

**THE FIFTH ROMANIAN-GERMAN SYMPOSIUM ON
OCCUPATIONAL MEDICINE**

Between the 17th and 20th of October 2007 in Iasi was held the Fifth Romanian-German Symposium on Occupational Medicine, organised by:

- THE INSTITUTE OF PUBLIC HEALTH IASI, ROMANIA
- THE INSTITUTE OF OCCUPATIONAL MEDICINE, CHARITÉ – UNIVERSITÄTSMEDIZIN BERLIN OF THE FREIE UNIVERSITÄT BERLIN & HUMBOLDT-UNIVERSITÄT ZU BERLIN, GERMANY
- THE ROMANIAN LITERATURE MUSEUM IASI

TOPICS:

1. Occupational related acoustic health effects, protective measures and risk assessment
2. Health care workers, stress and strain
3. Evaluation of cumulative work load
4. Physical load and ergonomic aspects
5. Adverse health effects of working compounds
6. Normal values in occupational health, reality or illusion
7. Electromagnetic field influence on health in working areas

ROUND TABLE 1:

**OCCUPATIONAL HEALTH SERVICES IN EU MEMBER STATES –
NATIONAL AND INTERNATIONAL ASPECTS**

Moderators:

Prof. Dr. med. Gustav Schäcke

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Dr. Doina Popa, senior researcher

Institute of Public Health Iasi, Romania

ROUND TABLE 2:

**ELECTROMAGNETIC FIELDS EXPOSURE: MEASUREMENT TECHNIQUES,
BIOLOGICAL EFFECTS, HEALTH IMPACT**

Moderators:

Dr. Răsvan Dănulescu, senior researcher

Dr. fiz. Cristian Goiceanu

Institute of Public Health Iasi, Romania

WORKSHOP I: *Visit of Industrial Unit*

WORKSHOP II: *Occupational Health Risk Evaluation of the Visited Workplaces*

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 DISEASES IN THE EUROPEAN UNION - NATIONAL DIFFERENCES

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The total member states of the European Union with a total population of 463.6 m inhabitants include 64.7% (2006).

In consideration of occupational diseases there are no general regulations in the area of the European Union. Each member state follows its own national legislation. For compensation it may be possible to follow several recommendations, if there are no ordinances. Comparing supranational lists of occupational diseases the principle of the lowest common denominator. This method is not acceptable in the field of occupational health medical sciences worldwide. A proposal to run out of this sociomedical gap will be presented.

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HEALTH CARE WORKERS, STRESS AND STRAIN

Chairpersons:

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WHAT DOES SECURITY AND HEALTH MEAN IN HOSPITALS AND INSTITUTES OF MEDICAL AND SOCIAL ASSISTANCE

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Problem definition:

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- 1) Finding the causes of accidents and diseases which are not connected to the medical act.
- 2) Finding an acceptable definition for the incidents, accidents and diseases appeared during patients' stay in hospital and in medical and social institutes.

Material and methods:

- 1) The authors have analyzed the statistical reports of 5 hospitals and 2 institutes of medical and social assistance concerning the cause of death and secondary diagnoses of patients at the moment of their release from hospital (ICD 9 and 10 codification).
- 2) The authors have analyzed the death certificate of patients who deceased in hospital and institutes of medical and social assistance and the treatment-cards of patients released from hospital.

Findings:

- 1) In more than 56% of the cases it is not specified how and why the secondary pathology appeared (accident, nosocomial infection or a complication as a result of the evolution of the basic disease).
- 2) In 32% of the cases the secondary pathology was not codified correctly.
- 3) In 12% of the cases they specified "other accompanying diseases", without any codification.

The authors have found that in the hospitals and institutes where our statistical and epidemiological study has been done, the secondary diseases that appeared during hospitalization were not analyzed and correctly registered, so it is not possible to evaluate the risks that are at the basis of these diseases. This is why it is not possible to take any legal and concretely targeted measures to prevent the incidence and prevalence of these affections.

The authors propose that the diseases appearing during hospitalization to be named IATROGENIC and the ones caused by infections or infestation through diagnosing and treatment activities, NOSOCOMIAL INFECTIONS.

Conclusions:

The authors have studied the secondary diseases written in the patients' medical documents and statistical reports of 5 hospitals and 2 institutes of medical and social assistance. They have found that most of these diseases were not written and codified correctly (according to ICD9 and ICD10). This fact is mostly due to the lack of knowledge but also to an unclear law concerning the way of registering diseases that appear during hospital stay. The authors have some proposals how to improve the actual law and to increase the responsibility of hospital managers in laying down some registration rules for these cases.

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DATA CONCERNING THE USE OF A COMPUTER AIDED PERSONAL INTERVIEWER IN HOME HEALTH CARE SERVICES

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Introduction: The home caring industry in Germany expanded very fast in the last years, a fact which raised questions concerning the workplaces. A new regulation concerning the work time was approved, in which the home caring personnel can work in 12 hours shifts, in order to reduce emotional stress at the patients and their family. However this puts the occupational medicine physician in a difficult position to assess the possible risks for these personnel.

Method: We interviewed in the last year 64 persons working in the home care from two different home care institutions. The questioning method was a computer assisted personnel interviewer (CAPI). The questionnaire contains circa 180 questions grouped in different chapters and also linked in a father-son relation meaning that some of these questions are only asked if the interviewed person gives a specific answer to a previous question. This makes it possible to reduce the questionnaire, without losing any information and to cut some time. After interviewing 40 persons we started to log the time taken to answer the question. This is important if we want to see which questions are hard to understand, and also to give an idea how long it takes to answer the questionnaire.

Results: The overwhelming majority of the interviewed persons are females, 53. The mean age is 36 with an age span from 20 to 59 years. The time span for answering the whole questionnaire varies from 24 minutes and 55 minutes. The relatively big time span is derived mainly from the possibility of the software to skip or show blocks of questions (for the individual persons). From these figures we can conclude that this questioning method has a big potential over a classical paper & pen questioning (no possibility to skip irrelevant questions). Another big advantage consists in the person to person contact, where the physicians plays the role of the interviewer, and can explain the question if there are understanding issues.

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ABSTRACTS

PLASMA CYTOKINES AND MONONUCLEAR CELL CYTOKINE SECRETION IN HEALTH-CARE WORKERS IN CLOSE CONTACT WITH TUBERCULOSIS PATIENTS

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Aim: In order to detect reliable markers indicating protection from or susceptibility to tuberculosis infection, we investigated six cytokine levels (IL-2, IFN γ , TNF α , IL-4, IL-5, IL-10) in plasma and supernatants of peripheral blood mononuclear cells (PBMC) stimulated with PPD for 7 days.

Material and method: The study groups have included 15 health care workers in close contact with TB patients, patients with active pulmonary tuberculosis at diagnosis and after treatment (12 advanced and 10 moderate TB, of which 6 had also pleurisy) and 20 healthy volunteers. The cytokines were simultaneously quantified by cytometric bead array (CBA) using a FACSCalibur flow-cytometer and the CellQuest software.

Results: Plasma and pleural fluid cytokine analysis at the outset of tuberculosis disease reflect the same Th1 response dominated by IFN γ . In opposition, very low IFN γ levels were recorded in neoplastic pleural fluids. Both types of cytokines (Th1 and Th2) were secreted in response to *in vitro* PPD stimulation of PBMCs and had different evolution in moderate and advanced TB. Thus, IFN γ , TNF α , IL-4, and IL5 production after 6 months-treatment decreased in moderate TB and increased in severe disease ($p < 0.05$). The highest concentration of IFN γ was measured in culture supernatants of occupationally exposed people and the lowest in advanced TB at the end of the treatment ($p = 0.03$).

Conclusions: Further studies are needed to understand the complex interaction between pro- and anti-inflammatory cytokines that might play an important role in the development of tuberculosis.

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**HEALTH SURVEILLANCE IN IONIZING RADIATION EXPOSURE FROM
NUCLEAR AND INTERVENTIONAL DIAGNOSTIC PRACTICES**

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Aim: Health status follow-up of medical staff from nuclear medicine and special X-ray examination (urology) - as procedures that constitute sources of ionizing radiation associated with relatively high exposure doses

Materials/method: 11 subjects (9.1% smokers) exposed to gamma emitters (^{99m}Tc , ^{131}I) and other 13 (61.5% females, 15.4% smokers) to X-rays, with mean exposure length of 19 ± 8.5 years respectively 7.9 ± 2.1 years, underwent physical examination, hematological and specialty exams, blood oxidative markers (whole blood SOD activity and serum lipoperoxides). External exposure was monitored by individual dosimetry.

Results: In clinical and specialty exams were diagnosed 11.7% allergic rhinitis and 8.8% occupational contact dermatitis at workers from radiopharmaceuticals preparation use, positively correlated with high blood eosinophils levels, $p<0.05$. At 16.6% subjects from ^{131}I exposure were monitored an occupational thyroidal pathology. As hematological effect 20.5% subjects had a high reticulocytes level in response to a past acute radiation dose. Other 14.7% medical workers had lymphopenia significant correlated with long-term exposure to gamma rays, $p<0.01$. Although individual dosimetry did not exceeded allowable limits, chronic exposure to X and gamma rays increased the blood SOD activity in 12.5% over 12 years exposed subjects. Also, it was associated with high lipoperoxides level at 45.8% cases with workload and acute dose, showing that the impairment of oxidant capacity might be related to the radiation-induced lesions. Serum oxidative markers correlated inversely with smoking habit, $p<0.01$.

Conclusions: Nuclear and interventional practices have a greater contribution to the exposure of staff involved as compared to other medical uses of radiation. Hematological and oxidative status changes vs. clinical diagnostic could reveal early signs of radiation carcinogenesis. Continuously specific radiological protection measures (replacement of old facilities, radiological protection and quality assurance programs) and bioassays are required. The annual effective dose to monitored workers involved in nuclear and interventional practices shall be estimated in future studies.

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ABSTRACTS

OCCUPATIONAL STRESS – RESPIRATORY AND BIOLOGICAL RESPONSES IN MAGISTRACY WORKERS

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Aims: We try to reveal stress aspects in two groups of magistracy employees, by means of spirometry and sputum examination.

Material and methods: 96 (57 female) magistracy employees were investigated. Averaged values of the investigated group were for age: 42.8 ± 14 years; for total work length: 22 ± 12 years; for actual work length: 13 ± 8 years. Group A: 49 prosecutors (26 females). Group B 47 registrars: (31 females). Spirometry data were evaluated. Sputum examination was also effectuated.

Results: Group A: 24.5% obstructive manifestation. Group B: 23.4 % obstructive manifestation. Sputum examinations reveal no differences and modification.

Conclusion: The spirometry data reveal the role of this kind of investigation in occupational stress, taking account by the other factors as irritation, allergies, noted in the magistracy activity.

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NORMAL VALUES IN OCCUPATIONAL HEALTH, REALITY OR ILLUSION

Chairpersons:

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THE “BIOLOGICAL LIMIT VALUES” IN OCCUPATIONAL HEALTH SURVEILLANCE PRACTICE IN 2007

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General Statement: Under the “**Proposal for a Regulation of the European Parliament and of the Council on Community statistics on public health and health and safety at work**” no.11874/2007, a *case of occupational disease is defined as a case recognised by the national authorities responsible for recognition of occupational diseases*. The data shall be collected for incident occupational diseases

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and deaths due to occupational disease. A case of work-related health problem and illness does not necessarily refer to recognition by an authority and the related data shall be collected mainly from **existing** population surveys.

The legal requirements for surveillance of occupational health are a reality in this moment and the main framework is represented by GD 1218/2006 and the GD 355/2007.

