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# FROM RISK-BASED HEALTH SURVEILLANCE TO HEALTH PROMOTION: AN EVIDENCE-BASED EXPERIENCE IN A HEALTH CARE SETTING

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**Abstract.** In the European countries the health surveillance may be provided as a part of the national health system intervention. In Italy, the legislative Decree (626/94) makes the health surveillance compulsory for all those workers who are exposed to occupational risks. The aim of this study was to describe the introduction of preventive and protective measures, according to the new regulations, in the teaching hospital of the University of Modena. The population examined in 2000 included 1523 workers. Specific health surveillance protocols were prepared on the grounds of the risk characteristics based on the scientific evidence and on the risk perception. The intervention was oriented towards health promotion. The subjects were classified into 10 groups according to the risk characteristics. The percentage of workers ranged from 4% to 42%, depending on the exposure-related health changes. Moreover, the study explored some of the health surveillance benefits: an improvement in worker's satisfaction, an improvement in relationship between stakeholders, an early detection of health changes and a sickness absence reduction after the influenza vaccination program.

**Key words:**  
Health surveillance, Health promotion, Risk perception, Risk assessment

## INTRODUCTION

The World Health Organization (WHO) defines health surveillance as “the medico-physiological examination of the exposed workers with the object of protecting health and preventing occupation-related diseases”[1]. Health surveillance shares the aim at contributing health and safety in the work environment with other tools and activities. Accordingly, the EEC Framework Directive on workers' health and safety in the work environment aims to ensure that workers receive the appropriate health sur-

veillance at regular intervals. In the European countries health surveillance may be provided as part of the national health system intervention, if the workers wish so [2,3]. In Italy, this Directive has been implemented by the virtue of several rules, the most important of which is Decree 626/94 [4]. This law makes the health surveillance compulsory for all workers exposed to occupational risks. This activity must be performed by the occupational physician (OP) who also has to co-operate with the employer in the implementation of measures to protect workers' health

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and psychophysical integrity. The OP tasks are specifically described in art. 17 of Decree 626/94. They include: (i) carrying out medical examinations; (ii) assessing work fitness; (iii) setting up medical records; (iv) providing workers and their representatives with information about the meaning of the examinations; (v) providing workers with information about the results of their examinations; (vi) communicating results of the health surveillance and their meaning to workers' representatives. Other obligations are: (i) two workplace visits/year; (ii) risk assessment; (iii) workers examination when needed; (iv) co-operation with the employer in providing first aid service; (v) co-operation in the workers training program.

The aim of this study was to describe the preventive and protective measures introduced in the teaching hospital of the University of Modena according to the new regulations. Moreover, we focused on some other points, according to the analytical framework provided by Conway [5]: (i) to ensure workers' health; (ii) to obtain regulation compliance and company protection; (iii) to perform early detection of health changes; (iv) to reduce costs; (v) to evaluate fitness for job; (vi) to provide medical baseline, and (vii) to be a part of the preventive program.

## MATERIALS AND METHODS

In accordance to the need to comply with the new rules for workers' health protection, the whole population of the teaching hospital was included in the study. Workers were evaluated by risk perception and risk assessment. Specific health surveillance protocols were prepared for different risks and then performed.

### Population

The health surveillance was performed on the basis of the available resources, starting in 1996. About 2600 subjects were examined in 1996–2000, the number of subjects examined differed per year.

The population examined in the year 2000 included 1523 subjects: 953 nurses and midwives, 320 doctors and scientific officers, 211 laboratory and radiological technicians, 39 other professionals (auxiliary staff, administrative and cler-

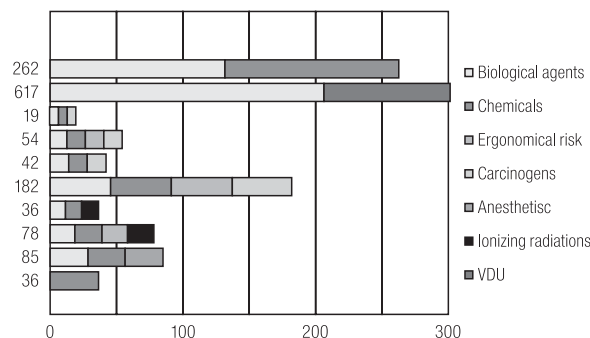


Fig. 1. Workers classified according to hazards.

ical personnel). There were 1057 females (69%), and 466 males (31%). The subjects were classified into 10 groups, according to the risk characteristics, as shown in Fig. 1.

