most typically it takes the form of a fine, pointed, itching erythema, which often disappears with continued exposure. Washing with water can generally alleviate it.

Material and method: we investigated a group of workers from MMMF industry by two cross-sectional surveys at 4-year interval. The exposed lot (N=67: mean age 38±6 years, mean length of service 16±6 years) was comparable with control. In the second part of the study 27 people left the workplace while another 40 subjects were still at work.

Results: the clinical examination had found skin reactions with different clinic aspects (irritation, rash and itching erythema), significantly more frequent in the first ten years of activity. The initial lesions was papular (in 52.2% cases), though secondary infection, or lichenification was found in 7.5%. This can be explained by each individual's adaptability and/or by changing the workplace of those with persisting or exacerbating symptomatology. The prevalence of the symptoms was higher among the exposed subjects (Yates $X^2 = 37.44$, p: <0.0005).

Conclusions: this research seems to prove that exposure to MMMF may cause occupational dermatoses (especially in the first 10 years of activity) because of the lack of protection equipment and of precarious hygienic conditions.

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PARTICULARITIES OF THE RISK OF EXPOSURE TO A MIXTURE OF CHEMICAL HAZARDS IN A SECTION OF ANTIBIOTICS CONDITIONING IN RELATION TO THE HEALTH STATUS

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Objective: To assess the occupational exposure risk to a combination of chemical hazards in an industrial unit of medicines conditioning and to evaluate the potential impact on health status of the exposed personnel.

Material and methods: The studied group was represented by 50 employees of the tablets producing unit (F=37. 74%) with the average age of 40.8 ± 6.8 years and the average length of work of 20.2 ± 7.5 years. In the first stage we evaluated the working condition factors through environmental measurements and exposure tests. In the second stage of the study we performed the health status evaluation through: occupational health physical examination, functional exploring tests (functional ventilatory tests, electrocardiography, electroneuromiography, audiometry), biochemical, haematological and immunological tests.

Results and discussions: The chemical compounds used in the unit during the various production stages are: organic solvents, acids, alkali, bromine, lubricant dusts and final product dusts. The environmental measurements did not exceed the TLVs for these substances. Among the exposure tests performed by us (sulphate index, total phenols, reduced and total glutathion), only glutathion presented a high rate of pathological values.

The results of the clinical examination showed as morbidity top rates: 42% irritative - allergic syndrome, 40% disturbances of the locomotory apparatus, 36% cardiovascular diseases, 34% genito-urinary malfunctions, and 28% digestive disorders.

In the functional ventilatory tests 20% of subjects presented DDOS; in EKG 33% of subjects had patterns without morphological changes; in ENMG 54% of subjects had functional disturbances of the peripheral nervous system.

The biochemical tests, the serum immunoglobulines and the haematological parameters had no changes with occupational pattern.

Conclusions: The evident improvement of working conditions occurred during the last few years in the studied units, as well as the renunciation to the semisynthesis stage generated the following results:

- low values, under the TLVs, for the main chemical hazards in the workplaces.
- the exposure tests had normal values, excepting the total glutathion.

In the final stage of the study, the dynamical and comparative study of the results for the production units will enhance better the importance of the working conditions improvement, of respecting the General Rules of Work Security for keeping and improving the health status.

**COMPARATIVE BLOOD BIOCHEMICAL PATTERN OF EMPLOYEES
FROM PHARMACEUTICAL INDUSTRY**

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Aim: In a cross-sectional epidemiological study we investigated health status of workers from three different compartments of a pharmaceutical plant: the research division, the tablet section and the ointments department. We tried to find out how are acting the work conditions upon their health by comparing the blood biochemical pattern of the three groups.

Material and methods: The 3 groups of workers were investigated by a complex protocol including clinical, biochemical and haematological investigations, EKG, pulmonary functional tests. Biochemical assays were performed with commercial kits and included glucide, protein and lipid metabolism markers, serum level of hepatic enzymes and biological exposure tests. Statistical analysis was done using Student's *t* test.

Results: The average age and length of service of the subjects in the three groups were comparable. The most important biochemical changes were found in the researchers group. The workers in the ointment department had the slightest blood biochemical changes and also the less frequent exposure markers changes.