The main list is consisting of 52 chemical substances with biological indicators and biological limit values. This biological surveillance represents a legal obligation for occupational medicine services involve in workers' health surveillance. Most of all, occupational disease diagnosis can not be sustain without a monitoring biological indicators which must be over the normal limit value.

Material and method: In the Authority of Public Health – office for occupational diseases surveillance there are two data bases. One for occupational diseases incidence in the last 15 years and second, some indicators from occupational health surveillance practice in the region. We made an assessment of the statistical methodology.

Results and discussion: Under a statistical research we discover that only 2 famous private occupational health medical services from Bucharest made a bio monitoring of 63 workers under their surveillance in the first half of 2007 and only 337 blood and urinary samples were done in Toxicology Laboratory from Authority of Public Health B in the same period. These samples were link with occupational exposure to solvents and lead and recommendations of the authority responsible for workers health was to improve the working conditions, protection equipment and fulfil the medical surveillance with all other necessary preclinical exams and analysis for a diagnosis. There was no feedback from the employers, employees or occupational health services.

Under this framework, without any other analysis the number of occupational intoxications decreased from 6 cases in 2002 to 1 case in 2006 and none cases in 2007.

In conclusion, we truly believe that is needed a **guideline for collecting data** from workers' health survey mainly consist of bio monitoring of exposure to chemical substances.

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ABSTRACTS

RESEARCH IN PROGRESS: USE OF THE MICRONUCLEUS ASSAY ON EXFOLIATED EPITHELIAL CELLS AS A BIOMARKER OF GENETIC DAMAGE

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The paper is aimed to present a review on the state of art of micronucleus assay in human exfoliated buccal mucosa cells including the experience of our laboratory on the background of the international experience built on the collaborative research of HUMN international project.

Over the last ten years, the number of laboratories working with MN in exfoliated cells has substantially increased. Many research groups are interested in exfoliated cells because these cells hold strong potential as a tool for biomonitoring human populations exposed to genotoxic agents or undergoing preventive treatments.

That is why, in order to validate the MN assay and to establish a standard protocol for all steps (biological material collecting, laboratory technique, diagnose, interpretation and data processing), an international team of specialists launched in 1997 a long-term and world-wide collaboration activity known as HUMN (Human MicroNucleus) – The International Collaborative Project on Micronucleus Frequency in Human Populations.

At the present moment, as (from our knowledge) the only Romanian laboratory that currently has been using this technique since 2004 until now, we are entitled to present the following achievements on this issue: accumulation of a broad and up-to-date database concerning the experience on this topic, on international level; implementation of a standard procedure in collecting, processing, evaluating and diagnosing the samples; current application of the MN assay on epithelial exfoliated cells on certain groups occupationally exposed to respiratory hazards: mineral powders, organic solvents, ionizing radiation, asbestos, cumulative exposures.

As the intention of the HUMN project is to provide a clear directive on the most appropriate procedure for preparation of slides and visual scoring of buccal cells for MN and other nuclear anomalies, we therefore declare our intention for the future to collaborate with the team of the international HUMN project and to join it in accomplishing its generous goals:

1. Collect and summarize data on exfoliated cells from different specific exposed groups
2. Standardize protocols
3. Analyze possible sources of variability in the results
4. Establish correlations between MN frequency in exfoliated cells and cancer risk for both site-specific cancers and general cancer incidence
5. Conduct a parallel study of the MN frequency in exfoliated cells and lymphocytes in the same subjects in order to obtain additional information on the predictive value of MN as a biomarker.

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SOLVENTS INDUCED ALTERATIONS IN BIOMARKERS OF EXPOSURE AND EFFECT IN SHOE-MANUFACTURERS

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Introduction: Shoe manufacturing is a traditional industry in Iasi County. Footwear-workers are routinely exposed to complex mixtures of solvents in degreasers, cleaners and adhesives used in the production process and possibly to dust particles, additives in shoe materials and degradation products of materials. Exposure to organic solvents has been reported to increase the risks for acute and chronic health effects. Researches have shown that workers employed in footwear manufacture are at increased risk of some cancers, the strongest evidence being for nasal cancer and leukemia.

Aim: The objective of the present study was to assess the occupational risk by biological monitoring of exposure to solvents and to make some observations regarding the reliability of biological exposure limits in the case of solvents co-exposure.

Material and method: 60 workers (mean age: 35.3±9.3 years, mean exposure length in shoe manufacturing: 10.5±9.2 years), including 11 men, and a matched control group (74 subjects) were examined in a cross-sectional study. Personal interviews containing questions related to personal protective equipment were used to identify working conditions. Exposure to organic solvents was evaluated through breathing zone air sampling using a Draeger - tube system. Post-shift urine samples were collected and analyzed for five exposure biomarkers: acetone, hippuric and methylhippuric acid, total phenols and sulphate index. The micronucleus frequency in oral mucosa exfoliated cells was used as a biomarker of early biological effect. The results were statistically analyzed through usual methods (χ^2 -test, Pearson's correlation coefficient).

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Results and discussions: The results from the air samples analyses show 12 different organic compounds existing in the workplace. Four major solvents were quantified in the workshops: ethyl acetate (730 mg/m^3), acetone (240 mg/m^3), xylene (66 mg/m^3) and toluene (4 mg/m^3). Excepting ethyl acetate, exposure intensity did not exceed the current threshold limit values. Other solvents coexposed included n-pentane, methyl ethyl ketone, cyclohexane and n-hexane. In 65.6 % of urine samples from exposed subjects at least one of the biological exposure limit for the five exposure biomarkers was exceeded compared with 13.6 % in controls ($p < 0.001$). The difference between frequency of abnormal values of exposure biomarkers in shoe-manufacturers and controls was statistically significant only with respect to methylhippuric acid (18 % vs. 4%, $p < 0.05$) and sulphate index (34 % vs. 9 %, $p < 0.001$). The values for sulphate index in exposed group correlated negatively, significantly statistic, with the length of work in shoe industry ($r = -0.52$, $p < 0.01$). Taking into account the workplace air measurements, we expected a higher frequency of enhanced urinary acetone. But, in accordance with the results of other investigations, blood concentrations of solvents after the exposure to a mixture were generally higher in aromatics and lower in acetone than after exposure to individual solvents.

Concerning the potential genotoxic risk represented by the exposure to above mentioned compounds, micronuclei in oral mucosa exfoliated cells were more frequent in exposed as compared with controls (25 % vs. 2.2 %, $p < 0.001$).

This study points out the existence of inadequate ventilation in the workplaces and inappropriate personal protective equipment. The workers in the workshops had never used respiratory protective equipment, had never worn gloves, and had occasionally used work clothes.

Conclusions: In the investigated shoe manufacturing workshops there are operations where the solvent exposure is considerable and represents a health hazard to the workers. These operations are mainly gluing, waxing and polishing. Exposures to solvents in the absence of personal protective equipment, tasks barriers, and mechanical ventilation can adversely affect health. Substantially protracted late phases of desaturation of aromatic solvents in the presence of slowly eliminated polar solvent points to a possible underestimation of exposure by biological exposure tests.

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***PHYSICAL LOAD AND ERGONOMIC ASPECTS/
EVALUATION OF CUMULATIVE WORK LOAD***

Chairpersons:

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**INCREASE OF THE STATUTORY RETIREMENT AGE AND MANPOWER
CHANGE**

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The retirement age varies from country to country but it is generally between 55 and 70. In some countries this age is different for male and females. Due to some professional activities some groups have sometimes certain jobs, the most dangerous or fatiguing ones in particular, have an **earlier or later retirement age**.

However, since the age at which retirement is mandated is often somewhat arbitrary and not based upon an actual physical evaluation of an individual person.

Discussing an increase of the statutory retirement age we have to take into consideration:

- Physiological changes,
- Life style habits,
- Diseases,
- Therapeutically consequences.

For those reasons occupational health scientists have to scrutinize the potential consequences before health relevant decisions are made.

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**SELF-ADJUSTMENT OF PHYSICAL ACTIVITY FOR THE PREVENTION
OF MUSCULAR COMPLAINTS DURING OFFICE WORK**

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Persons performing office work often report of complaints in the musculoskeletal system in spite of relatively small forces released during the occupational activity.

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Complaints may result from the long-term activation of the muscles needed for the stabilisation of the posture or from repetitive movements of high accuracy applied during the application of the keyboard or computer mouse.

In an investigation on office workers, working conditions, musculoskeletal symptoms, myoelectrical activities, and the work flow was studied. 69 employees of the German tax authority working in the same tax office were involved. A questionnaire regarding the activity of the persons, the used working tools and the spatial arrangement of the equipment was applied to study the working conditions. Musculoskeletal symptoms were investigated using a modified and enlarged version of the 'Nordic Questionnaire'. For a subgroup of 13 employees a detailed workphysiological study was performed. During total working shifts 4 surface electromyograms (EMG) were recorded in the right shoulder/arm region of the subjects. Simultaneously the actual activity of the persons was documented using a classification procedure. Additionally, at four points in time during the day the subjects were asked to indicate occurring actual musculoskeletal complaints.

The questioning reveals that the most frequent activity of the persons is related to computer work, followed by paper work and communication activities such as phoning, speaking, or participating in meetings. About 50% of the subjects indicated complaints for at least 8 days during the last 12 months for the neck and the lower back, and about 40% and 30% for the right or the left shoulder, respectively. In the electromyographical study it was observed that the average EMG amplitude was highest for the shoulder muscles during paper work and for the forearm during keyboard application. Temporal changes in the EMGs were analysed with respect to the EMG amplitude and the frequency spectrum. The previously developed method for 'Joint Analysis of the EMG Spectrum and Amplitude (JASA)' was used to classify the cause for a potential EMG change into the categories 'fatigue', 'recovery', 'force increase' or 'force decrease'. For several persons muscular fatigue – as indicated by a time-related increase in the EMG amplitude and a simultaneous left-shift in the EMG spectrum – was found for the hand extensor muscle during keyboard operation and for the right trapezius muscle during paper work. For the majority of persons an amplitude decrease and a simultaneous spectral left-shift in the course of the working shift was observed. According to the JASA method, such EMG changes indicate a decrease in the force production of the studied muscles during the day.

Further analyses reveal a correlation between EMG changes and the number of actual complaints. In particular, persons with a steeper decrease in the EMG amplitude of the shoulder muscles mentioned a lower number of shoulder complaints during the working day than persons with less change in the EMG amplitude. In summary, it is assumed that lowering of muscular activation during the day may be helpful to prevent muscular complaints. This finding suggests that persons with a low number of complaints perform a self-adjustment of the physical activity aiming for the avoidance of complaints.

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MUSCULOSKELETAL LOAD FOR FLIGHT ATTENDANTS DURING TROLLEY HANDLING ABOARD AIRCRAFT

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Passengers' services are extended into the ascent and descent phases on short and medium-distance flights increasingly in the recent years. For these service operations, trolleys containing the required meal and beverage items are moved along the aisles of the aircraft. Particularly focussing on the lower back, flight attendants report on high physical load and complaints; these findings are mainly ascribed to pushing and pulling of the trolleys during the flight phases combined with an inclined cabin floor. Within an interdisciplinary experimental study, task conditions were recorded aboard aircraft, subjective perception of musculoskeletal load and complaints were examined via questionnaires (592 flight attendants), the working capability and the biometric data of larger samples of German flight attendants were recorded, and typical push-or-pull manoeuvres considering various floor-gradient angles, trolley types and weights were investigated in a specific laboratory set-up with an adjustable walkway. According to the mainly involved body area, one of the study's important aims was to quantify the load on the lumbar spine, to estimate lumbar overload risk, to identify disadvantageous task conditions and - in order to prevent low-back overload for flight attendants - to derive biomechanically substantiated hints for work design.

