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THE STUDY OF THE CONTENTS OF FIRST AID KITS FOR RESCUERS AND THE SESU WORKERS

Aim. To compare the contents of first-aid kits of rescue teams in different countries.

Materials and methods. In the process of research the methods of content analysis, comparison, analysis, synthesis and generalization and expert survey were used. The experts were rescuers and workers of the State Emergency Service of Ukraine (SESU).

Results. As a result of the expert survey it has been determined that all fire and rescue teams today are staffed with first-aid kits. However, most respondents noted that in their professional activities they had to use first-aid kits to provide the first aid to the injured or colleagues. All respondents consider it necessary to have a first-aid kit in a rescue vehicle and to attend first aid courses. The content analysis has shown the main aspects of providing the SESU workers with medical products and medical devices. A comparative analysis of the contents of first-aid kits for rescuers has revealed significant differences in their component parts depending on the legislative framework of the country.

Conclusions. Trends in emergencies, the number of victims and deaths in recent years in Ukraine have been studied. The content analysis of the regulatory framework for medical equipment of fire and rescue teams has been conducted, and it has allowed determining the contents of first-aid kits that fire (rescue) teams and operational-mobile groups should be equipped with. The studies have shown the need to improve the contents of first-aid kits of rescuers.

Key words: first-aid kits; first aid; rescuer; medical products; medicine.

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ДОСЛІДЖЕННЯ СТАНУ АПТЕЧОК МЕДИЧНИХ РЯТУВАЛЬНИКІВ ТА ПРАЦІВНИКІВ ДСНС

Мета: порівняння складу аптечок медичних, якими укомплектовані бригади рятувальників у різних країнах.

Матеріали та методи: методи контент-аналізу, порівняння, аналізу, синтезу та узагальнення й експертного опитування, яке здійснювалося за допомогою розробленої анкети. Експертами виступали рятувальники та працівники Державної служби з надзвичайних ситуацій (ДСНС).

Результати. У результаті експертного опитування визначено, що всі пожежно-рятувальні бригади на сьогоднішній день укомплектовані аптечками медичними. При цьому більшість респондентів відмітили, що у своїй професійній діяльності їм довелося застосовувати аптечки медичні для надання першої домедичної допомоги постраждалим чи колегам. Усі респонденти вважають за необхідне обов'язкову наявність аптечок медичних у транспортному засобі рятувальників та проходження курсів із надання першої медичної допомоги. Контент-аналіз висвітлив основні аспекти забезпечення працівників ДСНС виробами медичного призначення та медичною технікою. Порівняльний аналіз складу аптечок медичних, якими забезпечені рятувальники, висвітлив значні відмінності в їх комплектації залежно від законодавчої бази країни.

Висновки. Досліджено тенденції виникнення надзвичайних ситуацій, кількості постраждалих та загиблих протягом останніх років в Україні. Проведено контент-аналіз нормативної бази стосовно медичного оснащення пожежно-рятувальних бригад, що дозволив визначити склад аптечок медичних, якими мають бути укомплектовані пожежні (аварійно-рятувальні) розрахунки та оперативно-мобільні групи. Проведені дослідження висвітлили необхідність удосконалення складу аптечок медичних рятувальників.

Ключові слова: аптечка медична; перша домедична допомога; рятувальник; виробы медичного призначення; лікарський засіб.

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ИССЛЕДОВАНИЕ СОСТОЯНИЯ АПТЕЧЕК МЕДИЦИНСКИХ СПАСАТЕЛЕЙ И РАБОТНИКОВ ГСЧС

Цель: сравнение состава аптечек медицинских, которыми укомплектованы бригады спасателей в разных странах.

Материалы и методы: методы контент-анализа, сравнения, анализа, синтеза и обобщения и экспертного опроса, осуществляемого с помощью разработанной анкеты. Экспертами выступали спасатели и работники Государственной службы по чрезвычайным ситуациям (ГСЧС).

Результаты. В результате экспертного опроса определено, что все пожарно-спасательные бригады сегодня укомплектованы аптечками медицинскими. При этом большинство респондентов отмечали, что в своей профессиональной деятельности им пришлось использовать аптечки медицинские для оказания первой домедицинской помощи пострадавшим или коллегам. Все респонденты считают необходимым обязательное наличие аптечек медицинских в автомобиле спасателей

и прохождение курсов по оказанию первой медицинской помощи. Контент-анализ выявил основные аспекты обеспечения работников ГСЧС изделиями медицинского назначения и медицинской техникой. Сравнительный анализ состава аптечек медицинских, которыми укомплектованы спасатели, выявил значительные отличия в их комплектации в зависимости от законодательной базы страны.