Conclusions: Regular health surveys are able to improve employees' health status by enhancing employer's interest into a safe and healthy workplace.

**ELECTRONEUROMIOGRAPHICAL WORK RELATED CHANGES IN
EMPLOYEES INVOLVED IN THE PROCESS OF MUSEUM
RESTORATION**

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Objective: The aim of this study is to emphasize the peripheral nervous system electroneuromiographic (ENMG) changes occurred in a group of museum restaurateurs in relation with occupational exposure to multiple noxious chemicals (organic solvents, alkali, dyes, resins etc).

Material and method: We performed a complex electroneuromiographic investigation on a group of 32 employees, restaurateurs in an important museum in Iasi (8 men and 24 women), with a mean age of 43 ± 6.5 years and a mean length of work of 17.1 ± 4 years.

The pluralism of hazards with a well known neurotoxic effect motivated us to perform the electroneuromiographic investigation. The gained data were interpreted in relation with the environmental measurements.

Results: The values of the ENMG investigated parameters allowed us to establish an ENMG functional diagnose; 15 employees (48.8%) presented different levels of

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polyneuropathic changes, 7 employees (21.8%) presented discrete ENMG changes and 10 subjects had no changes. Most (2/3) of the lesions found in the peripheral nervous system are joint, of sensitive - motor type.

Conclusions:

1. The ENMG investigation evidenced a significantly high rate of cases with polyneuropathic functional changes.
2. The occupational chronic exposure to multiple chemical hazards with acknowledged neurotoxic effects suggests us the idea of a possible occupational ethiology.
3. The long exposure time would explain the high rate of mixed forms of polyneuropathy - in time, the effect of the hazards affected both sensitive and motor fibres of the investigated peripheral nerves.

CHANGES IN THE ACTIVITY OF CERTAIN HEPATIC ENZYMES OF THE EMPLOYEES IN A MUSEUM COMPLEX

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Aim: to enhance the deviations from the reference values of certain hepatic enzymes of the employees in restoration laboratories of a museum complex.

Material and method: we investigated 36 employees with the average age of 44.02 ± 10.81 years and average length of work of 13.22 ± 8.83 years, who work in different laboratories: restoration of ceramics, metals, paintings, wood, paper, textiles. We performed complex clinical and laboratory exams in order to assess the activity of certain enzymes: transaminases (ASAT, ALAT), γ -glutamyltranspeptidase and alkaline phosphatase. We compared the results with a matched-control group. The working condition was evaluated through measurements of toxic compounds in air (acetone, toluene, ammonia, heavy metals, acetic acid, formaldehyde) as well as of exposure indicators (sulphate index, hypuric acid, methyl-hypuric acid, total phenols). The results were statistically analysed through usual methods (χ^2 -test).

Results and discussions: workplaces air measurements showed exceeded values over the exposure limit for: ammonia in the workshop of metal restoration, for toluene in the workshop of ceramics restoration and for formaldehyde in the workshop of textiles restoration. We found also increased enzymatic activity for ASAT, ALAT, and γ -glutamyltranspeptidase in a statistically significant higher rate of exposed compared to the controls ($p < 0.05$). The values for sulphate index, lower than normal in 61.4% of the exposed compared to 1.6% of the controls, correlated negatively significantly with the length of work ($r = - 0.54$; $p < 0.01$). The concentrations for hypuric acid exceeded the biological exposure indices in 33.33 % of the exposed, especially in restaurateurs of ceramics and paintings, which is a significantly statistic higher percent compared to controls ($p < 0.01$).

Conclusions: the significant rate of the biochemical changes already mentioned, the marked decrease of the sulphate index and the higher rate of hypuric acid eliminations may be associated with the presence of the hazards in the workplaces air. The authors conclude on the significance of these indicators and their utility in finding out hepatic disorders caused by chronically exposure to a mixture of hazards.

HEMATOLOGICAL ASPECTS OF CHRONIC EXPERIMENTAL EXPOSURE TO MIXTURES OF ORGANIC SOLVENTS

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Aims: The study of peripheral blood parameters in rats exposed to mixtures of organic solvents and the description of hematological changes induced by the studied combinations.