By observation of trolley handling aboard aircraft and subsequent video analyses, the musculoskeletal loads from moving trolleys on planes were studied. From the on-flight observations on typical task conditions, such as frequency and performance properties during trolley handling performed by a total of 15 female flight attendants on 10 flights in different types of aircraft, about 150 to 250 trolley manoeuvres can be supposed for a typical working shift.

Comprehensive three-dimensional measurements regarding adopted postures and exerted pull-or-push forces were performed in a laboratory set-up. The recorded data served as input measures at subsequent three-dimensional biomechanical model calculations for the prediction of several lumbar-load indicators (compressive and shear forces, bending and torsional moments of force with respect to the lumbosacral disc) for 458 manoeuvres performed by totally 25 selected flight attendants (22 female, 3 male) recruited from 5 German airlines. Owing to guarantee a

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representative sub-sample serving as subjects in the laboratory experiments, airlines' compilations were examined regarding the biometric data of 2,347 flight attendants, and the physical strength of 510 persons was estimated via measurements on the individual force-production capability at MVC level (maximum voluntary contraction).

Measurements and computations reveal that lumbar load varies according to handling mode (pushing, pulling), floor inclination (0°, 2°, 5°, 8°), trolley type (half-, full-size trolley), trolley loading (empty, medium, full) and according to the individual execution technique. For each of the implied 48 task configurations, lumbar load was evaluated with respect to potential biomechanical overload by comparison with work-design recommendations for disc compression and moment of force. Irrespective of floor gradient, trolley mass and individual performance, pushing of small trolleys is combined with acceptable lumbar load, whereas pulling yield to critical load. The latter aspect can be traced back to the considerable amplitudes of the vertical hand-force component superimposing the horizontal force component necessary for motion; in some cases the upward-directed force, applied to avoid tilting of the "short container", was about the force in movement direction. Moving the large trolleys occasionally lead to critical lumbar load, in particular, when heavy containers are pushed or pulled on relatively steep surfaces.

Paired comparisons of manoeuvres resulting in minimum or maximum lumbar-load values despite of identical task configurations, have shown that top-edge grasp positions should be avoided for pulling of half-size trolleys, whereas for the other cases - pushing small containers and pulling/pushing large trolleys -, grasping at the upper edge of the trolley is recommended in order to diminish the biomechanical overload risk for the flight attendants relevantly.

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CERTAIN ASPECTS REGARDING WORKERS HEALTH STATUS IN A MEDIUM-SIZED CIVILIAN BUILDING YARD

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Introduction: Construction industry is known as a **heavy industrial branch** where **noise impact, cold and heat stress, physical work overload, various air dusts** (with possible irritants and/or allergic effects) represent a real and serious occupational hazards. That is why we investigated the health status of workers in a civilian building yard.

Material and methods: The survey was made by a cross-sectional epidemiological study. The investigated group consisted of 57 subjects, with an average age of 36.7 ± 10.6 years and with an average length of service in construction industry of 13.4 ± 11.7 years. They were investigated by a complex protocol, including clinical, biochemical and immunological investigations, EKG, pulmonary functional and audiometric tests. The results were compared to a matched-control group.

Results: Only **12%** of the investigated workers were **healthy**; **88%** had **one or more diseases**.

About **75%** of them revealed **musculoskeletal disorders** with different clinic aspects: Low Back Pain (LBP), sciatica, tendinitis, epicondylitis, synovitis; the prevalence of this symptoms was higher among exposed subjects ($p=0,005$). This pathology can be explained by the heavy physical work of these employees. Most of them work full time, and many work over 40 even 45 hours a week. Construction workers may sometimes work evenings, weekends, and holidays to finish a job or take care of an emergency. They often work with potentially dangerous tools and equipment; some work on temporary scaffolding or at great heights, other ones have to lift and carry heavy objects.

In the second place we found **hearing loss (22.8%)** with different aspects. That can be appear because the construction workers are dashing off to work without properly protecting their hearing, thus unnecessarily placing their hearing at risk. Their work by nature is hard on the hearing. Continuous exposure to buzzing power saws, bulldozers, nail guns and other tools of the trade has resulted in hearing loss among some construction workers a group, which until now, hasn't been the focus of research in hearing loss.

The next frequent encountered diseases were **Irritant Contact Dermatitis (ICD)**, with a percent of **21.1%** of total exposed workers. Almost any material involved in their activity may be a cutaneous irritant with sufficient exposure in time and/or concentration. A corrosive agent causes the immediate death of epidermal cells as manifested by chemical burns and cutaneous ulcers. Solvents are another major cause of cutaneous irritation because they remove essential fats and oils from the skin, which increases transepidermal water loss and renders the skin susceptible to the increased direct toxic effects of other previously well-tolerated cutaneous exposures. Microtrauma also may produce skin irritation. A common example is fiberglass, which may produce pruritus with minimal visible inflammation in susceptible individuals. Skin irritation predisposes the skin to develop sensitization to topical agents. In this step of our study we can't make any allergical test, and IgE value wasn't significant increased, those we can conclude the etiology may be irritant, possibly aggravated by constitutional factors.

On the fourth place were situated the **digestive disorders**, present in **19.2 %** cases. This frequency might be connected partially to stress and also to lifestyle with irregular program of the meals. Work stress, is coming not only from specific duties, responsibilities and relationships or from the working program. It might originate also from noise, bad weather and/ incertitude of workplace.

ABSTRACTS

The **cardiovascular diseases** with a prevalence of **15 %** in the group might be attributed to the work conditions: **heavy work in noise, bad weather** and also to the high ratio of men (87.7 %) and smokers (89.4 %) in the group.

Conclusions: Construction is consistently ranked among the most dangerous industries and accounts for a large percentage of occupational illnesses and injuries. The work conditions and lifestyle are both acting upon the health quality of this category of workers. The most effective solution **to reducing safety and health hazards** on the construction site is a combination of **leadership** and **worker** involvement. Involved **employees** provide input and report the presence of **risk factors** on the site, report **symptoms and injuries**, suggest and design **solutions**. When a disease appears, the key to rapid successful return to health and productivity is **prompt access to health care** for assessment, treatment and follow-up.

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EVALUATION OF THE EFFECTS OF THE EXTENDED HYPERFLEXION POSITION AT TEXTILE WORKERS

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Aim: The correlation of the musculoskeletal hyper solicitation aspects of the employees in a textile business related to age, working age and of the vicious positions earned with the goal of reducing the professional risk and of improving the health of the employees.

Material and methods: The study has been done on 40 employees in a confection production unit for 4 years.

The analyzed factors were: the ergonomics of the work places, and the solicitation of the musculoskeletal system through posture and during activity time.

Results and discussion: Considering training 72% of the employees worked only as confectioners, obtaining an experience in this field over the years.

The age of the employees represents a stability factor but also a high risk considering the musculoskeletal disorders. 82% are aged between 35 and 55, of which 60% are aged between 35 and 45.

Generally they are working in only one shift but in certain situations, when the workload is bigger they commute to a higher work. 90% of the employees have accepted this work regime.

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80% of the employees have their residence in an urban environment, the rest are commuting from the surrounding areas.

3 employees were hired suffering from an extended form of spinal column spondilosis, following a periodic recuperatory physiotherapeutic treatment.

An employee has developed a disc hernia which has led to the greatest time of working incapacity. 25% of the employees are known with clinical spinal column spondilosis signs, and have been put to record. At the last medical check-up, during the summer of 2007, it was observed an increase of 15% of the musculoskeletal disorders. Together with the decision factors from the production unit we have redesigned some of the working places on a new ergonomically re-evaluation. We pledged the employees to change their stance every time they need to, and to take seriously into account every factor that determines musculoskeletal hyper solicitations, like the long orthostatic and the vicious positions.

Conclusion:

1. Musculoskeletal disorders tend to be at first place at confectioners morbidity through the next factors: type of activity, posture, age, working age.
2. Because of the legislation spinal column spondilosis is difficult to be considered a professional disease starting from the fact that the etiology is a multifactor one.
3. I suggest that at hiring there should be a rigorous exam, focusing on the locomotive apparatus through the evaluation of the articulation and the muscles. The following symptoms are to be observed: pain, tumors of the articulations, muscles and tendons.
4. Risk factor analysis of the work environment.
5. Ergonomic arrangement of the work place.
6. Spinal column radiography at hiring and when necessary, when musculoskeletal disorders appear.

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USE OF A SMALL PERSONAL COMPUTER FOR DATA COLLECTION OF WORK LOAD AND WORK PROCESSES IN MEDICINE

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Introduction: The strike of the physicians in Germany this year raised a series of questions concerning the strain and stress at work for these people. A big issue was to quantify how much does a physician work, and how much strain he has at work.

ABSTRACTS

Method: It is not possible to compare the workplace of two physicians from different specialities, nor is it possible to compare the work of a chief physician with the one of a physician who just started to work in the clinic. It was obvious that we needed to analyze the data from each clinic separately in order to gain accurate data. For the pilot study we have chosen a pulmonary disease clinic. Special software was developed which makes it possible to create a log with timestamps of all actions taken by the physicians. It is also possible to record two actions simultaneously e.g. the physician answers a phone call and also makes some paperwork. The software runs on an ultra mobile portable computer (UMPC) in order to not put strain on the observer. The gathered data was imported to Excel and further analysed with Visual Basic for Applications procedures and functions. The simultaneous actions were inserted into a matrix containing all the actions (ca 50 different recordable actions) and a special procedure counted the time a given combinations occurred.

Results: 7 different physicians were “surveyed” for a period of 6 consecutive shifts each. Preliminary results show that it is very common for the physician to perform two actions simultaneously. The clinic in which we conducted the study adopted a new schedule model in which the physicians only work in 8 hours shifts, fact which is more or less reflected by our investigation. However, overtime is still occurring. More data is still required in order to make complex statistical analysis on the workflow of the physicians, however our study gives an insight of the current situation in this specific lung clinic.

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THE CLINICAL AND EPIDEMIOLOGICAL ASPECTS IN THE MUSCULOSKELETAL INJURY TO WORKERS FROM TEXTILE INDUSTRY

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Purpose: Musculoskeletal disorders are the most common cause of occupational injury.

Methods: The studied group included 370 workers from textile industry having musculoskeletal disorders due to extensive use of some morphological structures.

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Results: The determining factors are represented by: long periods of sitting down, repetitive gestures, precise and coordination gestures, extensions of the spine, trepidations.

The spinal column spondylosis was found in 74.39% of subjects.

Paraclinical and laboratory testing consisted of radiological examination, sedimentation velocity of red blood-cells, neurological examination

Profession-related diagnosis in many cases was difficult to state, the professional factors contribution to the studied cases was important.

Conclusions: We must underline that it's imperative that the employer applies correct ergonomics, to provide a work regimen suitable for the professional activities.

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ADVERSE HEALTH EFFECTS AND WORKING COMPOUNDS

Chairpersons:

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WELDING AND OXIDATIVE METAL EFFECTS (WELDOX)

- CROSS-SECTIONAL STUDY ON HEALTH EFFECTS OF GERMAN

WELDERS EXPOSED TO METAL AND RESPIRABLE DUSTS -

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Introduction and objectives: Welding is a common technology that joins metal parts by energy. Emissions of potential carcinogenic metals are possible. This project basically aims at measuring welding fumes within the breathing zone of welders and studying dose-response relations between airborne metal concentrations, internal metal exposure and health effects.

Materials and methods: 200 professional welders shall be enrolled in a cross-sectional study. A pilot study was conducted to assess the feasibility of this project.