Выводы. Исследованы тенденции возникновения чрезвычайных ситуаций, количества пострадавших и погибших в последние годы в Украине. Проведен контент-анализ нормативной базы относительно медицинского оснащения пожарно-спасательных бригад, позволивший определить состав аптечек медицинских, которыми должны быть укомплектованы пожарные (аварийно-спасательные) расчеты и оперативно-мобильные группы. Проведенные исследования выявили необходимость усовершенствования состава аптечек медицинских спасателей.

Ключевые слова: аптечка медицинская; первая домедицинская помощь; спасатель; изделия медицинского назначения; лекарственное средство.

Statement of the problem. According to the current world trends the first aid should be provided by a person who first appeared at the scene of the incident – “the first at the scene”. Such persons may be rescuers (workers of the State Emergency Service of Ukraine (SESU)) who arrive at a call to the scene of the incident in the conditions of the need for their participation.

The results of the SESU activity show in recent years an increase in the total number of emergencies observed in Ukraine (by 11.4 % in 2017 compared to 2016). A positive trend is a decrease in the number of deaths and injuries resulting from these situations by 6.0 % and 50.6 %, respectively [1]. But in 2017 the number of emergencies due to accidents on transport (16 accidents) increased by 45.5 % compared to those in 2016 (11 emergencies). As a result of these accidents the number of fatalities in 2017 was 103 % more than in 2016, while the number of victims decreased (by 74.2 %). There was also a decrease in the number of emergencies associated with fires and explosions by 51.7 % and death tolls in them (by 58 %), while the number of victims increased by 54.5 % [2]. However, in addition to man-made emergencies (transport accidents, fires, explosions, sudden destruction, etc.) rescuers arrive to natural and social emergencies.

According to statistics provided by the Head Department of the State Emergency Service of Ukraine (SESU) for 2017 there were 15170 responses of the teams of this departments [3], the average time of arrival of fire and rescue units at the call site was 11.27 min (in 2016 – 11.43 min). However, in most cases, there is a need for providing the first aid. For example, about 85 % of deaths, which according to doctors can be prevented are deaths from bleeding, and about 10 % of cases – deaths from

collapse of the lungs [4]. The third place is taken by mortality from a chest wound.

Analysis of recent research and publications. A number of publications are devoted to the study of the contents of the first-aid kit for rescuers in connection with the importance of this issue, namely the works by Oleinik P. V., Omelchuk S. T., Tchaplik V. V., Pelko I. M., Karpenko V. V., Oleinik S. P., Gumeniuk V. V. [5], Avetisyan V.G., Senchikhin Yu N., Kulakov S. V., Kulish Yu.A., Trigub V. V. [4] and many others.

Identification of aspects of the problem unsolved previously. Publications on this issue reveal aspects of the rescues' first aid providing in various situations and requirements for first-aid kits. But in modern conditions, according to the European legislation, it is necessary to adapt the first-aid kits of rescuers to international standards taking into account the specificity of functioning in Ukraine.

Objective statement of the article. A necessary condition for preservation of life of the victims, reducing the severity of injuries and minimizing the cost of the treatment is the presence of an appropriate composition of the medical kit. Therefore, the aim of the article is compare the contents of first-aid kits, which teams of rescuers in different countries are equipped with.

Presentation of the main material of the research. The first-aid kit is a set (range) of drugs, medical products and other items of medical stock completed in special packing for rendering the first aid to the injured, including self-help and mutual aid.

The study was performed in three stages: the first stage – the questioning of the SESU workers, the second stage – the content analysis of the regulatory framework for medical equipment of rescuers, the third stage – a comparative analysis of the contents of first-aid kits for rescuers in different countries.