### Risk perception

Risk perception of different stakeholders in the hospital was assessed by individual interview and based on literature data. Health care settings were characterized by a variety of hazards, consisting in physical environment hazards, organization hazards and social environment hazards. Figure 2 shows the risk factors in the work environment as perceived and identified by a group of researchers [6]. The following effects were considered: (i) musculoskeletal disorders and accidents due to musculoskeletal load; (ii) irritative and allergic local or general disorders induced by chemicals; (iii) infectious diseases and biological accidents evoked by biological agents; (iv) gastrointestinal changes, sleep disturbances and job-related chronic fatigue, shift work and night work; and finally (v) relationships with managers, colleagues, clients and patients. Figure 3 shows the different risk perception among different stakeholders; the risk most frequently reported was the biological one, followed by the musculoskeletal load, shift work and stress. However, it should be stressed that difference exists between the risk perception among different stakeholders: employers focus more on the biological risk, trade unions are more concerned about musculoskeletal load and others consider other problems (chemicals, stress, shift work) as relevant.

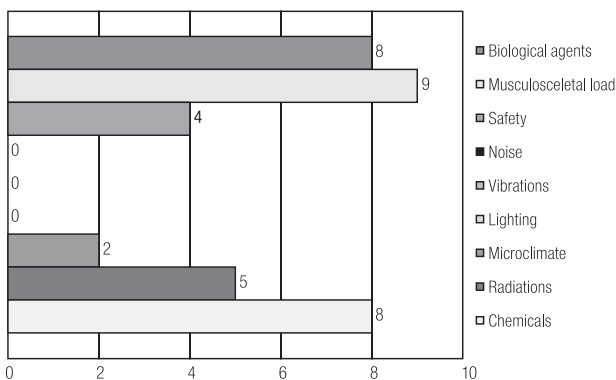


Fig. 2. Physical environment hazards.

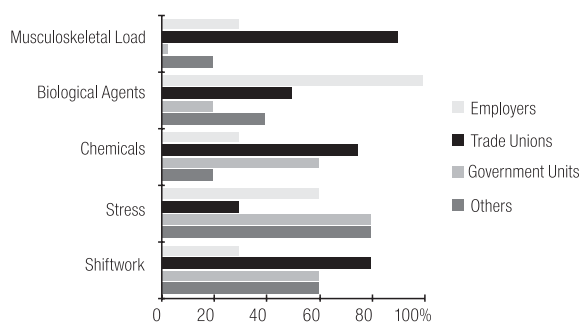


Fig. 3. Hazards and risks in health care settings: perception among stakeholders.

**Risk assessment**

As an example of the approach based on scientific evidence, we report the case of establishing a specific protocol for the anesthetic-exposed workers. Firstly, the hazards were identified: in the operating theatre we could find anesthetics (nitrous protoxide, forane) and other chemicals, including latex gloves and physical agents (microclimate and radiation), as well as other risk factors associated with work organization. Secondly, the exposure measurements were performed according to the available methods. In the operating theatre, we performed environmental biological monitoring of nitrous protoxide and forane. Thirdly, the dose/response relationship was evaluated. The literature data on anesthetics report an increased relative risk for liver diseases (RR = 2.22; 95% CI: 1.06–4.08; p < 0.05) [7], performance changes in workers exposed to nitrous protoxide of about 50 ppm [8] and spontaneous abortion (RR = 1.48; 95% CI: 1.4–1.58) [9]. The final phase consisted in the risk assessment that is the risk-based surveillance protocols supported by scientific

evidence provided by the literature. If the data were neither available, nor relevant to health status monitoring, a generic medical protocol was applied. This protocol was based on the health promotion approach, including counselling. The health examination of each subject was performed by an OP and an OP trainee. Each examination included a fitness judgement legally required by the Italian law.

**RESULTS**

Figure 4 shows the health changes according to hazards found in the population. Either anamnestic data, or laboratory or instrumental abnormalities were considered as health changes. The following observations were made: 25% of workers exposed to anesthetics showed liver enzyme changes (4.9%), subjective health changes (12.1%), and others (8%); 6% of workers exposed to carcinogens showed: liver enzyme changes (1.4%), irritative dermatitis (1.4%), reproductive changes (2.7%); 16% of workers exposed to chemicals showed: eczema (3%), irritative and allergic dermatitis (5.5%), rhinoconjunctivitis (3%), asthma (1.8%), Quincke’s edema (0.2%), and others (2.6%); 42% of workers exposed to lifting patients and other loads complained of: backbone changes (3%), lumbar disk syndrome (6.4%), upper limb symptoms (3%), lower limb symptoms (3.2%), low back pain (27%); 4% of workers exposed to ionizing radiation showed: blood disorders (0.85%), cancers (1.7%), and monoclonal gammaopathy (1.7%). Among video display unit workers, 13% manifested ocular fatigue (1.6%), musculoskeletal symptoms (2.3%), and ocular changes (8.6%). Among consequences of exposure to biological agents we looked for HBV and HCV serologic conversion in 2532 subjects: 23 subjects (0.91%) tested had HbsAg positive, including 2 subjects with HBeAb positive, and 47 subjects (1.86%) were HCV Ab positive, including 17 subjects with HCV RNA positive.