ABSTRACTS

During a shift, the personal exposure to welding fumes will be estimated by air sampling within the breathing zone of the welder using special helmets.

The exposure will be assessed with two devices that sample particles in the inhalable fraction and in the alveolar fraction. In addition, exposure to ultrafine particles will be determined by means of an area sampler at selected workplaces. A questionnaire documents the details of the workplace and the use of protective equipment in addition to other factors.

Concentrations of various metals are determined in welding fume, blood, urine, sputum and exhaled breath condensate. A comprehensive set of biomarkers for iron load, genotoxic and irritative effects is examined and associated with the exposure levels.

Results and discussion: A total of 36 welders from three German shipyards were examined within the scope of the pilot project. The feasibility of the comprehensive study plan was confirmed. Descriptive results from that pilot phase will be presented for selected key variables. Lung function measurements give hints to a healthy worker effect among all classes of age. Welding fumes contain a large fraction of iron that is reflected in parameters like ferritin. Protective devices like dust extraction and dust masks will be assessed with regard to reduction of internal exposure to metals. The analysis of biomarkers is still on-going.

The main data collection will start in October 2007. The end of the project is scheduled to the end of 2009.

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ASSESSMENT OF RISK FACTORS AND THEIR IMPACT ON WORKERS' HEALTH STATUS IN A MEDIUM SIZE FOOTWEAR FACTORY

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Aim: The authors attempt to study the relationship between professional risk factors and workers' health status in a medium size footwear factory.

Methods: A cross-sectional study was performed. All workers (60, 82 percent women) (average age: 35.3±9.2 years; average exposure: 10.3±8.9 years) were submitted to a well established protocol that included:

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- the filling out of a form regarding social data, professional route, family and personal medical history, life-style;
- physical examination;
- electrocardiogram;
- spirometry;
- biochemical, immunological, hematological and biotoxicological tests.

Results: The professional risk factors are represented by manipulation of different aromatic hydrocarbons in two small inadequate rooms without effective ventilation systems and personal protective equipment, prolonged seated position in non-ergonomic workplace. The processed data revealed a low prevalence of healthy subjects and a polymorph pathology that might be connected to occupational risk factors.

Conclusions:

1. Technical - organizatoric measures are imperiously needed.
2. Well planned longitudinal studies with objective measures of exposure and disease are important for future control of workers' health status evolution.

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BLOOD OXIDATIVE STATUS IN SHOE MANUFACTURING WORKERS

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Aim: Workers in shoe manufacturing industry experience exposure to a complex mixture of solvents. Because their mechanism of action lies on the enhancement of lipid peroxidation, we assessed oxidative stress markers in blood specimens of a group of footwear-workers

Material and Methods: Investigated group consisted of 60 workers (11 men) having mean age of 35.3 ± 9.3 years and mean service length in shoe manufacturing industry of 10.5 ± 9.2 years. Superoxide dismutase (SOD) activity and thiobarbituric acid reactive substances (TBARS) content were determined with standard methods and commercially kits. The results were compared to those of an unexposed group and were statistically analyzed through usual methods.

ABSTRACTS

Results: Although the mean values of the two markers did not differentiate statistically compared to controls, there were 34 subjects (57%) having higher blood SOD, 52% having higher TBARS level and 35% of subjects having both markers above upper normal limit. SOD and TBARS correlated slightly with Ig E in exposed ($p < 0.05$), suggesting a link between antioxidant defence and immune response.

Conclusions: our study shows that not the intensity of the changes of oxidative stress markers is as suggestive as the frequency of these changes. These changes could act as early signs of professionally-induced pathology.

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SPECIALS

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ANALYSIS OF THE IMPACT OF THE SARS EPIDEMICS 2002-2003 ON HEALTH SCIENCES

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Introduction: The first cases of the “severe acute respiratory syndrome” (SARS) occurred in November 2002. Since most patients were infected at their workplace, SARS was not only the first emerging infectious disease of this millennium but also an important occupational disease. 45% of the patients were members of the health system.

Methods: Our aim was to quantify and qualify the scientific research on SARS and consequently draw a comprehensive scientific map. Therefore we used the scientific online- databases “PubMed” and “ISI- Web of Science” as well as tools like the “science citation index” also provided by the “Institute of Scientific Information”.

Results: The record counts on SARS in both databases exceeded 4000 publications. The year with the highest output in publications was 2003 with 1250 record counts; the year with the highest counts of citations was 2006 with 11166 citations. There was a trend noticeable towards an increase of citations until 2006. The mean impact-factor of the publishing journals was highest in 2003 with 17.06 with a decrease in the following years to 4.02 in 2007. The country with the highest output was China with

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1283 articles in the regarded period, followed by the United States with 1079 publications.

The most popular topics of the articles were aetiology (1597), therapy (1483) and epidemiology (1465). There were 24 papers published in the field of occupational and environmental medicine.

Conclusions: There has been a significant impact of SARS on the scientific world with a high number of publications all over the world. A lot of well established journals were publishing about SARS. Particularly China showed a great output of publications.

Even though SARS had a great impact for the occupational and environmental medicine there is a low output of publications in that field.

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BRONCHIAL ASTHMA: IMPLICATIONS FOR HEALTH SCIENCES AND OCCUPATIONAL MEDICINE

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Background: The objective of this study was to estimate the research productivity in the field of asthma over the last four decades.

Methods: Using the databases “Pub Med” and “Web of science” we retrieved articles with the subject asthma in the period 1967 to 2007. The search-routines included the term “asthma*” and were specified using the “MESH-Database” and “Refviz” when possible. The results of these routines were restricted by using the limits and analysis-functions of the selected databases. The data was additionally analyzed using different computer programs such as “Refviz”, “Excel”, “Shapeviewer” and self-designed programs. Subjects of the search:

1. The sheer output in quantity with and without a differentiation regarding the origin of the research.
2. The progress of research for different substances of the therapy of asthma.
3. The numbers of citations over the years.
4. The mostly announced symptoms of asthma.
5. The language and subject type of articles.
6. The journals most important for the research of asthma.

ABSTRACTS

Results: We found a total of 81109 papers published in the analyzed period. Regarding the output of the different countries we found the United States in first position with an output of 25045, followed by England with 10616, next Canada 4417, France 4015, Japan 3992, Germany 3429. A number of 6606 publications were not possible to assign to a specific country. The quality of the publications measured by citations per item was found largest for Botswana 330,83; followed by Gabon 141,5; Malta 88,39; Guatemala 55; Peru 40,27. Of countries with more than 500 publications New Zealand had the highest ratio with 23,36 citations per item. Regarding the rate of publication over years we found an increase from 240 publications in the year 1967 to 5313 in the year 2006, with a major step in the year 1990 to 1991 where the number of publication almost doubled. When regarding the therapy of asthma, we found that beginning from 1967 the number of publications having corticosteroids as topic was equal to the publications about sympathomimetics and we found leukotrien-receptor-antagonists were not introduced before 1997, as the anti-IgE-antibodies were introduced in 2002. When looking for certain topics correlated with asthma as “environment”, “allergy” and “immunology” we found an increase correlating with the increase of publications.

When regarding the trends of citations we found a significant increase beginning in 1991. In correlation to these results the number of citations divided through the number of articles showed a significant increase from an average count of 15 citations per article to 22 citations per article in 1991. The symptoms that were mostly subject to research were: cough (34%); obstruction (23%) and constriction (13%). Regarding the languages we found English in first position (93%) followed by French (2,6%) and German (2,1%) in the period 1980-2004. The leading journals for asthma are: “JOURNAL OF ALLERGY AND CLINICAL IMMUNOLOGY” 6871 publications and “AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE” 3044 publications.

Conclusion: Our data suggest that scientific research focusing on bronchial asthma as a subject has made significant progress in the last four decades. Regarding the geographical ranking the United States of America are still in leading position, followed by Europe. Regarding the language there has to be regarded the fact that most of the databases favor articles written in English, so there might be a lot of articles written in other languages that are not included in these databases and falsify these results. Assessing citations per item does not seem to be a valid tool to rate overall quality.

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ANALYSING GLOBAL CHANGES IN ALLERGY RESEARCH

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Introduction: The field of allergy is one of very great importance for the occupational medicine. This study should analyze the research in this field, quantifying the biggest European congress on allergy in the past years.

Method: We inputted the data contained in two abstract bands from the past two years on the EAACI Congress of the European Academy of Allergology and Clinical Immunology in Excel spreadsheets. The data was then analysed using self-programmed Visual Basic for Applications (VBA) procedures and functions. A list with all the countries that participated at the congress and the papers / posters coming from that country was generated. If a paper was a result from a multinational cooperation, the paper was added to each one of the cooperating countries. The gathered data was also correlated with the gross domestic product (GDP) and the amount of money in US\$ which is allocated in each country for the health of a person. In order to better present the results density equalizing mapping (also called cartograms) were created.

Results: For each year more than 1700 papers and posters were analysed. From data it is very easy to recognise that the most papers are original from countries which have a very good working industry. It was interesting to find Iran among the top 10 countries. When we compare the data from 2007 with 2006 we see some changes in Europe. Also interesting is that African countries are very little represented at this congress, fact that can be explained by the small amount of money which is allocated for health in these countries.

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ABSTRACTS

A LEGAL APPROACH TO VIOLENCE AND HARASSEMENT IN WORKPLACES IN ROMANIA

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A job is the most secure manner to avoid the tendency to crime and delinquency, by assuring people a chance to honestly win their living. But what happens when the workplace becomes the scene of the violent act, representing an inner condition and a key factor in the process of crime committing?

The aim of this paper is to present the types of crimes which may occur in workplaces, accompanied by examples of real cases. The Romanian Penal Code describes several crimes which have as a prerequisite the fact that they are committed whether in criminal's or in victim's workplace.

In the majority of cases, the workplace as the scene of the crime represents an aggravating circumstance, which is frequently in connection with the disobedience of the work protection regulations – for example in the case of killing or injuring by imprudence.

The fact that some specific categories of workers are victims of certain crimes represents also an aggravating circumstance, if the crime is in connection with the victim's work or is committed while that victim accomplishes his/ her legal duties. This is the case of magistrates, policemen, military personnel or their relatives.

The crimes that cannot be committed elsewhere but in the criminal's workplace are the illegal causing of abortion, sexual harassment, torture, abusive behaviour and ill treatment.

The workplace is very likely to be the scene of a crime in the case of some felonies against the sexual life of the victim (especially in the case of minors), committed by the personnel charged with the responsibility of surveillance, educating, healing, teaching or looking after the victim.

To conclude, we consider that there is a need to raise the awareness towards the danger of crimes committed in the workplace, especially in today's society when obtaining and maintaining a job is not an easy task and many people would tend not to report abusive behaviours (to which they are victims or witnesses) in order not to threaten their employment status.

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POSTER SESSION

Chairpersons:

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Dr. Irina Anca Popescu

OCCUPATIONAL RELATED ACOUSTIC HEALTH EFFECTS, PROTECTIVE MEASURES AND RISK ASSESSMENT

MORBIDITY THROUGH OCCUPATIONAL HYPOACUSIA AND DEAFNESS

IN IASI COUNTY (2001-2007-JULY)

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Aim: Analysis and observations to cases of occupational hypoacusia and deafness, registered in Iasi county, in 2001-2007 (July).

Material and method: The methodology based on a clinical and epidemiological study for approx. 7 years, regarding the hospitalised patients in the occupational health clinic, as well as the official documents that exists at Occupational Health Department, ASP Iasi (BP₂, noise assessment). Statistically, data were correlated to profession, workplace, age at the moment of examination, average time of occupational exposure.

