

# A contribution to occupational health: a guide on the exposure to biological fluids

UMA CONTRIBUIÇÃO À SAÚDE DOS TRABALHADORES: UM GUIA SOBRE EXPOSIÇÃO AOS FLUÍDOS BIOLÓGICOS

UNA CONTRIBUCIÓN A LA SALUD DE LOS TRABAJADORES: GUÍA SOBRE EXPOSICIÓN A LOS FLUIDOS BIOLÓGICOS

**Fernanda Moura D'Almeida Miranda<sup>1</sup>, Altair Von Stein Junior<sup>2</sup>, Silvia Petreli<sup>3</sup>, Moacir Ramos Pires<sup>4</sup>, Leticia Gramazio Soares<sup>5</sup>, Bárbara Nicolato Ribeiral<sup>6</sup>, Leila Maria Mansano Sarquis<sup>7</sup>, Vanda Elisa Andres Felli<sup>8</sup>, Marina Ciola Lorusso Xavier de Oliveira<sup>9</sup>**

## ABSTRACT

Health workers are exposed to occupational hazards at the workplace, among which we highlight the biological risk. Information and orientation should be provided regarding the conduct that workers are expected to follow in the case becoming exposed. Thus, this guide is intended to provide the elements to orient workers' conduct in cases of biological exposure, improving adherence to the monitoring protocol.

## DESCRIPTORS

Occupational risks  
Nursing  
Health personnel  
Occupational health

## RESUMO

Os trabalhadores da saúde estão expostos a riscos ocupacionais no seu ambiente de trabalho, destacando-se, dentre eles, o risco biológico. A conduta esperada do trabalhador após esta exposição deve ser definida e orientada, para que medidas preventivas possam ser adotadas. Assim, pretende-se com este guia fornecer subsídios para a conduta dos trabalhadores em relação à exposição biológica, contribuindo para a adesão ao protocolo de monitoramento.

## DESCRITORES

Riscos ocupacionais  
Enfermagem  
Pessoal de saúde  
Saúde do trabalhador

## RESUMEN

Los trabajadores de la salud están expuestos a riesgos ocupacionales en su ambiente de trabajo, entre ellos se destaca el riesgo biológico. La conducta esperada del trabajador luego de esta exposición debe ser definida y orientada para que medidas preventivas pueden ser adoptadas. De este modo, se pretende con esta guía brindar ayuda a la conducta de los trabajadores en relación a la exposición biológica, contribuyendo a la adhesión al protocolo de monitoreo.

## DESCRIPTORES

Riesgos laborales  
Enfermería  
Personal de salud  
Salud ocupacional

<sup>1</sup> MSc student in Nursing of the Federal University of Parana. Specialist in Hospital Epidemiology and Infection Control. Nurse of the Worker's Health Unit. Member of the GEMSA Research Group. Curitiba, PR, Brazil. fernadadalmeyda79@hotmail.com <sup>2</sup> MSc in Health Technology. Nurse of the Worker's Health Unit. Curitiba, PR, Brazil. altairstein@pop.com.br <sup>3</sup> Specialist in Human Resources Training. Social Worker of the Worker's Health Unit. Curitiba, PR, Brazil. silviapetreli@sesa.pr.gov.br <sup>4</sup> Infectologist Physician of the Worker's Health Unit. Curitiba, PR, Brazil. dr.mpramos@gmail.com <sup>5</sup> Nurse. MSc student of the Federal University of Parana. Curitiba, PR, Brazil. leticiagramazio@yahoo.com.br <sup>6</sup> Nurse of the Federal University of Parana. Curitiba, PR, Brazil. barniri@hotmail.com <sup>7</sup> Nurse. Adjunct Professor, of the Graduation in Nursing Course of the Federal University of Parana. Member of the GEMSA Research Group. Member of the Quality of Life Research Group of the Department of Nursing Administration of the School of Nursing, University of São Paulo. Curitiba, PR, Brazil. leila.sarquis@ufpr.br <sup>8</sup> Nurse. Associate Professor of the Department of Professional Guidance of the School of Nursing, University of São Paulo. Leader of the Studies of Nursing Staff Health Research Group of the School of Nursing, University of São Paulo. São Paulo, SP, Brazil. vanda.felli@pq.cnpq.br <sup>9</sup> Specialist in Occupational Psychology. Psychologist of the Worker's Health Unit. Curitiba, PR, Brazil. ma\_marina26@hotmail.com