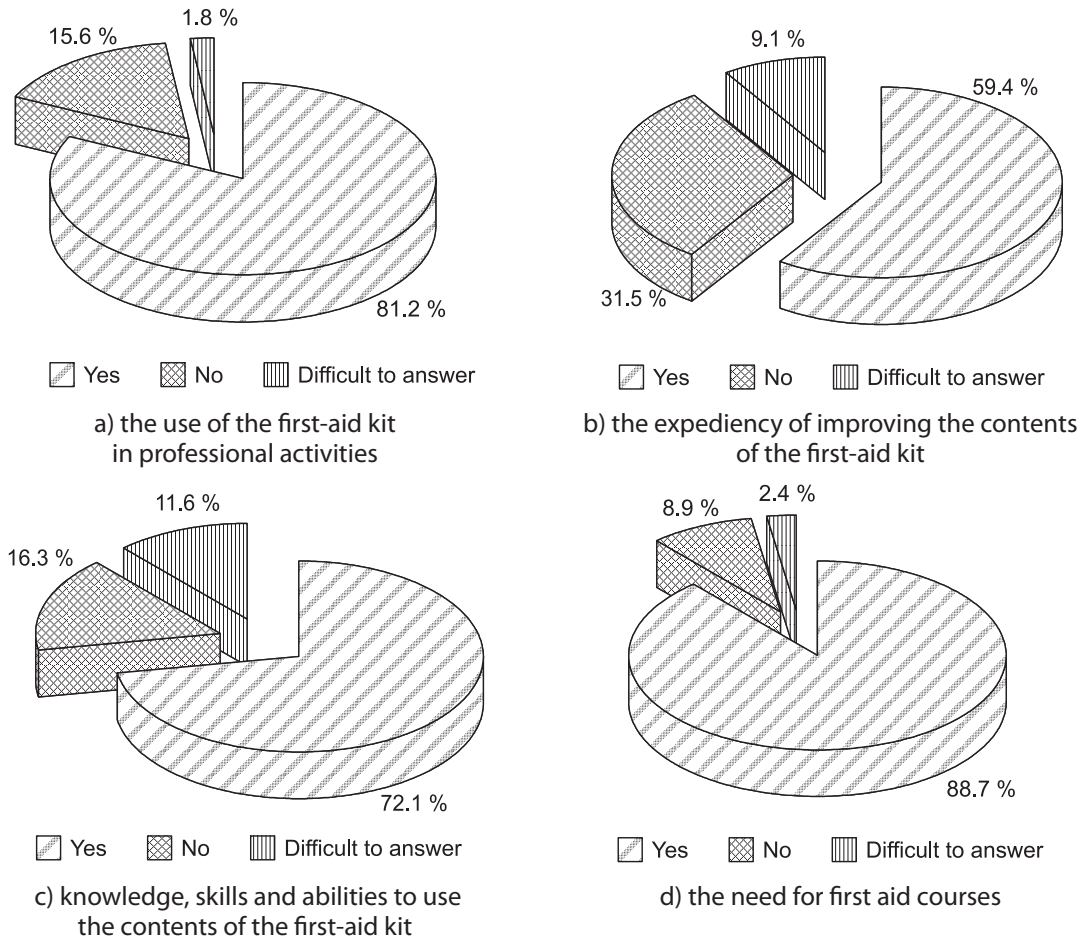


Fig. 1. The results of the expert survey of the SESU workers

At the first stage a survey of the SESU workers took place. In the course of the study the questionnaires developed were used, they made it possible to determine the provision of rescue teams with first-aid kits and their contents, as well as directions for their improvement. The experts were the rescuers and workers of the SESU. In the expert survey 294 respondents participated within 2018.

The survey of the SESU workers showed that all teams were equipped with first-aid kits (100 % of respondents); in almost 81.2 % of the responses workers used first-aid kits for rendering the first aid (Fig. 1a). All 100 % of workers considered that it was necessary to have first-aid kits in a rescue vehicle. 59.4 % of respondents thought it was appropriate to periodically improve the contents of first-aid kits, 9.1 % of respondents found it difficult to answer the question posed (Fig. 1b). 72.1 %

of respondents answered positively to the question about the knowledge and skills of applying first-aid kits, 11.6 % of respondents found it difficult to answer the question (Fig. 1c). Almost 90 % of respondents confirmed the need to complete courses on rendering the first aid (Fig. 1d).

At the second stage the content analysis of the regulatory framework for medical equipment of fire and rescue units was conducted. The SESU Order No. 358 dated May 29, 2013, "Standards of equipment, costs and service life of fire-fighting, technological and garage equipment, tools, personal armament and equipment, repair and maintenance materials of the SESU units" [6] suggests the presence of such types of first aid kits as medical automobile and automobile first-aid kit (according to the standard equipment they are fixed in firefighting vehicles used for firefighting and carrying out

rescue operations in the amount of one piece per one vehicle, respectively. For special rescue medium cars (CAPM-C) and light (CAPM-L) types the medical and paramedical tables for positioning the patient (one per 5-7 patients) are used.