Materials and methods: white male Wistar rats weighting 190 ± 20 g were inoculated intraperitoneally with the following mixtures: -*MI*- (30 % toluene, 30 % xylene, 40 % acetone) and -*MII*- (85 % toluene, 15 % benzene), diluted in sunflower oil and administered i.p. in equivalent doses of MAC and 1/2 of MAC, (1 injection/day) for 12 weeks; at the end of this period the animals were sacrificed. According to the concentration of the studied organic solvents in the total amount of administered liquid, the subjects were divided into 5 groups: *Group I* - 1200 mg/kg MI, *Group II* - 600 mg/kg MI, *Group III* - 500 mg/kg MII, *Group IV* - 250 mg/kg MII and *Group V* – control. We assessed certain indicators as: hematocrit, hemoglobin, red, white and platelet cells count and also the examination of the stained peripheral blood film.

Results: combined exposures to organic solvents induced hematological changes (statistically significant), both quantitative and morphological, in all three blood series.

Conclusions: The results of this experimental study point out the noxious effect of certain mixtures of organic solvents on the hematopoietic system. This fact represents a strong reason for us to continue such experimental studies, in order to make possible the extrapolation of the data to human organism.

IDENTIFICATION AND EVALUATION OF WORKPLACE HAZARDS IN CULTURAL INSTITUTIONS OF IASI

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Aim. This study is aimed to perform the identification and evaluation of workplace hazards in three cultural institutions of Iasi: a museum, a theater and a philharmonic orchestra.

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Method. The exposure levels were established for workplaces with various profiles (workshops, orchestra sector, actors rooms, stage, costume storehouse, workshops for restoration of ethnographic pieces, etc). The studied hazards (total and respirable dusts, gases, vapors, noise, air-microflora) have varied depending on the workplace. The methods of hazards quantification were conventional ones: GC, AAS, spectrophotometry, gravimetry, microbiology, sensors analyser.

Results. The measurement results showed exposure levels to occupational hazards which exceed the admissible limits in some workplaces: noise level in the orchestra sector – 104.3 dB(A); wood total dusts in the joiner's workshop – 62.5 mg/m³; formaldehyde in the air of the workshop of textiles ethnographic pieces restoration – 1.25 mg/m³; toluene in the shoemaker workshop – 1007 mg/m³, microbiological charge of the air in the tailor workshop – 5459 UFC/m³).

Conclusions. The employees of the cultural institutions of Iasi are exposed to a hazardous working environment due not only to the presence of the toxic elements, but also to precarious working conditions: old buildings, small rooms without or with poor ventilation and practically non-existent occupational security measures.

POSSIBLE PROTECTIVE EFFECTS OF CERTAIN AMINO ACIDS IN CHRONIC EXPERIMENTAL INTOXICATION WITH 2,4-DICHLOROPHENOXYACETIC ACID (2,4-D)

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The 2,4- D herbicide, which is still widely used on a large scale, has a reduced toxicity in mammals, but its mechanism of toxic action remains unclear. Our study, performed as chronic experiment on male rats, aimed to assess the possible protecting action against the toxic effect of 2,4-D, exerted by certain amino acids - cysteine, methionine and aspartic acid, the last two being ingredients of the drug named Metaspar. All the substances were administered in food; after sacrificing the studied subjects, we performed the evaluation of certain biochemical and hematological indicators.

We found certain significant changes in serum total proteins and urea, of whole blood glutathione and in certain hepatic enzymes. Comparing the results of hematologic indicators, after 90 days of treatment with those of the "recurrence" experiment, we found improvements, especially in hematocrit and hemoglobine, in almost all experimental groups.

Our investigations revealed a possible protective effect of the tested amino acids. This type of research updates the concerns related to the protective nutrients in individuals exposed to chemical hazards.