Results: There were 64 cases registered with hearing deficiency caused by professional noise, 44 cases with hypoacusia, 20 cases with occupational deafness, the workers being of over 45 years old at the time of examination and an occupational length over 25 years only in 2006-2007 (July) 11 cases were registered with occupational hypoacusia and other 4 cases with occupational deafness. The noise levels varied between 82 dB and 110 dB, workplaces and professions frequently exposed (83%) belong to the machine building and wood industry (foundry, locksmith's trade, turnery, carpentry); 17% represents the workers percent that work in small and medium enterprises with professions as turner, tinker, instrumentalist.

Conclusion: The cases of occupational hypoacusia and deafness were found belated, the change of workplace being not possible due to age, professional experience, actual economic and financial state. How to change this condition: through a well informing of population regarding generally occupational diseases and especially those induced by noise, by militating to integrate these concepts in the national system of social security according to European Programme of Occupational Diseases (EODSEUROSTAT).

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EPIDEMIOLOGICAL SURVEY UPON NOISE INDUCED OCCUPATIONAL DISEASES IN MOLDAVIA DISTRICTS

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Aim: A survey on occupational exposure to hazardous noise conditions and on noise induced occupational diseases (NIOD) registered in North-East Romania countries along the last 7 years was performed. **Methods:** A data-base of declared NIOD in the 8 districts of Moldavia region in 2000-2006 was done. **Results:** 47 % from working people is exposed to occupational hazards and a quarter of them are exposed to hazardous noise conditions. The occupational exposure to noise is the 1st occupational hazard in Moldavia Region. There was an increased frequency of occupational diseases (OD) along the first three years; in the last 4 years of studied time there was a decrease of 40 per cent comparatively with the year before. Silicosis, noise induced occupational diseases (NIOD) were the most frequent OD every year. Every year NIOD frequency represented about 1/5 from all OD. The most exposed fields of activities are mine industry and machine manufacturing industry. The most frequent profession are miner and locksmith.

Conclusions:

1. The number of OD increased in the first three years.
2. Silicosis and noise induced occupational diseases (NIOD) were the most frequent OD.
3. Realising a 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.

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ASSESSMENT OF THE DAILY NOISE EXPOSURE LEVELS OF EMPLOYEES FROM DIFFERENT OCCUPATIONAL BRANCHES IN THE PERIOD 2004 – 2006 IN MOLDOVA REGION

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Aim: The objective of this study was the evaluation of exposure to noise in different occupational branches between 2004 - 2006. **Material and method:** The study present the measurements of global noise performed between 2004 - 2006 with an integrated soundlevelmeter Quest 2900 in 572 workplaces from different occupational areas. The daily personal noise exposure ($L_{EP,d}$) was computed taking into account the equivalent continuous sound level and time of exposure. **Results:** The exceeded values for $L_{EP,d}$ were recorded in 41,2 % (236 cases) from inquired workplaces. The admissible limit of 87 dBA was exceeded in 83.5 % of these 236 workplaces, with an average value of $L_{EP,d}$ of 93.6 ± 5.5 dBA, in 10.2 % of these workplaces was exceed the admissible limit of 75 dBA, with an average value of $L_{EP,d}$ of 84.4 ± 7.3 dBA and in 6.3 % of the workplaces was exceed the admissible limit of 60 dBA, with an average value of $L_{EP,d}$ of 80.9 ± 13.0 dBA. The study presents a distribution of the exceeded values with respect to admissible limits of noise, occupational domains, and technological operations for every year between 2004 - 2006. **Conclusions:** The authors recommended technical and organizational measures in order to reduce noise exposure in occupational sphere.

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HEALTH CARE WORKERS, STRESS AND STRAIN

SOME OCCUPATIONAL HEALTH RELATED PROBLEMS IN SURGICAL DEPARTMENS

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ABSTRACTS

There is a general tendency of minimizing the health aspects in health care workers, especially concerning the workplace related health problems. There is also a certain lack of interest in occupational health professionals concerning this peculiar and less discussed field of occupational health. The physical as well as chemical hazards are generally less studied in this domain, comparative with the biological hazards.

Our research aimed to identify the peculiar occupational health hazards in some surgical departments, to study the possible adverse health effects of these hazards and, consequently, to identify the appropriate prophylactic measures.

The methods implied detailed work environment investigations for the characterization of the workplaces, as well as a thorough health status investigation of the health care workers.

The results revealed a clear prevalence of the biological hazards, with peculiar aspects, a high level of the psychological stress and some possible interference with the immune function. Further survey is needed and we think that there is possible to improve the strategy and peculiar measures to protect the health status of this category of health care workers.

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BIOCHEMICAL ALTERATIONS IN PERSONNEL FROM HEALTH CARE INSTITUTIONS

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Aim: The goal of this study was to enhance the deviations from the reference values of certain biochemical parameters of the employees in four hospitals from Iasi.

Material and method: 250 employees (32 men) with the mean age of 38.5 ± 10.3 years and an average length of work of 15.31 ± 10.69 years, who work in different hospitals for about 10.2 ± 9.6 years, and a matched control group (150 subjects) were investigated in a cross-sectional study. In addition to a complete occupational disease medical history and a physical examination, serum samples were obtained to determine the activity of the aspartato aminotransferase (AST), alanin aminotransferase (ALT), gamma glutamiltransferase (GGT), cholesterol (COL), triglycerides (TG) and glycemia. The results were statistically analysed through usual methods (χ^2 -test).

Results and discussions: The hospital employees had a higher prevalence of elevated glycemia, alanin aminotransferase (ALT) and aspartate aminotransferase (AST) than controls did. There were found increases in a statistically significant higher rate of glycemia (30 % vs. 5.3 %, $p < 0.001$) and of the activity for enzyme ASAT (15 % vs. 4.5 %, $p < 0.05$) on the exposed personnel compared to the control group. The frequency of abnormal values for γ -glutamyltranspeptidase, cholesterol and triglycerides was comparable with that of the controls. 33.3 % of the health care personnel with abnormal transaminases had a ratio of AST to ALT lower than 1, with a mean of 0.66.

Conclusions: The findings suggest that there is the possibility of liver involvement among even asymptomatic health care workers, and that periodic liver screening may be useful. The significant prevalence of the biochemical alterations on exposed group, already mentioned, may be associated with the working conditions. The authors conclude on the significance of these indicators and their utility in finding out hepatic disorders caused by chronically exposure to cumulative occupational risk factors.

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SOME DATA REGARDING TUBERCULOSIS IN OCCUPATIONALLY-EXPOSED HEALTHCARE WORKERS

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Background: Tuberculosis (TB) is a communicable disease caused by the organism *Mycobacterium tuberculosis* (MT). It has two general states, latent infection and active disease, but with few exceptions only those who develop active tuberculosis in the lungs or larynx can infect others. Romania is the first European country regarding tuberculosis (TB) incidence in 2004, with 134.6 cases/100,000 inhabitants. Everyone can ask: *Are health care at a greater risk of infection, disease, or mortality due to tuberculosis than others in the communities in which they reside?* The data on occupational tuberculosis infection are limited, based on weak research methodologies, and derived mainly from hospital settings.

Aim: to achieve a 30-yrs survey concerning the occupationally-induced TB registered in the biggest Pneumology and TB hospital in Moldavia Region (NE Romania).

Material and methods: a 30-yrs retrospective study was performed; the authors assessed the risk (number of patients with TB diagnosed and cured yearly) and the diagnosed TB among healthcare workers by studying the data regarding TB registered

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in 1973 – 2003 in Pneumology Hospital Iasi. **Results:** during the last two months of the year 2001 there were diagnosed with TB 139 patients (63 with MT positive in sputum), in the year 2002, 1214 patients (595 with MT positive in sputum), in 2003, and 1610 patients (900 with MT positive in sputum). The number of medical personnel was 479 every year; they worked in different places of the hospital. There were 57 healthcare workers diagnosed with TB infection along these 30 years. The most frequent profession was nurse and Pulmonary TB was the most frequent clinical form.

Conclusions: 1. Medical staff, especially in Pneumology Services represents a high risk group for occupational induced TB. 2. Not all the cases of TB registered along these 30-yr were declared and registered as occupational diseases at the healthcare personnel. 3. These epidemiological data prove that occupational health services for hospitals are needed for implementation of TB control policies such as administrative controls, engineering controls and personal respiratory protection.

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ADVERSE HEALTH EFFECTS AND WORKING COMPOUNDS

MIXED EXPOSURES – A COMPLEX PROBLEM ON OCCUPATIONAL HEALTH

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The study of mixed exposures is a priority area. Workers are continuously exposed to a wide variety of chemicals, biological and physical agents and other stressors encountered both in and out of the workplace. Mixed exposures can produce deleterious health effects that are additive, synergistic, or can potentate the response expected from individual component exposures. We investigated a group of workers exposed to multiple stressors: organic solvents mixtures, noise and stress. The exposure conditions evaluation and clinical examination were performed. Individual's questionnaires were used in order to evaluate the stress factors and the history of the exposure. Some biotoxicological parameters (phenols, hippuric acid, sulphate index) were measured at the end of the work week. Audiograms were also performed. The

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evaluation of the exposure conditions showed that the exposure is variable and intermittent. The clinical exam showed that all investigated subjects presented pronounced dizziness and nausea. Toxicological parameters were found pathological: 50% of subjects presented values over permissible biologic limits for conjugated phenols and 38% of subjects presented higher values than permissible values for hippuric acid. Surveillance and control measurements were suggested. Recommendations have been made in order to improve the occupational medicine services for the exposed workers. Additional research is needed to develop better evaluation tools that can be used to assess the risk factors to multiple simultaneous exposures.

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THE OCCUPATIONAL EXPOSURE OF PERSONNEL IN THE FOOD INDUSTRY

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Purpose: The purpose of the study is to establish the specific indicators of personnel occupational exposure from the restaurants and fast-foods kitchens.

Material and methods: Workplaces monitoring has been made through dynamic measurements of the polycyclic aliphatic hydrocarbon concentration (HPA), aerosols and microclimate. 15 locations have been monitored with approximately 45 exposed subjects. In 40 % of the cases the exposure values exceeded the acknowledged limits from the current legislation.

Results: The results show that for the investigated workplaces the hydrocarbon concentration (anthracene, phenantren, benzeneanthracene), at the breathing area level, is fluctuant, depending on the speed and direction of the air currents, as well as on the type and efficiency of local and general ventilation system in use.

Conclusions: Even in conditions of exposure to low concentrations, considering the potential cancerous effect of the HPA derivatives, quantitatively and qualitatively detected, the risk evaluation remains a must and it demands a periodical complex medical exam.

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EFFECT OF AIRBORNE ALLERGENS EXPOSURE ON SERUM IMMUNOGLOBULINES IN PERSONNEL FROM A MUSEUM COMPLEX **Mirela Ghițescu, Carmen Croitoru, Felicia Grădinariu, Iuliana Cotea, Brigitte Scutaru**

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Objective: The aim of this study was to determine the immunological response and the prevalence of allergy symptoms among employees from a museum complex.

Material and method: In a cross-sectional study, 64 employees (average age: 43.5±9.9 years; average exposure: 21.4±8.9 years) from ten museums and from a book restoration laboratory and a matched control group (74 subjects) were questioned about allergy symptoms (respiratory, dermatological, conjunctival) and analyzed with respect to serum immunoglobulins - Ig (IgG, IgM, IgA, IgE). Airborne microflora was measured with the Koch method. The results were statistically analyzed through usual methods (Student's t-test, χ^2 -test).