## INTRODUCTION

The possibility of exposure to biological fluids occurs among healthcare workers and may cause harm to their health. These workers perform, direct or indirect care to the patients, and are exposed to microorganisms found in the blood or other biological fluids, such as urine, feces, among others<sup>(1-3)</sup>. The risk of exposure is present in different work environments, such as Primary Health Units, hospitals, clinics, outpatient clinics, dental surgeries or clinics, and in healthcare services. However, the hospital environment presents more complexity, mainly because it focuses on patients with infectious, contagious and parasitic diseases, and also because it concentrates a large number of workers<sup>(4-6)</sup>. The risk of the worker developing infections after exposure to biological material is variable and depends on the type of accident and on other factors. Therefore, these accidents are considered emergency cases due to the need for chemoprophylaxis for the prevention of Human Immunodeficiency Virus (HIV) infection within the first two hours after biological exposure. Injuries from needles and piercing-cutting materials are considered dangerous because they can transmit more than 20 different types of pathogen, among them HIV and the Hepatitis B and C viruses. The average risk of acquiring HIV is approximately 0.3% after percutaneous exposure, and 0.9% after exposure through mucous membranes. The probability of infection with the hepatitis B virus after percutaneous exposure is greater than the probability of HIV infection, possibly reaching 40%. For hepatitis C, the average risk is 1.8%<sup>(7)</sup>.

One way to avoid or reduce these accidents is the use of preventive measures, with the use of personal protective equipment (PPE), such as gloves, goggles, gown and mask, the establishment of biosafety standards, not recapping needles, adequate disposal of piercing-cutting materials immediately after use, the implementation of training through continuing education and vaccination immunization<sup>(7)</sup>. These measures are not always adopted, both by the health institutions and the workers, which implies a great exposure of workers to biological agents such as viruses, bacteria and parasites. Studies conducted both in the international and national context, have shown the problem of work accidents with biological material among healthcare workers, allowing the frequency and severity of this exposure to be evaluated.

The confirmed cases in the United States, described by the Centers for Disease Control (CDC), up to December 2001, totaled 57 cases of seroconversion after occupational exposure and 138 suspected cases of seroconversion among healthcare workers. The CDC estimates that each year 385,000 piercing-cutting injuries occur among

health workers, i.e. an average of 1,000 percutaneous injuries per day<sup>(8-9)</sup>. Accidents with piercing-cutting instruments are the main form of HIV transmission among health professionals, as reported by several authors<sup>(10-13)</sup>. The WHO affirms that health workers have suffered approximately 16,000 infections by the Hepatitis C Virus (HCV), 66,000 infections by the Hepatitis B Virus (HBV), and 1,000 HIV infections. These results express the problem of the health of these workers, causing illnesses and disabilities that can compromise their quality of life<sup>(14)</sup>. The data recorded by the Occupational Safety and Health Administration (OSHA) shows that, from 1992 to 2002, of the 67,363 workers that died from occupational diseases, 28 were healthcare workers who had accidents with piercing-cutting instruments. This study shows a more complex problem when considering that the health workforce in the United States is composed of 6 million workers<sup>(15)</sup>. A study conducted in Rio de Janeiro analyzed the work accidents which occurred with bodily fluids and showed that the individual, collective and institutional perceptions indicate a restructuring of the standards of the safety procedures in the hospital environment, in order to minimize these risks<sup>(16)</sup>.

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Chemoprophylaxis reduces the risk of HIV seroconversion, however, the initiation of pharmacotherapy should take place immediately after the exposure to biological fluids. Behavior and personal conduct become aggravating factors, because when workers abandon the medication the vulnerability to possible seroconversion increases<sup>(17)</sup>. This study showed that 58.3% of the workers exposed to biological material did not receive the necessary guidance at the time of the accident. The most significant and disturbing fact was the percentage of workers (42.8%) who did not complete the chemoprophylaxis indicated. Adding to this severity, 23.8% of these workers refused the prescribed medication. In another study, 66.6% of the sample did not correctly follow the standards proposed. These data are expressive and indicate the need for revision and elaboration of accidental exposure to human bodily fluid prevention strategies<sup>(18)</sup>. Preventive strategies can reduce or minimize biological exposure. These strategies include: immunization for HBV, the use of protective barriers and of drug prophylaxis after HIV exposure, when indicated<sup>(14)</sup>. This occupational exposure is experienced in the work quotidian, however, there is a large amount of underreporting of these accidents and it is noted that often the workers do not adhere to the monitoring stipulated in the biological monitoring protocol<sup>(19)</sup>. Thus, considering the high frequency and severity of occupational exposure to biological fluids and the need to disseminate knowledge about the preventive practices, this article intends to provide subsidies for safe working conditions, as regards the exposure of workers.