THE STRESS OF THE UNCERTAINTY OF THE WORKING PLACE (S.U.W.P.): EDUCATION AND HEALTH

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Aim: studies made between 1992-1995 of The Occupational Health Department from The Institute of Public Health in Iași pointed out strong significant statistical relationships between S.U.W.P. and psychiatric, digestive, endocrine, cardiovascular diseases. In 2003, 10 years later, the responsables' for hospitals confirmed a „blow-up” of S.U.W.P. as a risk factor for health and asked for money, medical staff, beds in hospitals by mass-media means.

In Romania, S.U.W.P. is marked by the transition (unknown in the western countries) from the communist to the market economy. . In the same time, adults have the stress of the familial and social status. Besides, young people have the identity conflict and the young coming from orphanages has, in addition, the late consequences of the affective deprivation. These could motivate some projects for people's education and information regarding the relationship between S.U.W.P. and health.

Methods and sample: programs for the ordinary people (depending on age, sex, profession, stress intensity levels) and for medical staff (reinforcement and development of information's concerning S.U.W.P. and health). The monitoring of the S.U.W.P. as indicator of health, the checking up and measuring, if its possible effects of these programs.

Results: the programs could answer to the medical responsables' requests and could mean economy for medicine, beds in hospitals, working time, staff and therefore, money for the government and, more important, health for people.

Conclusions: local or even national programs for education, information and development could be an opportunity for prevention of the consequences of the S.U.W.P. upon health.

PUBLIC EXPOSURE TO NATURAL RADIATION SOURCES IN ROMANIA

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The present paper updates figures for the radiation doses received by the Romanian population from annual exposure due to the natural radiation background.

The main natural sources of ionizing radiation under review are: naturally occurring radionuclides, taken up in the human body through ingestion and inhalation (radon and thoron progeny) – as internal radiation sources, and, cosmic rays, and terrestrial gamma-radionuclides – as external radiation sources.

The methods used for dose estimation were specific to each type of radiation source and exposure pathway. Internal exposure through ingestion of long-lived natural radionuclides in food and water has been evaluated from the natural radioactive content of diet using sensitive radiochemical methods and also multi-channel gamma-

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spectrometry. Internal exposure due to inhalation of ^{222}Rn and ^{220}Rn daughters in indoor and outdoor air has been estimated from their individual concentration, measured by the active method of sucking air through filter and counting the deposited activity with an alpha-scintillation counter. Exposure to cosmic radiation was calculated as a function of latitude and altitude. Exposure from gamma-terrestrial radiation was derived from the average activity concentration of ^{238}U , ^{232}Th , and ^{40}K in soil measured by high-resolution gamma-spectrometry techniques and the resulting absorbed dose rate in air.

The dosimetric coefficients used in estimations are those published in UNSCEAR – 2000 Report and the ICRP Publications and an indoor occupancy factor of 0.75 and an outdoor occupancy factor of 0.25 were used in all calculations.

The new value for the annual effective dose per capita resulted from natural radiation background in Romania is 2.51 mSv, with a corresponding annual collective effective dose of 67,613 manSv.

The present estimate of the annual total is lower than the previous one by about 20%.

UPDATE OF DIAGNOSTIC MEDICAL RADIATION EXPOSURES IN ROMANIA

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This survey represents a review of radiation doses received by patients from medical and dental X-ray examinations and *in vivo* diagnostic nuclear medicine procedures, focused on the year 2000.

Effective doses from diagnostic radiology were estimated for adult and pediatric patients undergoing 20 most important types of conventional X-ray examinations. Data were collected from 48 X-ray departments, selected by their annual workload, throughout the country. Estimates were made using two kinds of dosimetric quantities: entrance surface dose, derived from the absorbed dose air measured by simulation of X-ray examinations and, dose-area product measured during X-ray examinations of paediatric patients and “complete” examinations, involving fluoroscopy, of adult patients. In all estimations, the appropriate conversion coefficients calculated by the NRPB for six mathematical phantoms representing the adult and 0, 1, 5, 10, 15 year old children were used.

Effective doses to patients from *in vivo* diagnostic nuclear medicine procedures were derived from the average activities of administered radionuclides, multiplied by the appropriate dose conversion factors provided by the ICRP. Data were collected from 16 nuclear medicine units deserving more than one third of Romanian population.