According to the regulatory framework of Ukraine the availability of first-aid kits for civil protection units is provided. Thus, the Order of the SESU No. 293 of 05/30/2014 "Regulations on provision of bodies and divisions (formations) of civil protection, educational institutions in the field of SESU management of Ukraine with medicines, medical products and medical equipment of the current supply" [7] provides for individual means of medical protection and special first-aid kits related to special medical equipment.

The Provision [7] also provides the contents of first aid kits for fire (rescue) teams and for the contents of the operational mobile group (Tab. 1), which differ in medicines (for the operational mobile group there is no 3 % boric acid solution, 10 ml, and corvalol drops; for the fire team there is no rehydrone powder, 18.9 g, activated carbon, 0.25, No. 10 and 5 % iodine solution, 9 ml). In relation to the "Dressings, syringes, catheters" group they differ in the contents of the quantitative composition and the absence of a disposable mask for fire teams, and for operational mobile groups there is no respiratory mask pack, cold pack, individual dressing package, sterile small medical dressing, alcohol cleansing pads No.100, 2 ml syringes for a single injection. Moreover, immobilizers are completely absent in the contents of the operational mobile group package, while there is no sterilium and safety pins in the package for fire teams. In first aid kits for the operational mobile group the oxygen cylinder with a breathing mask and an Ambu breathing bag Disposable Resuscitator for adults are absent.

According to other sources [4] the first-aid kits include 1) dressing material (sterile and non-sterile bandages (medium (7 cm) and wide (14 cm)), individual packs, medical cotton, elastic and rubber bandages, adhesive bandage, triangular bandage, bactericidal bandage, safety pin, shears); 2) antiseptics (3-5 % tincture of iodine (in ampoules), brilliant green solution, potassium permanganate powder, pantocide

tablets, panthenol, Inhalyptum); 3) cardiovascular medicines (validol, nitroglycerin, valocordin (corvalol or cordiamine), caffeine); 4) medicines for gastrointestinal diseases (phthalazole, chloramphenicol, besalol); 5) painkillers and antipyretic drugs (aspirin (acetylsalicylic acid), analgin, diphenhydramine); 6) other medicines (ammonia spirit, bicarbonate soda, trioxazine, lanolin cream (Nivea, Det, Taiga, Repudin, etc.), a hemostatic clamp, medical thermometer, multivitamin pills, vitamin C with glucose, pipette). As can be seen, the contents are significantly different from the paramedic packing provided by Order No. 358 by the presence of various drugs and an insignificant number of medical products.

At the third stage a comparative analysis of the contents of first aid kits in different countries was performed. First aid kits of emergency services differ in their contents not only in native legislation, but also compared to other countries. Thus, the experience of North American rescuers [8, 9] indicates the obligatory presence of a specific list of medical products in their first-aid kits; these products allow them not only to render the first aid quickly to the injured, but also to save the life of the injured. According to statistics, in the USA the main causes of death are penetrating injuries – 60 % of bleeding of the extremities, 33 % of intense pneumothorax, 6 % of airway obstruction and 1 % of other causes [10]. Medical products are stocked in bags, which have a convenient and compact form, several compartments and several attachment points and effective in stress conditions (Tab. 2).

Comparison of the contents of first-aid kits for rescuers in Ukraine and other countries revealed their significant differences. The common features include the presence of a tourniquet, a medical sterile gauze bandage, an individual sterile dressing package, a bactericidal adhesive bandage, medical gauze sterile pads, bandage shears and gloves. The difference of the national first aid kits is the presence of medicines, an eye bath and a cup for drug intake (Tab. 3).

All distinctive features, the advantages and disadvantages identified, as well as the importance of providing aid in the first 30 minutes determine the need to substantiate the optimal contents of first-aid kits, which rescuers use in their practice.

Table 1

**COMPARISON OF THE CONTENTS OF THE MEDICAL PRODUCTS AND EQUIPMENT
FOR A FIRE TEAM (RESCUE SQUAD) AND OPERATIONAL MOBILE GROUP**