This article reports the experience in the Occupational Health Unit, which is a reference for the care of workers exposed to biological fluids in the city of Curitiba. The guidance reported here is backed in the legislation and is transmitted during monitoring by nurses, infectologists, psychologists, social workers, professors of the Multidisciplinary Study Group of Adult Health (GEMS) of Parana Federal University and professors of the Quality of Life Research Group of the ENO Department of EEUSP. It is therefore proposed to construct a guide to contribute to adherence to the biological monitoring protocol, in accordance with the following guidelines and interventions.

### Information to the workers

- **Even if the exposure is a drop on the mucosa, the worker must carry out the follow-up:** Regardless of the type of exposure and amount of secretion, the follow-up should be performed for 6 months<sup>(7)</sup>.

- **If the source-patient is elderly or a child, there is a risk of contamination:** For any source-patient, regardless of their age, medical condition, optional celibacy or sexual orientation, serology for HIV, HBV and HCV must be requested. The risk of contamination is present<sup>(7)</sup>.

- **Negative HIV results after testing the source-patient:** Among the agents transmitted by blood, the least infectious is HIV. The Hepatitis B and C viruses present higher transmissibility than HIV and cannot be neglected in any way in the evaluation of exposed workers. Patients with recent exposure to HIV, less than three months, may be within the immunological window period and test negative. Therefore it is necessary to investigate whether the source-patient has been exposed to infection in the last three months. If so repeat the examinations. If the source-patient is negative for HIV, antiretroviral chemoprophylaxis is not indicated, however, serological monitoring for HIV and Hepatitis B and C should be carried out, even with the possibility of HIV infection being very low<sup>(7)</sup>.

- **All health professionals should be vaccinated against Hepatitis B:** The vaccine for Hepatitis B is available from the Brazilian National Health System (SUS) for all health professionals, with immunization achieved through three doses, with an interval of one month between the first and second dose and six months between the first and third dose (0, 1 and 6 months)<sup>(7)</sup>.

- **Results of the examination on the day of occupational exposure:** The examination performed on the day of biological exposure serves as security for the worker to prove their state of health at the time of the biological exposure, being necessary to repeat the examination for HIV after 30 days due to the immunological window. The total period for antibody detection, i.e. the immunological window, is characterized by undetectable viral markers in the blood sample<sup>(20)</sup>.

- **Donation of blood after the biological exposure:** In cases of accidents with biological material, donating blood should be avoided for a period of 12 months<sup>(7)</sup>.

- **Pregnancy after occupational exposure:** It is recommended not to become pregnant during this period, the exposed worker should use condoms in all sexual relations, mainly in the 6 to 12 weeks after exposure, just to be safe<sup>(7)</sup>.

- **Breastfeeding after occupational exposure:** The physician and nursing professional who attend the victim should indicate that breastfeeding should be interrupted after exposure<sup>(7)</sup>.

- **Refusal to carry out the examinations by the source-patient:** The examinations of the source-patient can only be performed if they permit this. There is no law that requires them to perform the examinations. In these cases the assisting physician should be contacted and requested that they inform the patient about the importance of the examinations<sup>(21)</sup>.

### Procedure faced with biological exposure

- **Actions to be taken immediately after the accident with biological fluids:** Advise the worker to remain calm; advise them to wash the area of the wound with soap and water in cases of percutaneous or cutaneous exposure; advise them to wash thoroughly with water or saline mucosa exposures; alert the service, in which the worker suffered the occupational exposure, to provide the serological examinations for Hepatitis B, Hepatitis C and, if possible, the rapid HIV test when the source-patient is known; the worker should seek emergency care at the Emergency Unit, preferably from 2 to 6 hours after the accident, to conduct Hepatitis B Surface Antigen Determination (HBsAg) testing, the Antibody against Hepatitis B Virus Core Antigen (Anti-HBc) test, the Antibody against Hepatitis C Virus (Anti-HCV) test and the Antibody against the Human Immunodeficiency Virus (Anti-HIV) test and to verify the need for the use of chemoprophylaxis; the indication of chemoprophylaxis will be according to the medical procedure in the Emergency Unit, according to the protocol of the Ministry of Health; advise the worker that a Notice of Work Accident (NWA) should be issued by the company and that the medical certificate should be completed at the Emergency Unit; advise the worker of the performance of the 6 month follow-up after biological exposure; reinforce that monitoring abandonment may compromise their health, since non-adherence is around 70%; the worker should inform the person in charge immediately if they present the following symptoms: lymphadenopathy, rash, sore throat or flu symptoms, which are symptoms suggestive of acute seroconversion; advise the temporary suspension of breastfeeding and attempts to become pregnant, as well as the suspension of blood donation by the worker during this period; and reinforce with the worker the biosafety measures and basic precautions while they are on duty<sup>(7,8,21)</sup>.