The patient-weighted mean effective dose from X-ray examinations performed annually in Romania is 1.20 mSv, with 1.26 mSv for the average adult patient and 0.74 mSv for the average paediatric patient. The annual collective effective dose is 12,495 manSv, with the main contribution belonging to adult patients (93%). The annual effective dose per capita is 0.55mSv.

THE SECOND ROMANIAN-GERMAN SYMPOSIUM ON OCCUPATIONAL MEDICINE

The annual effective dose per average patient undergoing diagnostic nuclear medicine procedures is 12.7 mSv, the annual collective effective dose is 910 manSv and 0.04 mSv represents the annual effective dose per capita.

The total annual collective effective dose from diagnostic medical exposures in Romania is 13,405 manSv, with the corresponding annual effective dose per capita of 0.59 mSv.

The current estimate of patient exposure from diagnostic use of ionizing radiation is lower than the previous one by 11 %.

ASSESSMENT OF URINARY NICOTINE METABOLITES IN TEENAGERS

Gabriela Mancaș, Marieta Vasilov, Oana Barna, Iliana Palamaru. Gabriela Albu, Roxana Alexandrescu

Institute of Public Health Iași, Romania

According to WHO, tobacco smoking habit of children and young people generates higher risk for complications of upper respiratory airways infections and an important respiratory insufficiency. On the other hand, passive smoking was classified in the list of potential carcinogenic agents by US Environmental Protection Agency (USEPA, 1993). The survey of behavioral pattern with risk in teenagers has indicated an increase of smoker prevalence with 2 % per year, over the last decade in our country. The knowledge of smoking frequency, among other behaviors with risk represents one of the topics investigated by our specialists in the recent years, in studies on teenagers samples from different schools in Iasi (Romania). The results of the studies carried out in 2000-2002 period on a sample of 837 school children aged 15-22 years, have revealed a smoking frequency of 42.6 % and a poor information about the associated risks. The most frequently mentioned smoking start-age declared by the investigated subjects was 14-15 years for boys and 16-17 years for girls. The most used method for smoking exposure estimation is based on questionnaire, despite the biases by: underestimation of exposure, differences in nicotine content and not taking into account the depth of tobacco smoke inhalation. That is why, more objective methods – accurate, relatively cheap biochemical measurement of some exposure bioindicators in biological samples are used in the recent years in order to quantify the organism impregnation as a smoking consequence. In this context, our study aimed: 1 - to investigate the relationship between tobacco smoke exposure (assessed by questionnaire) and the urinary nicotine metabolite levels in teenagers; 2 - to validate the method using the questionnaire versus exposure bioindicators levels. A sample of 296 teenagers aged 15-20 years was randomly selected in three high schools from Iași, Galati and Bacau towns from Romania. An adequate questionnaire (validated by a pilot study) regarding the smoking status was used. At the same time, urine specimen were sampled for measurement of cotinine levels, the major nicotine metabolite, and thiocyanate levels, another bioindicator of smoking exposure. A smoker frequency of 40 % among the investigated teenagers was self-reported, ranging from 38 % in the subjects aged 15-17 years to 50 % in those aged 19-20

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years. Only 22 % of them were self-reported unexposed nonsmokers and 37.6 % - passive smokers. An increasing trend was found for the urinary cotinine levels according to the duration of exposure through smoking only for those teenagers self-reported to smoke daily 5-10 cigarettes. Regarding the smoking intensity (number of cigarettes smoked daily), an increasing trend was established for cotinine levels, with statistical significant differences between different smoker categories. The urinary thiocyanate levels didn't correlate with the smoking intensity. The validation of self-reported smoker status (assessed by questionnaire) in comparison with the urinary cotinine levels has indicated a sensitivity of 0.92 (7.5 % false negatives) and a specificity of 0.49 (0.51 % false positives). The findings of our study have highlighted a linear positive correlation between the urinary cotinine levels and the number of cigarettes smoked daily and, partially, with the duration of smoking exposure of teenagers. The urinary cotinine levels, as exposure bioindicator, were proved to be an useful tool in order to measure the organism impregnation, as smoking consequence, in the estimation of exposure associated with this behavior with risk. The techniques of questionnaire validation have indicated that is a sensitive but less specific method for exposure assessment compared to urinary cotinine level.