Results and discussion: The total number of mesophilic germs ranged from 0 to 631 CFU/m³, the airborne fungal concentration was exceeded (> 500 CFU/m³) in 5 museums. The Ig concentrations exceeded statistically significant ($p < 0.001$) the reference values in 69 % of the exposed compared with 25 % in controls (IgG in 51% vs. 8.2%; IgA in 7% vs. 0%; IgM in 40% vs. 18%; IgE in 20% vs. 1.4%). Two or more Ig levels were exceeded in 28 % employees with higher exposure to airborne microflora and only in 1.4 % of unexposed subjects. The serum IgG level was significantly increased in exposed in comparison with controls (2214±886 mg/dl vs. 1420±660, $p < 0.001$). Altogether 60 % of museum employees complained of allergy symptoms in comparison with 25 % of controls ($p < 0.001$). The prevalence of allergy complaints was significantly higher in exposed compared to control group (dermatological disorders: 22 % versus 12 % - n.s.; respiratory symptoms: 27 % versus 5 % - $p < 0.001$; conjunctival reactions: 33 % versus 13 % - $p < 0.01$). Though the association between dermatological, respiratory or conjunctival disorders and Ig was not significant, 65 % of the exposed subjects with elevated Ig complained of at least one allergic symptom.

Conclusions: The prevalence of abnormal immunoglobulin levels was significantly higher in exposed as compared with controls. The museum employees reported more allergy symptoms than unexposed subjects did. The symptoms were probably caused by allergenic properties of the bioaerosols from the occupational area.

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ELECTRONEUROMYOGRAPHIC CHANGES IN OCCUPATIONAL EXPOSURES TO ASPHALT MIXTURES

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Aim: this study investigates the electroneuromyographic changes in relation with the health status in a group of workers occupationally exposed to asphalt mixtures (PAH).

Method: We performed a complex electroneuromyographic investigation on a group of 65 workers employed in an asphalt road paving. Mean age is 35.8 ± 9.9 years and the mean length of service is 12.9 ± 6.5 . The gained data were interpreted in relation with the results of the physical examination.

Results: The values of the investigated parameters helped us to establish an ENMG functional diagnose:

- 53.8% of the group present different levels of polyneuropathic changes with 27.7% mixed (sensitive-motor) alteration.
- 46.1% are ENMG normal

A significant rate of the subjects with polyneuropathic diagnoses present associated clinical symptoms.

Conclusions: The pathology of the nervous system appears to be an important element on the polymorphic background of the pathology. The revealed polyneuropathic alterations have a multifactor etiology, in which occupational exposure plays an important role, together with the life habits and social and economic welfare of the investigated subjects.

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Chairpersons:

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***PHYSICAL LOAD AND ERGONOMIC ASPECTS/
EVALUATION OF CUMULATIVE WORK LOAD***

MUSCULO-TENDINOUS PAINS AMONG MUSIC SCHOOL PUPILS

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Objective: The purpose of this study is to present the prevalence of the musculoskeletal pains among the students which are preparing their musical career.

Methods: A very simplified questionnaire containing a body diagram and one gradual scale of discomfort (0 to 10: zero means not all and 10 maximum possible pains or functional impaired) were distributed to 58 pupils from a gymnasium musical school. The average age of subjects was 12.18 years old (SD=1.8); 24 boys (41.37%) and 34 girls (58.62%) with average length of exposure to repetitive movements and awkward angular posture of the upper limbs of 5.4 years (SD=3.8 years). The musical instruments used were: 29 strings instruments (50.0%): violin 16 subjects, cello bass 7 subjects, guitar 6 subjects, 23 wind instruments (39.65%) and 4 piano. The weekly number of hours dedicated for instrumentals study was between 3.5-7, similarly with time dedicated for other activities (sports, PC-games).

Results: The cervical pains were found at 46 cases (79.31%), shoulder pains at 26 cases (44.82%), elbow pains at 24 cases (41.37%) and 22 cases (37.93%) with wrist and finger pains. Dorsal and lumbar vertebral pains were indicated on the diagram for 33 (56.89%) pupils. The intensity average was 2.5 for 20.9 students and 5.5 for 50.4 subjects that means persistent and moderate pains.

Discussions: The high number of students with musculoskeletal pains may indicate a possible bad technique during of the instruments playing. The high number of traumatism in personal medical history of the upper limbs (22 cases: 37.93%) may contribute to the pathogenic mechanism of the pains.

Conclusions: During the qualification for professional musical career, the pedagogical staff must be very careful with the technique of study, work-rest schedule, physical training, correction of the psychological factors.

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**MUSCULOSKELETAL DISORDERS AT PATIENTS FROM
OCCUPATIONAL HEALTH CLINIC, TIMISOARA"-**

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Aim: The diseases caused by the occupational over-solicitations, especially musculoskeletal, are the principal and actually occupational pathology as in EU as in USA. In EU, musculoskeletal diseases (MSD) have a higher prevalence in the new member countries. For example, the low-back pain is in these countries 39% comparative with 24% in the rest of countries. In these circumstances our purpose was to put in evidence MSD and their professional causes at a group of hospitalised patients in the Occupational Health Clinic from Timisoara.

Materials and methods: The lot of study consists by the patients hospitalised in Occupational Health Clinic Timisoara in the last year (2006). At this patients we followed few parameters regarding: area activity, profession, ergonomic analyse of workplace, (position, effort, repetitive movements, work en force, vibrations, climate), age, the period of work with musculoskeletal over-solicitations, subjective and objective aspects of MSD, the duration of diseases, treatments. Statistic analyses were performed by EPI Info2000 of World Health Organisation and I Microsoft Office Excel programs.

Results and discussions: Patient number with MSD hospitalised in our clinic in 2006 was 267 persons. The structure of the group regarding gender was: male/women=167/99. Medium age of studied group was $48,14 \pm 11,92$ years, higher at women as the male (52.36 ± 11.72 vs 45.59 ± 11.37). The length of work with musculoskeletal over-solicitation was 24.18 ± 8.53 years. The area main of activity was: mining (41.20%), construction, textile industry, commerce, office activity. The many causes of MSD recognised by the patients were: associations at hard work, vicious positions and orthostatic position, (69.63%), and the prolonged standing or sitting positions were recognised by a lower number of patients (10.86% respectively 6%). The high physic effort was present at 39.7% patients, the medium effort at 46.4%, and the less effort at 13.9%. The main localisation of MSD were, as we estimate, low-back pain 65.5%, followed by the upper extremity (27%), knees (21%), shoulders (9%), haunch (6.4%), upper-back (4.5%), elbow (2.6%) localisations.

Conclusions: MSD represent an important percentage at the all hospitalised patients (40.73%), and at approximately 55% of them were the main diagnosis as occupational disease. MSD imply a high number of sick day's absenteeism; frequently require the change or the adaptation of the workplace. Taking in consideration this data, it is necessary to improve the workplace conditions, to train the workers and to check their health status periodically. The employers must give a higher importance at the workplace organisation, taking ergonomic measures in their factories. An important aspect is the participation of workers at this process.

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THE OCRA SCORE AND THE RISK EVALUATION OF MUSCULOSKELETAL DISORDERS IN A GROUP OF FEMALE WORKERS IN THE ELECTRO TECHNIQUE INDUSTRY

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Handling of low loads at high frequency (repetitive work) may cause pain and fatigue, which may lead to musculoskeletal disorders, reduced productivity, and deteriorated posture and movement co-ordination. The latter can increase the risk of errors and may result in reduced quality and hazardous situations. Good ergonomic design and proper organization of work are basic requirements to avoid the adverse effects mentioned.

Risk factors in repetitive work include the frequency of actions; the exposure duration; the postures and movement of body segments; the forces associated with the work, work organization; job control; demands on work output (e.g. quality, task precision); level of training/skill. Additional factors can include: environmental factors (climate, noise, vibration, illumination).

The prophylactic measures include avoiding as much as possible the manual repetitive work and the evaluation of the risk factors of such activities.

For this purpose, the Italian researchers *Occhipinti* and *Colombini* developed a method which takes into consideration a multitude of risk factors: the OCRA (*occupational repetitive actions*) method.

We have applied this method in a group of 400 female workers in the electro technique industry. The mean age is 32.16, they are between 18 and 48 years old, most of them (60 %) being in the age group of 30 to 40. They work while sitting on ergonomic chairs, with lumbar support, and perform manual repetitive precision work. They have to make a certain number of electric pieces per day, so they have to work fast, with little breaks.

The OCRA score which we have obtained is increased mainly because of the force and working position scores, resulting in a high level of risk.

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***ELECTROMAGNETIC FIELD INFLUENCE ON HEALTH IN WORKING
AREAS***

**EXPOSURE OF WORKERS IN SPOT WELDING PROCESSES TO ELF
MAGNETIC FIELDS**

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Objective: To evaluate the workers exposure in spot welding processes to extremely low frequency magnetic fields. **Methods:** We use an EFA – 300 EM Field Analyzer from Narda for magnetic fields measurements, which is appropriate for measurements in complex fields, with non-sinusoidal signals. The frequency domain is 5 Hz – 32 kHz and the sampling rate was 5 s. The results are displayed as percentage from the selected standard limit. We measured at approximate 10 cm distance from the worker, at 3 levels: head, chest and waist. **Results:** Exposure of welders to magnetic fields is characterized by periods of high levels during the active welding operations, interrupted by lower background levels. The values measured in the effective welding time exceeded the reference level /action limit value recommended by ICNIRP. **Discussion:** Our results are in accordance with data from literature. There are necessary further investigations to assess whether the ICNIRP basic restrictions are also exceeded.

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CLINICAL APPROACH TO EMF SENSITIVE PATIENTS (EHS)

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The paper discusses a physician's approach to patients who present complaints attributed to low levels of exposure to electromagnetic fields (EMF) from occupational environment. Selected cases are presented to illustrate the diversity of patients, seen with a view to refining the diagnosis of the condition and improving the

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management of these patients .It is suggested the differential diagnosis needs to consider a spectrum of illness , ranging from localized sensitivity to fields through more generalized symptoms, to phobic states and psychiatric disorder, each with appropriate management. The importance of history taking to asses the pattern of symptoms in relation to the exposure to EMF and to exclude other medical disorders is noted. Various aspects of provocation tests are discussed. Because the sensitivity and specificity of provocation tests is unknown, the results of such tests should be interpreted in conjunction with the total clinical picture.

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SPECIALS

POSSIBILITIES OF COST/ADVANTAGE ANALYSIS IN HEALTH ROMOTION AND SECURITY OF WORK

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Problem definition: The authors have studied the possibility of elaborating a methodology to **analyze the efficiency** of preventive actions within the framework of companies.

Methods: We have elaborated a **model of controlling the costs of labour protection**. This model has at least 3 indispensable elements.

1. We have performed the analysis of morbidity with temporary invalidity for 6 main diseases, for which we have calculated the frequency index, the seriousness index and mean duration of diseases. On the basis of this situation we were able to calculate the value of **produced expenses** in Lei to paying the **equivalent value** of sick leaves and **losses of productivity** calculated for person/day of work.

The groups of diseases fixed by us, which can vary from company to company, according to the frequency and seriousness of illnesses, are as follows:

- diseases of the skeletal and articular system and of muscles;
- diseases of the respiratory system

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- diseases of the digestive apparatus;
 - accident in working and out of company activities;
 - cardiovascular diseases;
 - other diseases
2. We have created a staff for monitoring the causes of morbidity and **deficiencies of labour protection** activities. This staff consists of physicians, psychologists, sociologists, economists, engineers with labour protection responsibilities (health and security). They had to propose concrete measures to remedy these shortcomings in the framework of a planning system in time, space and groups of problems.
 3. Periodical **cost/advantage** analysis and **cost/effectiveness** respectively. The above mentioned staff has also done the periodical evaluation of **effectiveness and efficiency indicators**.