In the population examined in the year 2000, 163 workers (11%) were judged unfit for work (2% for chemical risk, 1% for physical risk, 7% for ergonomical risk, 1% for other risks). A selected group of 26 workers with impaired work ability was followed-up for a 5-year period (Table 1).

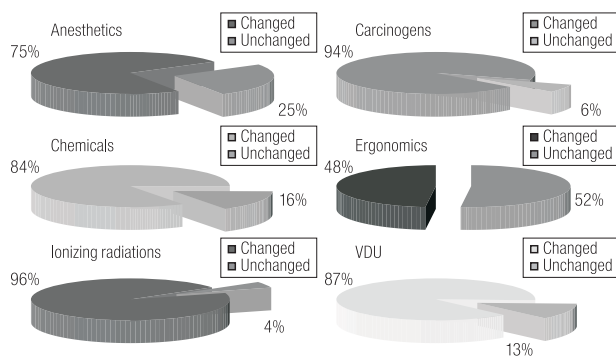


Fig. 4. Health changes according to the hazard.

Table 1. Follow-up (1996–2000) of 26 workers with impaired work ability

	Number of subjects	Number of subjects fit after removal from exposure or PPD	Number of unfit subjects	Effectiveness %
Ergonomical problems:				
• Decreased ability to lift patients	11	6	5	55
• Postural difficulties	4	2	2	50
Exposure to chemicals:				
• Major latex dermatitis	4	4	0	100
• Hepatitis	1	1	0	100
Exposure to ionizing radiation	6	6	0	100

It included workers visited at least twice throughout the whole period: 15 were judged unfit for ergonomic problems (11 for decreased ability to lift patients and 4 for postural difficulties), 5 because of chemical exposure (4 for major latex dermatitis, 1 for hepatitis), and 6 because of exposure to ionizing radiation. We evaluated the difference between the first and the last fitness judgements. Table 1 shows the variation in work ability throughout the period and the effectiveness of the health surveillance in terms of reduction of workers unfit for job.

## CONCLUSIONS

The aims of the health surveillance consists in different aspects: (i) to ensure workers' health; (ii) to comply with regulations; (iii) to detect health changes at their onset; (iv) to reduce cost; (v) to provide fitness for job judgement; (vi) to provide a medical baseline; and (vii) to be part of the preventive program. Some of these aspects are perceived as benefits by different stakeholders. The employers indicated as beneficial: improved workers' satisfaction, reduced costs, improved interpersonal relations, and early

detection of health changes [5]. The study showed that others found beneficial: improvement in workers' satisfaction, better relationship between stakeholders (even though based on qualitative data only), an early detection of health changes in few cases and a sickness absence reduction after the influenza vaccination program.

## REFERENCES

- World Health Organization. *Biological Monitoring of the Chemical Exposure in the Workplace*. Geneva: WHO; 1996.
- European Union. *Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work*. Luxembourg: EU; 1989.
- Franco G, Alessio L, Saia B. *Health surveillance: scope, tools, efficacy, prospects*. *G Ital Med Lav Erg* 1999; 21: 108–13 [in Italian].
- Repubblica Italiana. *Decreto legislativo. 626/94*. Rome; Official Journal No. 262; 12 November 1994 [in Italian].
- Conway H, Simmons J, Talbert T. *Effects of occupational medical surveillance programs as perceived by respondents to Occupational Safety and Health Administration's 1990-91 survey*. *JOM* 1993; 35: 687–97.
- Verschuren R, de Groot B, Nossent S. *Working conditions in hospitals in the European Union*. Dublin: European Foundation for the Improvement of Living and Working Conditions; 1995.
- Carpenter LM, Swerdlow AJ, Fear NT. *Mortality of doctors in different specialties: finding from a cohort of 20000 NHS hospital consultants*. *Occup Environ Med* 1997; 54: 388–95.
- Lucchini R, Belotti L, Cassitto MG, Faillace A, Margonari M, Micheloni G, et al. *Neurobehavioral functions in operating theatre personnel: a multicenter study*. *Med Lav* 1997; 88: 396–405.
- Boivin JF. *Risk of spontaneous abortion in women occupationally exposed to anaesthetic gases: a meta-analysis*. *Occup Environ Med* 1997; 54: 541–8.

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