Session V: SPECIALS

Chairpersons:

Prof. Dr. Alexandru Dienes

Dr. ing. Brigitte Scutaru, senior researcher

GAMMA-HEXACHLOROCYCLOHEXANE CONCENTRATION IN DIFFERENT TISSUES – AN EXPERIMENTAL ANIMAL STUDY

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Introduction: Hexachlorocyclohexane (HCH) is an aromatic hydrocarbon. Technical HCH contains gamma-HCH in concentrations from 8 to 15%. In Germany gamma isomer is named Lindan, for medical purpose Jacutin, Kwell, Quellada, for technical use Streunex, Biltex, Hexachlor etc. Lindan is used as widespread insecticide. Exposure to pure gamma-HCH may be given by contaminated textile, leather or by its application in medical treatments such as are delousing, killing damaging insects or by handling tools or materials used herewith.

Aim: The aim of the presented investigation was, to get results on the accumulation of gamma-HCH in different tissues of animals.

Materials and methods: Mini pigs, weight of 8 kg, were investigated. There was no

other exposure to other chemical hazards in the environment. Over a period of 3 to 30 days they got a daily oral cutaneous intake of 7.5 to 25 ml of *Jacutin* (dose of 450 mg gamma-HCH [Jacutin/Hermal]). After treatment the animals were killed and samples of different tissues were taken for gas chromatographic analysis.

Results: Gamma-HCH showed a high concentration in fatty tissue while were low concentrations in muscular tissue, myocard and kidney. The concentration in brain tissue was little higher than muscles while an accumulation was observed in peripheral nervous structures and in bone marrow. After an unexposed period of 120 days the HCH concentration in the analysed organs was found just as low as at the beginning of the experiments.

Discussion: For unexposed persons the maximum allowable concentration is 3 µg/l. According to probably exposed persons handling Lindan, a maximum concentration of 188µg/l gamma-HCH in blood serum was published. But there is no study which shows clear data about the accumulation of gamma-HCH in different tissues. The only one study in Germany is made about the accumulation of gamma-HCH in sea food. While there were some cases to be discussed by expert opinions for the toxic effects of Lindan before the background of occupational disease, the observed data have to be discussed carefully.

ASSESSMENT OF CHRONIC EFFECTS IN OCCUPATIONAL CUMULATIVE EXPOSURE

Irina Anca Popescu, Brigitte Scutaru, Felicia Grădinariu, Valeria Hurduc, Iulia Roman, Mirela Ghițescu

Institute of Public Health Iași, Romania

The study aimed to detect chronic effects in workers occupational exposed to heavy metals (Cr, Cd, Ni) and organic solvents.

We investigated 84 subjects from three departments of plating industry (average of length of exposure 15.57±5.10 years) and 49 matched-controls by clinical, paraclinical, biological exposure and effect indices, specialty exams. The individual levels of noxious were under the maximum allowable concentrations (MAC), but with global toxicity index over 1. There was an increased frequencies ($p<0.001$) of respiratory and renal (B2MG-U) effects, of the oxidative stress indices (serum lipoperoxides) and chromosome aberrations in exposed compared to controls. We found also contact dermatitis (at 12.5%-group I; 4.34%-group II), hypertension (30.6%-group I; 26.08%-groupII; 3/13-group III); chronic gastritis (2.1%-group I; 4.3%-group II; 2/13-group III); hyperlipidemic syndrome ($p<0,001$); liver cell injury and thrombocytopenia ($p<0,005$).

Cumulative exposure causes significantly increased frequencies of chronic effects, in different and associated clinical aspects at the same subject, at over 15 years length of exposure, except chromosome aberrations. A careful and continuously surveillance of workers` health status is required.

ABSTRACTS

THE FREQUENCY OF INDIVIDUAL ACCUSES RELATED TO SOME PSYCHOLOGICAL DIMENSIONS

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Aim: to establish the relationships between subjective accuses and temperamental (emotionality - E, activity - A, belated reactions - BR), motivational (learned helplessness - LH, speed of choice - SC, intrinsic motivation - IM) dimensions and resistance to psychosocial stress (sense of coherence - SOC).