Findings: The cost/advantage analyzes have been the basis of budget planning for **health promotion** activities and the **improvement** of labour **security** system. This is why we have elaborated a commonly accepted methodology of planning and controlling health and security measures at workplaces and globally at companies (see sketch). The LEAN production concepts – with the model of controlling health and security activities – offer a valuable tool for the general management to integrate activities related to health protection and labour security into the major organizational and management decisions.

In 3 years' time the **“health rate”** of companies where this model has been applied increased with 38% (the staff present at work related to the total number of staff).

Conclusions: Controlling and monitoring the cost/advantage indicators of **health and labour security** measures provide not only for justifying a real budget, but also for an efficient way of promoting employees' health. Applying this concept, we can stimulate the interest of management in maintaining and improving the system and also contributes to motivate employees to protect their one health and to respect the rules of labour security. During my lecture I will present 4 synthesizing graph of this system.

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ABSTRACTS

DIESEL EXHAUST ENHANCES THE SPECIFIC HYPERRESPONSIVENESS OF OVALBUMIN SENSITISED RATS AIRWAYS

Irina Luciana Dumitriu, B. Gurzu, Maria Dinca, Beatrice Mihaela Gurzu, G. Petrescu

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Diesel exhaust (DE) is a complex mixture of thousands of gases and fine particles emitted by a diesel-fueled internal combustion engine. Airborne pollutants, particularly DE components, are thought to cause or exacerbate lung disease such as asthma, bronchitis and other allergic respiratory disease. We studied the effects of the aqueous-trapped solution of DE, as well as its interactions with bronchoconstrictors on bronchial rings tone from normal and ovalbumin sensitized rats. DE was collected into chilled impingers containing phosphate-buffered saline (PBS). The isolated left main bronchi rings of male Wistar rats were cleaned of surrounding tissue and mounted in 2 ml organ bathes containing Krebs-Henseleit solution aerated (95% O₂ and 5% CO₂) and heated (37°C). Contractile responses were expressed as percentages from control contractions obtained with acetylcholine (ACh, 10 microM). Our preliminary results showed that DE extract didn't modified by itself both bronchial reactivity on sensitised rats and angiotensin II and Ach - induced bronchoconstriction, but DE extract significantly amplified ovalbumin (OVA) induced bronchoconstriction. These findings suggest that DE extract enhanced allergen – induced bronchoconstriction on OVA – sensitised rats being in agreement with epidemiological data and results of toxicity studies in experimental animals about the possible health risk of diesel exhaust exposure.

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THE INTENSIVE VOCAL STRAIN – FAVOURABLE FACTOR FOR UPPER GASTROINTESTINAL TRACT PATHOLOGY

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A specific, occupation-related susceptibility of professional singers to experience upper gastrointestinal tract symptoms was hypothesized. We investigated the prevalence of upper gastrointestinal tract symptoms in a series of professional opera choristers in comparison with a general population sample. Hyperventilation increased the frequency of inspiratory pressure oscillations at the EGJ without affecting the end-expiratory EGJ pressure. Partial expiration resulted in cessation of the flow across the EGJ, failure of esophageal peristalsis to traverse the entire length of the esophagus, increased esophageal transit time, and incomplete esophageal clearance of a liquid bolus (saliva). In this condition, the sphincter between the stomach and esophagus is inefficient, and acidic stomach secretions reach the laryngeal tissues, causing inflammation. The most typical symptoms of gastroesophageal reflux laryngitis are hoarseness in the morning, prolonged vocal warm-up time, sore throats, halitosis and a bitter taste in the mouth in the morning, recurrent respiratory tract infections, a feeling of a lump in the throat, frequent throat clearing, chronic irritative cough, and frequent tracheitis or tracheobronchitis. Any or all of these symptoms may be present. Heartburn is not common in these patients; thus, the diagnosis is often missed. For this study two groups were selected: a test group made of 59 subjects and a sample group of 22 subjects, with a similar distribution in age, sex and body mass. Opera choristers reported a statistically significant higher prevalence of heartburn, regurgitation ($p=0.036$), occupational dysphonia ($p<0.001$), respiratory problems ($p=0.048$) and antiacide medicines ($p=0.029$).

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SOME EFFECTS OF PRIMARY PSYCHOLOGICAL INTERVENTION ON INDIVIDUAL ACCUSES FREQUENCY

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Objectives: To evaluate the influence of some actions of psychological counselling on evolution of frequency of individual health affection accuses.

Materials and methods: A lot of 260 employees from a food industry enterprise were investigated as concerning the frequent individual accuses of health affection, alimentary habits, occupational and familial psychosocial risk factors, temperamental, motivational and of stress resistance individual peculiarities. In the first step of psychological intervention, the subjects were informed about their psychosocial risk

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factors and psychological peculiarities, and in the second step were informed about the significant relationships between the investigated factors and individual accuses. After 5 years period, the remained subjects were asked both about the actual frequency of individual accuses and the usefulness of received counsels.

Results and discussions: The comparison of accuses frequency at the start of the study with those observed after a 5 years period, put in evidence significant diminishment in frequency for a great number from those over 260 monitored individual accuses.

Conclusions: The monitoring of frequency evolution of individual accuses feeling, associated with the information of employees concerning both their psychological peculiarities and the relationships between the psychosocial risk factors and those accuses, can contribute to the significant diminution of individual health affection accuses frequency.

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POSSIBLE PROTECTIVE EFFECTS OF AMINO ACIDS AND MINERALS ON 2,4 –D INDUCED BIOCHEMICAL AND HAEMATOLOGICAL ALTERATIONS IN RATS

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Aim: The authors of the present paper aim to reveal and asses the possible protective effect conferred by certain amino acids (AA) and certain minerals against the long-term exposure of rats to the 2,4-dichlorophenoxyacetic acid (2,4-D).

Material and method: We used 100 white Wistar rats, males and females, the protocol being built on a 6 months sub-chronic experiment. The dose for 2,4-D was 24 mg/kg body weight/day (1/16.7 DL50), and for the protective substances – the medicines “Metaspar” – which contains AA, and “Eurovita multiminerale” respectively, the doses being chosen so as to diminish the toxic effects that can raise after the exposure. The investigations included biochemical and hematological indicators.

Results and discussions: There is an improvement of certain specific indicators of the protein metabolism – serum albumins and hepatic glutathione - , in the groups with protection versus the unprotected-exposed group. On hematological plan, we observe a discrete raise of the hematocrit values and a decrease of leukocytes counts

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in the 2 groups treated with protectors compared with the group treated with 2,4-D. The rest of the analyzed indicators show less conclusive changes.

Conclusions: The above presented changes indicate a possible positive effect on the metabolization of 2,4-D, under the influence of the two medicines, fact that leads to the necessity of continuing the investigations on other issues related to the organism – xenobiotic.

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THE STRESS OF THE UNCERTAINTY AT THE WORKPLACE AND THE NEGATIVE ATTITUDE TO LIFE AT THE SUBJECTS WHO WORK IN DIFFERENT FIELDS OF ACTIVITY

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Aim: The pointing out of the stress of the uncertainty of the workplace (SUWP) and the relations between it and the negative attitude to life at the subjects who work in a private activity field and the subjects who are paid by the Government.

Method and group: A semistructured questionnaire (which emphasized the SUWP) and the Lüscher Color Test (which emphasized the negative attitude to life and emotional uncertainty) were administrated to 37 subjects who work in the textile industry and to 42 subjects who work in magistracy.

Results: The SUWP, the physical discomfort, rootlessness, need for a safer environment, renunciation, relinquishment, protest and the revolt are more frequent (with statistical significance) at the subjects who work in the textile industry. We have found that the SUWP is associated (statistically significant) with the noninvolvement, the concealment, physical discomfort, rootlessness, need for a safer environment and the emotional uncertainty at the subjects who work in the textile industry more than at the subjects who work in magistracy.

Conclusions: The renunciation, relinquishment, intolerance, protest, revolt, rootlessness and the physical discomfort emphasizes the negative attitude to life at the group that works in the private field. The association between the SUWP and the noninvolvement, concealment, rootlessness, physical discomfort, need for a safer environment and the emotional uncertainty suggest the implications and the consequences of the SUWP and of the negative attitude of life on the health status and on familial, social, emotional relations of the subjects who work in the textile industry.

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At the same time, a high frequency of non-involvement, concealment and emotional uncertainty suggests the presence of the negative attitude to life at the subjects who work in magistracy. It is not significantly associated with SUWP. Knowing which situations determine the negative attitude to life of the workers in magistracy could be important.

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COMPENSATION ISSUES IN CASE OF OCCUPATIONAL DISEASES AND ACCIDENTS

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The aim of this paper is to analyze, evaluate and compare the compensation system for occupational diseases and accidents in Romania with those in UK, Spain, US and New Zealand. Suggestions for further improvement of Romanian compensation scheme are included.

In Romania, the compensations for occupational accidents and diseases imply: medical rehabilitation and recovery of work capacity, professional reconversion, compensation for temporary working incapacity and/or temporary change of workplace, for physical injuries or death, and costs reimbursement. The worker has the right to medical treatment and services free of charge, consisting in medical assistance in the place of the accident, transportation and priority for medical services in hospitals/occupational diseases clinics; recovery treatment, plastic and reparatory surgery, physiotherapy and balneotherapy treatments. Partly, these rights exist in Spain and UK, without being exhaustively enumerated.

The Romanian workers entitled to compensations for physical injuries are those who have reduced their working capacity to below 50%, or have suffered a mutilation consecutively an occupational accident or disease. The UK law states that the worker is entitled to the benefit even if the disfigurement “does not trouble” him.

Spain offers a “temporary disability benefit” – a daily subsidy covering worker's loss of income caused by common diseases, work- or non-work-related injuries, occupational diseases, and during the periods under observation for occupational diseases.

In the US most employees who are occupationally injured have an absolute right to medical care, and often, monetary payments to compensate for temporary or

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permanent disabilities. US legislation lacks a unified national set of employee entitlements covering minimum wage, wage and hour, or collective bargaining rights in addition to compensation.

In New Zealand, workers' compensation is part of a compulsory, national, no-fault accident insurance compensation system.

After analyzing and comparing the foreign provisions, it results that the necessary improvement for the Romanian legislation in the field should be the augmentation of monetary compensations for temporary disabilities to correspond to worker's former wage, not to the minimum national wage.

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ROUND TABLE
OCCUPATIONAL HEALTH SERVICES IN EU MEMBER STATES –
NATIONAL AND INTERNATIONAL ASPECTS

Moderators:

Prof. Dr. med. Gustav Schäcke
Dr. Doina Popa, senior researcher

STANDARDIZATION OF OCCUPATIONAL HEALTH SURVEY IN THE
EUROPEAN UNION UNDER THE ASPECT OF MIGRATION OF
WORKERS

G. Schäcke, D.A. Groneberg

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Occupational health survey is one of the most important activities in occupational medicine. Due to the aspect of migrating workers the exposure to numerous occupational stress factors need an appropriate and safe health survey system linking the different the occupational diseases, as far as they listed in the EU member states.

A proposal of such a system will be discussed.

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THE ROMANIAN MULTIDISCIPLINARY SERVICES OF OCCUPATIONAL HEALTH AND SECURITY – HISTORY AND PERSPECTIVES

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The authors accomplish a review of the structure of the Romanian Occupational Health Services, starting with 1930 when the first modern Sanitary Law was enforced.

