

# Double gloves using as a prophylaxis element against blood-borne infections among paramedics personnel

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## Summary

**Introduction.** Medical rescuers are particularly exposed to the risk of blood-borne infections. The use of personal protective equipment in this occupational group is extremely important.

**Purpose.** This study aimed to assess the use of double protective gloves as part of prevention of blood-borne infections in this professional group.

**Material and Methods.** The study included 220 paramedics employed in emergency departments and emergency medical teams. The material was collected by an anonymous questionnaire, the questionnaire was specifically designed for the needs of research.

**Results.** Only 8% of paramedics at work applying double gloves. The main reasons for non-dual protective gloves include: difficulties in manipulating hand (67%), tingling or numbness of the hands (56%), decreased sensation hands (23%). 45% of respondents do not see the need for the use of double gloves.

**Conclusions.** Medical rescuers minimize the risk of infection with HBV, HCV, or HIV during exposure to infectious material. Men, people with higher education and working in the emergency medical teams away frequently use double gloves for the prevention of blood-borne infections. Every third paramedic never reported needle sticks contaminated with biological material of the patient. It is the introduction of compulsory training for the prevention of blood-borne infections paramedics.

**Key words:** paramedic, double gloves, blood infection.

## Introduction

Paramedics due to the nature of the profession and thus frequent contact with blood are counted as surgical specialty physicians are faced with the risk of contact with infectious material [1,2].

Occupational exposure of medical personnel to pathogens blood is a serious problem. In 2010, in Poland in 2933 reported cases of occupational diseases, while 24.9% were infectious diseases or

parasitic [3,4]. The most common occupational disease is transmitted blood-borne viral hepatitis, both HBV [5]. Health care workers also should not underestimate the possibility of contamination by biological material with HCV or HIV. One of the basic principles used in medical emergencies is "their own safety" and therefore medical personnel, including paramedics should use all available means of personal protection to reduce the risk of infection [6]. Taking into ac-

count the possibility of infection HBV, HCV, or HIV, each patient should be treated by paramedics as potentially infected [7].

In the literature there is no scientific reports on the use of double gloves by paramedics as part of the prevention of blood-borne infections. Therefore, it seems purposeful risk assessment and prophylactic against haematogenous infections in a group of paramedics.

## Methods

Studies have been conducted during the 01-06.2012. Study group consisted of 220 paramedics working in emergency departments and emergency medical teams away throughout the Polish.

The respondents ranged in age from 22 to 42 years (mean: 29 years), and their length of service ranged from 1-21 years (mean: 4.5 years). The majority of respondents as the main place of work indicated emergency medical mobile teams (76%). 54.54% of respondents declared a paramedic diploma earned in post-secondary vocational study, the other person had a higher education. Most respondents were male (N=171, 77.7%).

As a research tool anonymous author interview questionnaire consisting of 10 questions. The research material was developed in MS Excel 2010 and developed using the Statistica 10.0. The results are presented in the form of numbers, percentages or percentage of the median. For the analyses used Student's t-test and Kruskal-Wallis test. Results were considered statistically significant at  $p < 0.05$ .

## Results

The question "How do you (and) believe that the percentage of patients are infected with HBV, HCV and HIV?" respondents told  $9\% \pm 1.2\%$ ,  $4\% \pm 1.4\%$  and  $5.3\% \pm 1.2\%$ . They know about the risks of infection while stabbing a needle contaminated with biological material in the case of HBV showed a 18% HCV – 12% of HIV – 14% of respondents. Most respondents downplayed the risk of infection.

Only 8% of participants in the study paramedics always use double gloves. The main reported reason why other people do not use double gloves

with respect to each patient can include: difficulties in precise manipulation of hand (67%), tingling or numbness of the hands (56%), decreased sensation hands (23%), while 45% of respondents do not see the need for the use of double gloves. Only 17% of respondents always use protective goggles and masks.

Vaccination against hepatitis B were performed in 100% of paramedics. However, 29% of respondents held a full series of three vaccinations, while only 18% examined the levels of anti-HBs. People who investigate the levels of antibodies were characterized by statistically significantly longer period of professional practice ( $14.3 \pm 2.1$ ) compared with the group not examining each antibody ( $6.3 \pm 0.9$ ,  $p < 0.0001$ ).

In response to the question "How often report the actual stabbing a needle contaminated with biological material of the patient?" The answer always was declared by 14% of paramedics, sometimes (11%), from time to time (15%), rarely (27%), while 33% never reported this fact. The average number of needle prick in the past three years in the study group was  $2.4 \pm 0.6$  at once.

Eye and mucous membrane irritation by secretions of the patient in the last three years reported 19% of paramedics, including secretions persons with confirmed HIV infection, AIDS, HBV, HCV has been exposed respectively 3.2%, 0.9%, 9% and 5, 45%. Following exposure to secretions of HIV-infected patient, HBV, HCV, 21% were treated with antiretroviral drugs.

Table 1 shows the effect of selected factors influencing the wearing by paramedics double protective gloves.

Table 2 shows the correlations between selected demographic variables of the study group paramedics, and the results of preventive measures applied by the professional group.