### Procedure after biological exposure

• **All workers should perform the follow-up and monitoring for a period of 6 months:** After occupational exposure all workers should, according to the protocol of the Ministry of Health, perform the follow-up for 6 months, regardless of the type of exposure<sup>(7)</sup>.

• **Prophylaxis after biological exposure:** Workers will make use of prophylaxis if a positive result for HIV or Hepatitis B is obtained from the source-patient, or if this source-patient has a clinical-epidemiological history suggestive of HIV or Hepatitis B infection. If the source-patient is unknown prophylaxis will possibly be indicated, depending on the severity of the accident (greater volume of blood, deep wounds, large caliber needles, etc.) and the epidemiological profile of the workplace. The post-exposure prophylaxis (PEP) indicated for HIV should be initiated as soon as possible, preferably within the first two hours after the accident. It is recommended that the maximum period is up to 72 hours after the accident. The duration of the chemoprophylaxis is 28 days.

The preferential schemes for PEP established by the Ministry of Health (MH) are: Basic – Zidovudine (AZT)+Lamivudine (3TC) - preferably combined in one tablet; expanded preferred in which three antiretrovirals or two antiretrovirals plus a protease inhibitor are combined. The most indicated is AZT + 3TC + TENOFOVIR (TDF), as it offers the advantage of convenient dosing regimen (three tablets daily), better adherence and less toxicity in the short-term; another option is AZT + 3TC + lopinavir/ritonavir (LPV/r.) and expanded alternative, recommended in cases of intolerance or adverse effects to the preferential scheme, being: TDF + 3TC + LPV/r<sup>(20)</sup>.

The prophylaxis for Hepatitis B for those exposed who were not vaccinated is Hepatitis B immunoglobulin, within seven days of the occupational exposure, but, ideally within the first 24 hours after exposure<sup>(7)</sup>.

### Preventive procedures faced with biological exposure

• **Piercing-cutting materials:** Do not remove, bend or recap needles already used in procedures. Take care and pay attention with piercing-cutting materials, such as blades, glass and short-bevel catheters, try to discard them in containers appropriate for this purpose in accordance with the current standards.

• **Handwashing:** After carrying out procedures which involve the presence of blood, bodily fluids, secretions and items contaminated by these, or after removing gloves; before and after contact with each patient.

• **Personal Protective Equipment:** Use disposable gloves when the procedure or situation involves the pos-

sibility of contact with biological materials, such as blood, cerebrospinal fluid, semen, vaginal secretions, mucosae, broken skin or any object that may be contaminated. Masks, goggles and face shield should be used in situations in which contact may occur through splashing or squirting of blood or secretions. An apron suited to the situation should be used where there is a possibility of contamination from biological material. Shoes should be completely closed, and waterproof boots are indicated when there is the possibility of contact of the feet with wet or damp environments.

• **Precautionary Measures:** Use support material, such as kidney pan and tray, during any invasive procedure for the placement of piercing-cutting materials. Separate carefully the piercing-cutting materials from the drapes and clothes used in invasive procedures, after the performance of the procedure. Never place piercing-cutting materials in the common waste of the rooms, corridors and offices. The piercing-cutting box should be sealed and transported by the straps keeping it away from the body. Do not store this material in pockets or bed sheets<sup>(21)</sup>.

### CONCLUSION

Work accidents with biological fluids in healthcare workers are among the most frequent and the most serious accidents and can cause the development of diseases. Occupational exposure among these workers, more specifically, among the nurses, can be attributed to several direct or indirect factors, such as: integral and direct care to the patient, administering medication and dressing wounds; cleaning and sterilization of surgical materials and diverse instruments; excessive workload; inappropriate conditions for carrying out the work process; not adopting preventive measures, including not using personal protective equipment and not vaccinating against hepatitis B; and others. Thus, it can be said that for modification of the conditions shown above it is necessary to guide the workers, primarily because exposure to biological fluids subjects them to various health problems, with often dire and irreversible consequences. This may lead to sick leave, unemployment and the impossibility of returning to the same work position. Monitoring these workers, through the protocol established by the Health Ministry, is also necessary, as well as the promotion of adherence. It was found that, even with this protocol, which must be followed by all health workers, the reality experienced shows noncompliance due to ignorance, the difficulty of changing behavior and the lack of institutional investment in the training of the workers. Accordingly, the content covered in this text constitutes a guide to support institutional interventions that are necessary for the valorization of the health professionals in their bio-psycho-social aspects.



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