Material and methods: in a group of 239 employees from a food factory, we tried to find the relationship with the psychological dimensions, the subjective accuses from different segments of the body and organic systems. To establish the relationships between the frequency of accuses and psychological dimensions, was used the multiple regression analysis, taking into account the regression coefficients with a p-level < .05.

Results and dsicussions: Were obtained significant regression coefficients ranging from .13 to .78 between different symptoms and psychological dimensions.

Number of significant regression coefficients

<i>Accuses</i>	<i>E</i>	<i>A</i>	<i>BR</i>	<i>LH</i>	<i>SC</i>	<i>IM</i>	<i>SOC</i>
Face		1			1	2	7
Head	1	2			2	1	6
Hair	1	2		1			4
Eyes	1	2	1		3	1	10
Nose		1	1				
Mouth	1	6		2		1	5
Ear	3	1	2				4
Neck		2		2			1
Hands	3	2					7
Nails	1			1			
Skin	4	4	1	1	1	1	3
Legs	1	3		1	1		2
Back		2	1	1			2
Joints	4	1					2
Digestive	4	6	2	2	3	3	4
Neuroveget.	1	2	1	3	2		2
Circulatory	2	1		1	3	1	2
Endocrine	2	2			2	2	2
Excretory	2	3			1		2
Respiratory	3	3	4	3	3	3	2
Genital	1		2		1	1	2

The emotionality influences especially the accusers at the level of skin, joints and digestive. The reduced activity has an influence especially on the accusers at the level of mouth, digestive and skin. The belated reactions influences especially the respiratory accusers. The reduced resistance to psychosocial stress is associated with the majority groups of accusers, but especially with those at the level of eyes, hands, head and digestives.

Conclusions: Knowing the significant relationships between the subjective accusers and psychological dimensions, it could be promoted some educative programs to reduce the influences of psychological dimensions, thus influencing the frequency of subjective accusers and consequently, the improvement of subjective wellness.

BIOLOGICAL MARKERS IN INVASIVE BREAST CARCINOMA

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Introduction: immunohistochemistry has become an important tool for an adequate pathological report of breast carcinomas and also for prognostic and predictive evaluation.

Aims: to investigate correlation between ER, PR, pS2, c-erbB2, von Willebrand Factor, PCNA immunostaining and Elston & Ellis and nuclear Fischer score with mitosis counting; based on this correlation to initiate/establish an alternative scoring system for assessing the biological status.

Materials and methods: immunohistochemical staining (DAKO, LSAB2 System with 3,3' Diaminobenzidine vizualization) of ER, PR, pS2, c-erbB2, von Willebrand Factor,

PCNA in 119 invasive breast carcinomas was semi-quantitatively assessed. Correlation coefficients were calculated according to Kruskal-Wallis H test (equivalent to Chi square) and a P value <0.05 was considered to be significant.

Discussion and conclusions: the highest expression was correlate with low proliferation index and 5,6,7 Elston & Ellis score. These results oriented toward hormonal therapy, or depending on lymph nodes status, von Willebrand Factor and c-erbB2 semiquantitative assessment, to chemotherapy. In the 8,9 Elston & Ellis score group, ER and PR were positive only in 20%. The high proliferative index (80-85% positive tumoral cells) and

c-erbB2 positive feature (3+) suggested the need of a more aggressive chemotherapy regimen. PS2 protein provided valuable information concerning hormonal receptor's functionality. That the alternative scoring system we proposed provided us the possibility of estimating a biological status score value of maximum 14 (long disease free interval) and a minimum 4-5 (high risk of recurrence, potential of metastatic spread).

ABSTRACTS

Workshop MEET THE EXPERT/CASE STUDY PRESENTATION

BLADDER CARCINOMA DUE TO POLYCYCLIC AROMATIC HYDROCARBONS

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Anamnesis: A 60 year old male patient, motor cycle accident with head fracture in 1959. In 1990 he had a stomach operation because of perforated ulcer, since that time without recidivation. In 1991, 1993 and 1998 he had polyps of colon and rectum operation, in 1993 he had acute pancreatitis, in 1996 implantation of femoro-iliacal stent. Spine problems started since several years.