Name of medicines, medical stock	Contents	
	For a fire team	For an operational- mobile group
1	2	3
1. Medicines of general use		
Antidote against carbon monoxide poisoning	+	+
Validol tabl. 0.06 g, No. 10	+	+
Sodium bicarbonate, 50.0 g	+	+
Panthenol, 140 ml	+	+
10 % Ammonia solution, 10.0 ml	+	-
1 % Alcohol solution of brilliant green, 20 ml	+	-
3 % Alcohol solution of boric acid, 10.0 ml	+	-
3 % Solution of hydrogen peroxide, 40.0 ml	+	-
20 % Sulfacyl sodium solution, 1.5 ml, No. 2	+	-
Rehydron powder, 18.9 g	-	+
Activated carbon, 0.25 No.10	-	+
10 % Ammonia solution, 40 ml	-	+
1 % Alcohol solution of brilliant green, 10 ml	-	+
5 % Solution of iodine, 9 ml	-	+
5 % Hydrogen peroxide solution, 40 ml	-	+
20 % Sulfacyl sodium solution, 10 ml	-	+
Corvalol, 25.0 ml	-	+
2. Dressings, syringes, catheters		
Sterile gauze bandage, 5 mx 10 cm	+	+
Sterile gauze bandage, 7 mx 14 cm	+	+
Absorbent sterile cotton wool, 50.0 g	+	+
Adhesive bandages, 5 cm x 500 cm	+	+
Bactericidal adhesive bandages, 10 x 4 cm	+	+
Disposable mask	-	+
Respiratory mask pack	+	-
Cold Packs	+	-
Individual dressing package (PPI)	+	-
Sterile small medical dressing	+	-
Alcohol cleansing pads, 100	+	-
Thermoapplicator, 20 x 40 cm	+	-
Syringe for a single injection, 2 ml	+	-
Medical handkerchief (dressing)	+	+
3. Immobilizers		
Long transportation board	+	-
Orthopedic collar for fixation of the cervical spine (for children, adult)	+	-
Flexible tire for an upper limbs	+	-
Flexible tire for a lower limbs	+	-
4. Medical products		
2 L oxygen cylinder with a respiratory mask	+	-
Rubber tourniquet	+	+
breathing bag Disposable Resuscitator for adults	+	-

Continuation of Table 1

1	2	3
Dynarex Trauma Shears for bandages with a button, horizontally curved with a length of 185 mm	+	+
Sterile medical latex gloves No. 7 (8, 9)	+	+
Sterilium, 150 ml	-	+
Breathing tube TD-1.02	+	+
5. Other products		
Notebook	+	+
Pencil	+	+
Packing bag	+	+

Table 2

THE STUDY OF THE COMPOSITION OF FIRST AID KITS FOR MEDICAL RESCUERS IN DIFFERENT COUNTRIES OF THE WORLD

Country	Composition	Price, \$
1	2	3
USA [11-13]	Rescue kit 7 TEMS consists of 5 modules (Airway, Ortho, Burn, Bleeding, and rans), which facilitates access to medical products necessary for immediate use: 6 Pair Black Talon® nitrile trauma gloves, large Bag 1 Shears, 7.5" 1 x Permanent Marker, Small <i>Bleeding Control Kit</i> 2 C-A-T® (Combat Application Tourniquet®), 1 Tourniquet SWAT-T 1 Bandage 20 x 20 4 Compressed Gauze <i>Minor Injury/Bandages</i> 25 Adhesive Bandages 1 "x 3" 10 Oval Board, 2" x 4" 10 4" x 4" Gauze dressing pads, 2-packs 4 Corresponding gauze roll bandages 2 3M Tegaderm transparent film, 4" x 4.75" 5 Wound closure strips, 0.25" x 3" (packs of 3) 3 Benzoin tincture 2 1 Surgical adhesive tape, 2" x 10 1 Glucose, 15 gm 1 Nasopharyngeal airway kit 2 5" x 6" instant cold compresses 2 Elastic bandages, SAM splint, 4 ¼" x 36" 4 Triangular sling/bandage, w/2 safety pins	650.99
China [14, 15]	Emergency rescue first aid bag (EMS) is designed for ambulance. Its advantages are easy accessibility of the contents, resistant material and large capacity. 1. Triangular Bandage 1pc 2. Flexible Fabric Adhesive Bandages 8 pc 3. 1 Pair Talon Nitrile Gloves 4. Gauze dressing pads, 2-packs 5. Conforming gauze roll bandages 6. Zinc oxide, strip 7. Emergency blanket 1pc 8. Alcohol cleansing pads 4pc 9. Gauze dressing pads 1 pc 10. First aid guide	5,98