The analysis revealed a statistically significant correlation between the use of double gloves, goggles, checking the level of anti-HBs and frequency of reporting cases of the exhibition and gender. In the case of men, the more important factor was the use of double gloves and protective glasses as well as giving up checking the level of anti-HBs. In the case of the relationship between age of the re-

**Table 1:** The reasons for the use of double gloves by paramedics.

	Very important (%)	Important (%)	Not important (%)
Patient age	11.5	15.6	72.9
Patient gender	23.6	12.5	63.9
Marital status	10.4	9.6	80.0
Hospital	18.4	16	65.6
EMS	58.6	31.2	10.2
Trauma case	74.6	23.4	2.0
IV drug user	46.4	14.2	39.4
HIV infected	89.8	4.2	6.0
Hepatitis carrier	94.6	2.4	3.0

infections is particularly important in the case of emergency medical attention, that persons practicing the profession take medical rescue activities to persons in a state of sudden health threat, hence the majority of procedures is associated with direct contact with body fluids of the patient [6,10].

Due to the fact that paramedics are a relatively new professional group – as introduced Legislative Decree of 8 September 2006 on the National Emergency Medical Services – there are no studies in the scientific literature related to the prevention of blood-borne infections in this professional group.

**Table 2:** The correlation between demographic variables and protective actions taken.

	Gender	Age	Education level	Work experience	Work place
Double gloves using	0,24*	0,12	0,23*	0,15	0,23*
Safety glasses using	0,22*	- 0,06	0,24*	0,11	0,25*
anti-HBs verification	0,27*	0,25*	0,29*	0,24*	0,19
Bloodborne exhibition reporting	-0,24*	- 0,18	0,23*	0,19	- 0,27*
					* p<0,05

spondents, there was only statistical significance with respect to reporting cases of the exhibition. Older people often undergo this test than younger people. In the case of the demographic variable defined as “education”, it significantly correlated with factors such as the use of double gloves and protective glasses, checking the level of anti-HBs and reporting of the exhibition.

All factors were significant in the case of higher education than secondary education. Significant correlations with respect to the variable “Place of work” was observed in the case of the use of gloves and goggles and reporting cases of the exhibition. The use of gloves and goggles was more significant in the case of persons working in the emergency medical teams away, while others report cases of the exhibition was more important for those working in emergency departments.

## Discussion

Exposure to blood pathogens among medical staff is serious problem that must first be prevented [6,8,9]. The problem of blood-borne

According to a report by the World Health Organization in 2003, 38% of viral hepatitis (hepatitis) type B, 39% hepatitis C, and 4% of HIV / AIDS recognized among medical staff in the world resulted from occupational exposure by stabbing a needle [11]. According to the Centers for Disease Control and Prevention (CDC) among people working in the health care in the United States each year there are 385 thousand. such cases, work-related [12]. In Poland, the data published by the Institute of Occupational Medicine prof. J. Nofer in Lodz show that in 2008, hepatitis B and C accounted for almost half of all documented cases of occupational diseases among workers in health care [13]. Taking into account the results cited above can not be underestimated occupational risk HBV, HCV, or HIV.

An important element considered in the context of prevention of blood-borne infections is the use of the medical staff of personal protective equipment, whether gloves or goggles. Scientific research shows that health professionals routinely do not follow safe behaviour at work and do not use barrier protection measures [14,15]. As

the research Gańczyk and Szych only 5% of the staff of the treatment applies both gloves and masks, gowns, and eye protection [16]. In our study, only 17% of paramedics apply protective glasses in case of exposure to potentially infectious material, while 8% said dual protective gloves. So far, studies on the use of double gloves were conducted only among the staff of the treatment. It is true that double gloves do not protect from needle stick but research shows that when applying them less likely to break the continuity of skins. Furthermore, as shown Berguer and Heller risk of exposure to blood of the patient in the event of the application of double gloves decreased by 87% [17]. In turn Quebbeman et al showed that the risk of damage to the procedures 143 of one pair of gloves was 51% while only 7% of cases, to damage of both pairs of gloves [18]. Other authors also point to reduce the risk of damage to the skins of needle sticks by contaminated biological material [19,20,21,22], or a direct contact with the patient's blood medic skin coating [23,24]. Analysing these data seems to be indisputable fact greater protection when using dual protective gloves especially when performing procedures associated with the use of sharp tools or direct contact with body fluids of the patient.

How to give Webb and loop during the use of double gloves respondents reported a decrease in sensitivity and the ability to precisely manipulate the hand [25]. In the present study demonstrated that the main reason for non-use of double gloves were problems with the precise moving hand and a tingling sensation.

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If you have already come into contact with infectious material of the patient is essential that quick notification of occupational exposure to blood. Unfortunately, in this case scientific studies show numerous instances of non-compliance with the recommendations of the exhibition.

Analysis of the research material showed that 33% of paramedics never contaminated needle stick injury report potentially infectious material, while only 14% reported always any, fact. Reporting of occupational blood exposure in other occupational groups of health professionals is also low [14,26,27]. Please note, therefore, that early notification of exposures, and thus early diagnosis of infection increases the chances of a cure.

## Conclusion

- 1) Paramedics minimize the risk of infection with HBV, HCV, or HIV during exposure to infectious material.
- 2) Man, people with higher education and working in teams exit emergency medical services use the most double gloves for the prevention of blood-borne infections.
- 3) Every third paramedic never reported needle sticks contaminated with biological material of the patient.
- 4) Indicated is the introduction of compulsory training in prevention of blood-borne infections for paramedics.

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