Acute anamnesis: 1998 blood in urine testing. Patient said, that he recognized that also in 1997, but did not mention. The ultrasonic testing showed a 2.5 cm tumour of the bladder. In 2/1998 transurethrale resection of the tumour was performed. The histological examination revealed a papillary urethrale carcinoma; as far as in 3/2002 resection of at least 10 relapses have been made. In 4/2002 total resection of the bladder and the pelvic lymphatic nodes and implantation of an artificial bladder exit by ileum conduit. The separation of the resected tissue also revealed a prostatic carcinoma. In 1999 the patient had a spontaneous cough with sanguinolent sputum. The operation with bilobectomy of the right lung showed a high differentiated carcinoma of the bronchus.

Occupational biography: In 1958 training as getter. In 1960 work as butcher. During 1961–11/1999 railway worker; his duty was the installation of new railway sleepers. While old ones had to be removed, the new ones were painted with coal-tar. In summertime there was a strong smell of the paint and the hands were contaminated by the coal-tar while painting the sleepers. There were no skin or respiratory protective measures. The investigation done by the technical department of the responsible Industrial Injuries Insurance Institute (Gewerbliche Berufsgenossenschaft) revealed, that over the total period of 38 years, the worker has been exposed to coal-tar, consisting of different hydrocarbons; the most important content were polycyclic aromatic hydrocarbons as benzo(a)pyrene and beta-naphthylamine.

Result: The worker was exposed to benzo(a)pyrene, and beta-naphthylamine. The exposure to benzo(a)pyrene has not been quantified; but it was estimated, that the concentration would had been below the analytic detection limit. On the other hand the exposure to beta-naphthylamine was regarded as a causative factor for bladder carcinoma. The Industrial Injuries Insurance Institute accepted this fact. The exposure to benzo(a)pyren and the induction of lung cancer will be subject of another expert opinion.

LARYNGEAL CARCINOMA IN OCCUPATIONAL EXPOSURE TO HEAVY METALS

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A 51 year old man presented at Clinics of Occupational Diseases Iasi for dysphonia, laryngeal smarting pain, lost weight (over 20 kilos in 18 months), cough and purulent expectoration, asthenia, legs paraesthesia. He was platter with a 22 year history of occupational cumulative exposure to heavy metals (Cr, Ni, Zn, Cd) and solvents (butyl acetate, white spirit), acids (hydrochloric, sulphuric). The individual level for each metal often exceeded the maximal allowable concentrations (MAC). For 17 years he had no subjective symptoms and medical examinations (hiring and periodical) were normal. In the next year he was diagnosed with chronic laryngitis, after 2 years with laryngeal cyst and another 2 years later was operated for laryngeal carcinoma (epidermoid type) and had chemotherapy. He smoked 40 years 20 cigarettes/day. Clinical and laryngoscopic examination showed a larynx infiltrate/relapse. Other investigations showed: pulmonary emphysema, Klebsiella pneumoniae in sputum, hyperlipemia, sensorial polyneuropathy and bulbar ulcer. The treatment during hospitalization consisted of antibiotics (for acute bronchitis), vasodilators, vitamins, hypolipemiants, physiotherapeutics.

Clinical evolution was unfavorable, even the occupational exposure was stopped. Medical recommendations were for an urgent admission to a specialist for adequate and complete treatment, smoking cessation, evaluation by territorial expertise commission to decide upon the working capacity. The particularity of this case was the diagnosis of a chronic laryngitis after 17 years of exposure to heavy metals, at a periodical medical exam. Further on exposure in the same workplace had a bad clinical influence, the worker being diagnosed after another 4 years with laryngeal carcinoma. The association between occupational exposure and laryngeal cancer was established long time (3 years) after he was first diagnosed. At that time, the platter was unemployed and he had no occupational medicine monitoring for 2 years.

This case was not confirmed as occupational disease because the illness was emphasized while the worker was unemployed and for this reason he was less compliant.