Continuation of Table 2

1	2	3
Russia [16]	<p>Set for equipping fire trucks by order No. 408n [17]:</p> <p>1. <i>Medical products for temporary stopping of external bleeding and dressing:</i> tourniquet medical sterile gauze bandage (5 m x 10 cm and 7 m x 14 cm) medical non-sterile gauze bandage 5 m x 5 cm elastic tubular bandage (for fixing dressings) No. 3 and No. 5 individual sterile dressing package sterile dressing hemostatic agent based on zeolites or calcium and sodium aluminosilicates, not less than 50g bactericidal adhesive bandages, not less than 1.9 cm x 7.2 cm rolled adhesive bandages, not less than 2 cm x 5 m medical sterile gauze pads No.10, not less than 16cm x 14 cm sterile pads, not less than 40 cm x 60 cm and 70 cm x 140 cm dressing hydrogel anti-burn sterile agent (based on allyloxethanol and lidocaine), at least 24 x 24 cm</p> <p>2. <i>Medical products for cardiopulmonary resuscitation</i> breathing bag Disposable Resuscitator for newborns, children, adults</p> <p>3. <i>Medical products for immobilization and fixation of the cervical spine:</i> neck collar for adults and children immobilization splint for single use, not less than 60 cm, not less than 80 cm and not less than 120 cm discharge bandage for an upper limb</p> <p>4. <i>Medical products for local cooling</i> hypothermic package</p> <p>5. <i>Other medical products</i> pair of Lister bandage scissors non-sterile medical gloves, for examination, size not less than M non-sterile medical three-layer mask of non-woven material with elastic bands or ties eye glasses or screen antiseptic pads of paper textile-like sterile alcohol material, not less than 12.5 cm x 11 cm emergency blanket, not less than 150 cm x 200 cm soft frameless fire-resistant medical stretcher (flame retardant), not less than 170 cm x 70 cm</p> <p>6. <i>Other products</i> block of paper forms, at least 30 sheets, size at least A7 set of pencils black permanent marker safety pin with steel coil, not less than 38 mm recommendations with pictograms on the emergency medical product use for the first aid plastic bag with a clip, not less than 20 cm x 25 cm backpack</p>	375

Table 3

COMPARISON OF THE RESCUER'S FIRST-AID KIT FROM DIFFERENT COUNTRIES

Composition of drugs and medical products	Russia	China	USA	Ukraine
1	2	3	4	5
Tourniquet	+		+	+
medical sterile gauze bandage	+	+	+	+
medical non-sterile gauze bandage	+			
elastic tubular bandage	+		+	
individual sterile dressing package	+	+	+	+
hemostatic sterile dressing	+		+	

Continuation of Table 3

1	2	3	4	5
bactericidal adhesive bandages	+	+	+	+
rolled adhesive bandages	+			
medical gauze sterile pads	+	+	+	
dressing hydrogel anti-burn sterile agent	+		+	
breathing bag Disposable Resuscitator	+		+	
neck collar for adults	+		+	
neck collar for children	+			
splint immobilization	+			
discharge bandage for an upper limb	+			
hypothermic package	+		+	
bandage shears	+	+	+	
non-sterile medical gloves	+	+	+	
medical non-sterile mask	+			
eye glasses or screen	+			
antiseptic pads	+	+		
emergency blanket	+	+		
soft litter (stretcher)	+			
block of paper forms	+		+	
set of pencils	+			
permanent marker black	+		+	
safety pin	+			
recommendations for the use of medical products	+	+		
plastic bag with a clip	+			
forceps		+		
sterile gauze pad		+		
disposable finger			+	+
oval board			+	
gauze sponge			+	
transparent film			+	
benzoin tincture			+	
Glucose, 15 ml			+	
triangular bandage with pins		+	+	
Analgin, 0.5 g				+
Validol, 0.06 g				+
acetylsalicylic acid				
cough tablets				+
activated carbon, 0.25 g				+
potassium permanganate, 3 g				+
boric acid, 10 g				+
sodium bicarbonate, 50 g				+
Valerian tincture, 15 ml				+
10 % ammonia solution				+
10 % alcohol iodine solution, 10 ml				+
5 % boric ointment, 25 g				+
eye bath				+
cotton wool				+
cup for drug intake				+

Conclusions. Trends in emergencies, the number of victims and deaths in recent years in Ukraine have been studied.

The need for first-aid kits for medical vehicles in a fire and rescue cars, the expediency of periodically improving the contents of first-aid kits, as well as the need to take courses in the first aid have been determined on the basis of a questionnaire survey of the DSNS staff. The content analysis of the regulatory framework for medical equipment of fire and rescue

teams has been conducted, and it has allowed determining the contents of first-aid kits that fire (rescue) teams and operational mobile groups should be equipped with. A comparative analysis of the contents of the first-aid kits for rescuers from different countries has identified their common features and differences.

The studies have shown the need to improve the contents of first-aid kits of rescuers.

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