Between 1955 and 1965, these services have diversified, becoming either real internal multidisciplinary services inside the large companies with chemical, metallurgical, mining, or machine construction profile, or external services in the big industrial cities.

After 1977 – 1980, these structures started disappearing, being replaced by “Enterprise Medical Dispensaries” served by General Medicine Physicians.

The uncertain legislation and the sanitary reform started in the 90’s have led to the effective disappearance of these first stages of the Occupational Health assistance. Only after 2000 these services began to restructure themselves, still having though a relative statute and legislative gaps.

The general tendency is to settle multidisciplinary occupational health and security services in the coming future.

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OCCUPATIONAL HEALTH SERVICES IN BELGIUM AND ROMANIA – SIMILARITIES AND DIFFERENCES

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Historically, Belgian preventive structures have been mainly focused on medical and safety aspects. In 1996, new legislation (the Law on Well-Being of employees at work and Royal Decrees) redefined the practice of prevention and protection at work in Belgium. The occupational health and safety services were restructured: the expertise required on prevention and protection can either be organised by the

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employer - ISPPW (with restrictions depending upon the size of the company) or be solicited from external preventive services - ESPPW. In most cases, there is a mixture of both. The external service for prevention and protection is set up as an independent multidisciplinary service, which provides both specialised technical and medical service to affiliated employers, in fulfilment of their legal obligations in the fields of safety, health and the well-being of workers. At the present moment, The Belgian law covers five main areas: occupational safety, occupational medicine (*stricto sensu*), occupational hygiene, ergonomics and psychosocial problems in the work place, with a growing focus on prevention and multidisciplinary in all these areas.

The Occupational Health System in Romania is comparable with the Belgian one, but it functions better in Belgium because everybody applies and respects the laws. There are some differences:

- regarding the fund for occupational diseases – unlike Romania and other European countries, occupational diseases are managed by an institution separate from that managing “accidents at work”. The biggest difference is that for accidents at work, every employer has to contract a private insurance, and the insurance companies are supervised by the Fund for accidents at work, while the Fund of occupational diseases acts as a direct insurer. Yet both are federal public institutions under the supervision of the Minister of Employment and Labor and the Minister of Social Affairs, Public Health and Environment. In Romania, the Law no. 346/2002 establishes the requirements for compensation in the event of a work-related accident or disease, but even now the law has been going through the process of implementation. The Romanian National Fund is a public institution under the supervision of the Ministry of Labor, Family and Equal Opportunities;
- regarding the External Services for Prevention and Protection. In Romania exist external medical services, but they are not specialized only on workplace prevention and protection;
- regarding the formation and training of industrial hygienists/safety engineers. *Safety engineers* focus their efforts on safety and accident prevention. *Industrial hygienists* primarily perform assessments of exposures to chemical, physical, and biologic agents. Romanian university curricula does not include as a specific discipline occupational hygiene. We hope that occupational hygiene would be recognized as a profession after the integration of Romania in the EU.

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ROUND TABLE
**“ELECTROMAGNETIC FIELDS EXPOSURE: MEASUREMENT
TECHNIQUES, BIOLOGICAL EFFECTS, HEALTH IMPACT”**

Moderators:

Dr. Răsvan Dănulescu, senior researcher

Dr. fiz. Cristian Goiceanu

**PROCEDURES FOR DETERMINING THE ELECTROMAGNETIC FIELD
LEVELS IN WORK ENVIRONMENT**

Cristian Goiceanu, Răzvan Dănulescu

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EU countries are currently adopting the harmonized European standards as national standards. In the domain of occupational exposure to electromagnetic fields, national legislations have to agree to the requirements of EU Directive 2004/40/EC before 29 of April 2008. Until that datum, all technical and methodological standards elaborated by CENELEC regarding the measurement of field levels and the exposure evaluation through dosimetric assessment of field absorption inside tissues have to be assimilated by national regulations.

In Romania, the national regulations in this domain have been updated in October 2006 and they are in very good agreement with the Directive. CENELEC technical and methodological standards have been partly adopted and the other part is going to be adopted soon as Romanian Standards. Consequently, compared to the old legislation, a big change is recorded in terms of regulations, methods, procedures, needed measuring equipment. Consequently, in the new context, a real necessity of highly-specialized personnel occurs.

The complexity of the new methodology, one hand, and the real situation observed in the practice of measurement, on the other hand, made us elaborate a strategy of measuring the occupational levels of EMF, general procedures, as well as some specific procedures to be applied. We took into account frequent errors and mistakes we observed coming in contact with operators of measuring equipment or when analyzing their measurement reports. These procedures have the role of guiding the personnel involved in EMF measurements and the manual we wrote represents a basis in the needed knowledge to assimilate the CENELEC methods.

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**ACTIVITIES AT THE INSTITUTE OF PUBLIC HEALTH OF IAȘI
RELATED TO HEALTH PROTECTION AGAINST EXPOSURE TO NON-
IONIZING ELECTROMAGNETIC RADIATION IN THE INTERNATIONAL,
EUROPEAN AND NATIONAL CONTEXT**

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During last couple of decades, at international and EU level, the issue of protection against non-ionizing electromagnetic radiation has shown an increasing interest. World Health Organization initiated projects on effects of exposure to electromagnetic fields (EMF) and to ultraviolet radiation. ICNIRP elaborated guidelines on limiting exposure to non-ionizing radiation (NIR). European Union adopted Directives and Recommendations to limit human exposure to NIR.

Before 1990, in Romania the issue of health protection against NIR focused on ultraviolet radiation, infrared radiation and lasers. First exposure standard for EMF exposure was adopted in 1996.

At the Institute of Public Health (IPH) of Iasi, the topic of health protection against electromagnetic radiation has been addressed since 1992. In 1997, the Romanian Working group on Non-Ionizing Radiation Protection (RWG-NIRP) was founded in Iasi, based on a core from the Institute of Public Health of Iasi.

During last decade, our team has carried out many NIRP activities: drafting exposure standards, calculation of additional exposure limits, measurement of EMF levels in many workplaces, elaboration of procedures and methodologies for EMF measurement. Moreover, a “Practical guide for EMF measurement at workplaces” was published in 2006. IPH Iasi also participates in an EU Networking Project: *EMF-NET Project*. Scientists from IPH Iasi are also involved in measuring EMF levels at workplaces as well as in epidemiological and experimental studies on EMF exposure. Last, but not least, our **consultancy services** on EMF exposure are provided for all levels of society.

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**RADIOFREQUENCY FIELD MEASUREMENTS BY THE FREQUENCY-
SELECTIVE METHOD IN CONNECTION TO HUMAN EXPOSURE
ASSESSMENT**

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ABSTRACTS

In order to assess the electromagnetic radiation against the appropriate reference levels of human exposure to electromagnetic fields (radiofrequency - RF), the most rigorous method to be used is the detailed investigation, which is also mostly suitable when the exposure level may reach the limits (occupational exposure). Only the execution of this procedure will determine if the limits are exceeded, thus guaranteeing a confidence in the results. Moreover, the uncertainty calculation supplies the precise assessment of human exposure level.

Present contribution aims to discuss aspects regarding the procedure we used in various measurement cases, when field level measurements of GSM signals coming from the base stations or of other RF signals were made. We used two different frequency-selective systems: the TS-EMF system by Rohde & Schwarz - driven by RFEX software and Field Nose System by ARC Seibersdorf - driven by Nose Basic software. The measurements took place at outdoor or indoor sites, in the far-field region of the source antennas. Independent (separate) or comparative simultaneous measurements were made by the two systems during the sessions. This allowed us to observe the settings influence on the measured values and to find the reliable and rationale solutions when discrepancies appeared. The measurement methodology was based, after case, on most actual/suitable regulations.

ICNIRP guidelines reference levels for RF exposure of the population where never exceeded in our research study measurement campaigns, however an unpredictable distribution of the field was almost always present. This conclusion shows that even when simple calculations or software-prediction levels may be obtained, the most reliable result is always the measurement, by using the right procedure, device and expertise.

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EMPLOYEE WITH CARDIAC PACEMAKER IN ELECTROSTATIC WORK ENVIRONMENT – A CASE REPORT

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Cardiocirculatory disturbances have the highest mortality rate in most industrial countries. Among workers with chronic cardiocirculatory diseases may suffer from cardiac arrhythmia and may need a cardiac pacemaker.

Those persons with pacemaker may continue their occupation if the pacemaker is not disturbed by electric fields in the working area.

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This had to be discussed by a **legal procedure**, because the working contract of a worker with a cardiac pacemaker was terminated by the employer.

Having inspected the working area by the court-ordered expert discussed the problem is based on the current scientific knowledge.

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OCCUPATIONAL HEALTH EXPOSURE TO EXTREMELY LOW FREQUENCY ELECTRIC AND MAGNETIC FIELDS, AND SOME RELATED HEALTH EFFECTS IN RAILWAY WORKERS

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The growing of the modern society and the subsequent technology have determined a huge scale development of sources of electric and magnetic fields (EMF). During the last century this implied an unprecedented exposure of human beings to man made EMF. The scientists all over the world faced a new challenge when considering the possible biological effects of these fields. There are thousands and thousands of studies in this research field and we saw, in the last years, even an exponential growth of scientific activity in this domain. The results are rather discordant and frequently inconclusive. The international organizations and the experts involved in this kind of research recommend a growing effort to study thoroughly all the aspects and the implications of the interactions between EMF and human beings in order to be able to protect the people against the hypothetical harmful effects of these fields.

We had in view this wide range of human exposure conditions to extremely low frequency (ELF) EMF caused by the generation, delivery and use of electricity, the potential biological effects of these fields. We have performed some epidemiological studies involving people occupationally exposed to ELF EMF in order to try to contribute to the general scientific effort pointed toward the better knowledge of the hypothesized health effects of this part of the spectrum of nonionising radiations.

ABSTRACTS

The results shows that ELF occupational exposure could be a risk factor for nervous system and for cardiovascular system, by interfering with myocardial excitability and conductivity as well as with the conductivity at the nervous system level. Some other results could indicate an early change towards carcinogenesis.

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HEALTH EFFECTS OF EXPERIMENTAL SUBACUTE EXPOSURE TO ELECTROMAGNETIC FIELDS

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Aim: The purpose of this paper was to study the health effect of low level electromagnetic field in a subacute experimental model. The results in the literature in this respect are conflicting and non-conclusive. Because in the mechanism of biological interaction of electromagnetic field it is postulated the intervention of lipidperoxidative processes, we investigated some oxidative stress markers in tissue specimens of exposed mice.

Material and Methods: Swiss white female mice, 5/group were exposed 1,2,4,8, and 12 hours/day, 15 days in a transverse electromagnetic cell to an unmodulated ultra high frequency field with a power density of 1 mW/cm². We assayed superoxide dismutase (SOD) activity and thiobarbituric acid reactive substances (TBARS) content in liver and back limb muscle tissue. The results were compared to those of an unexposed group and were statistically analyzed through usual methods.

Results: TBARS level augmented in both tissues directly with exposure length, excepting the group exposed 12 hours/day where it drawn towards the control level. This suggests that lipid peroxidation is enhanced in exposed animals, and in the longer exposed group the adaptive mechanisms are acting. Muscle SOD activity was inhibited compared to control, more intensely in the shorter exposed animals. In liver, the most pronounced inhibition was observed in the longer exposed groups, probably due to the complex detoxifying and metabolic tasks of this organ.

Conclions: in our experimental model, we could measure changes of oxidative stress markers consecutive experimental exposure to electromagnetic field. These changes

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in antioxidant status lead to some adaptive responses due to the activation of systems controlling the body protecting mechanism balance.

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