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ENHANCING FIRST RESPONDER CBRN CAPABILITIES

UNAPREĐENJE KAPACITETA HITNIH SLUŽBI U USLOVIMA HEMIJSKIH, BIOLOŠKIH, RADIJACIJSKIH I NUKLEARNIH (HBRN) INCIDENATA

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Summary: First responders perform a multitude of life-saving activities, including pre-hospital care, in challenging environments and situations. Responding to mass casualty events is difficult in any setting, but is even more complex during chemical, biological, radiological and nuclear (CBRN) incidents.In light of the growing concern about CBRN risks and the identified gaps in preparedness and response, the European Union (EU) has launched the EU Centers of Excellence (CoE)initiative on CBRN Risk Mitigation. One of the projects within the CoE initiative, Project 14, aims to enhance the capacities of first responders in South East Europe, Caucasus and Moldova. Two training courses have been implemented in the region, and this report aims to highlight some of the key points discussed, including the usability of the specific “Gamma Ray Dose Constant”.

Key words: EU CoE, CBRN awareness and response, first responders, capacity development

Sažetak:
Osoblje hitnih službi obavlja mnoštvo spasilačkih aktivnosti, uključujući pre-bolničko zbrinjavanje u izazovnim okruženjima i situacijama. Odgovoriti na događaje sa masovnim žrtvama je teško u bilo kom okruženju, ali je još složenije tokom hemijskih , bioloških, radijacijskih i nuklearnih (HBRN) incidenata. Usled rastuće zabrinutosti o rizicima od HBRN opasnosti i identifikovanih nedostataka u pripravnosti i odgovoru na iste, Evropska unija (EU) je pokrenula inicijativu da se naprave referentni centri u cilju ublažavanja HBRN rizika. Jedan od projekata u okviru ove inicijative, projekat 14, ima za cilj da unapredi kapacitete hitnih službi u jugoistočnoj Evropi, Kavkazu i Moldaviji. U regionu su sprovedena dva kursa, i ovaj izveštaj ima za cilj da istakne neke od ključnih tačaka diskusije, uključujući i upotrebljivosti specifične "Konstante za dozu gama zračenja".

Ključne reči: EU referentni centri za HBRN, svest i odgovor na HBRN, hitne službe,unapređenje kapaciteta

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INTRODUCTION

Prehospital care is a crucial part of society's preparedness for chemical, biological, radiological and nuclear (CBRN) incidents. When a CBRN incident occurs, it more often than notresults in a mass- casualty event which requires cooperation between all three branches of first responders: emergency medical services, fire department and police services. While on-scenecoordination and cooperation can be challenging during most major crisis, the presence of chemical, biological or radiological materials can further complicate the immediate response and subsequent long-term effects of crisis. For instance, before a proper detection and analysis of the agent can take place, first responders are in charge of creating safety zones, performing triage, initiating decontamination and treatment. Actions taken, or not taken, may have profound consequences of affected individuals as well as the community at large. In order to increase the preparedness and improve the response during CBRN events, the European Union (EU) has initiated a number of projects on a regional and European scale. This article will highlight one of these projects: enhancing first responder CBRN response capabilities in South East Europe, the Caucasus and Moldova.

What is CBRN?

In short, the term CBRN encompasses chemical, biological, radiological and nuclear substancesthat can cause serious harm or death in humans, animals or plants, all depending on each agent's specific properties. The cause of CBRN events can be criminal (for example sabotage, trafficking or acts of terrorism), accidental (for example industrial catastrophes, particularly chemical or nuclear) or natural (mainly pandemics). The awareness about CBRN risks has been a growing globally, including the concern that these substances may be used by non-state actors to inflict disruption of target societies.

CBRN Centers of Excellence

In light of the growing concern about CBRN risks and the identified gaps in preparedness and response, the European Union (EU) decided to launch the EU Centers of Excellence initiative on Chemical, Biological, Radiological and Nuclear Risk Mitigation (CBRN CoE) in 2010. The CBRN CoE initiative seeks to address the mitigation of, and preparedness against, CBRN risks, whether they are naturally occurring, accidents or caused by criminalacts. Furthermore, it aims to enhance cooperation efforts and to develop coherent strategies on a regional and international level. The initiative is funded by the European Commission in cooperation with the Joint Research Centre (JRC) and the United Nations Interregional Crime and Justice Research Institute (UNICRI). There are currently over 40 projects in the CBRN CoE framework, and the European CBRNE Center at Umeå University in Sweden is implementing two of them, project 2 and project 14.

CBRN CoE project 14

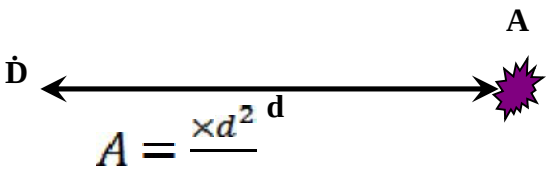
The CBRN CoE project 14 – provision of specialized and technical training to enhance first response capabilities, will now be described in more detail. The overall aim of the project is to raise basic CBRN awareness in all branches of first responders in countries located in South East Europe, Caucasus and Moldova.The core component of the project is the delivery of training sessions. The course contents were developed after consultations with national representatives from the target countries in order to tailor the course to suit their country contexts. Furthermore, the structure and aim of each module were built on previous initiatives such as the NATO Guidelines for First Response to a CBRN Incident, OSHA Preparing and Protecting Security Personnel in Emergencies, and Major Incident Medical Management and Support. The course contents were also adjusted in accordance with observations and preliminary conclusions within the EU FP7 project PRACTICE regarding training for First Responder CBRN Preparedness and Resilience.
The first training course within CoE project 14 took place on 10-12 March 2015 in Sarajevo, Bosnia and Herzegovina. The course had 37 participants from first responder organizations from eight countries (Albania, Bosnia and Herzegovina, Croatia, the Former Yugoslav Republic of Macedonia, Georgia, Moldova, Montenegro and Serbia). The course facilitators came from the European CBRNE Center, the Swedish Defence Research Agency (FOI) as well as one representative from each of the first responder branches in Sweden. The topics during the first training course were designed to provide basic CBRN information, including the history, classification and properties of CBRN

agents. An overview of existing CBRN conventions and legislation was also presented. CBRN signs and triggers, threat assessments and civil emergency planning were discussed, as were how to identify a scene and the need for response. Additionally, the participants engaged in several group discussions and presentations.

The second and final training course for the first responders took place on 21-23 April 2015 in Belgrade, Serbia. 33 participants from eight countries attended the training. During the training course in Belgrade, the main focus was on-site response and responding together. This included personal protective equipment (PPE), detection and identification, as well as basic decontamination principles.Furthermore, the participants were divided into groups and were given scenarios in a so called table-top exercise. This exercise is designed to allow the participants to discuss inter-agency cooperation in their respective countries and reflect on needs and gaps.

After briefly outlining the CBRN CoE initiative and the content of the project 14 training course, some specific examples of the technical aspects highlighted during the course will now be presented in more detail. In the area of personal protective equipment, information was provided about how to choose the right personal protection for an assignment. Itwas pointed out how important it is to know the hazards, or potential hazards, in order to match the correct personal protection equipment with the work requirements. The optimal personal protection should be just "good enough" because with increased protection comes performance degradations. It is also very important for first responders to be well educated and trained in the use of personal protection equipment. Individual fit test of respiratory protection is of great importance - if the face piece does not fit, it does not matter how good the protection of the piece with air supply or filter is.

The usability of the specific "Gamma Ray Dose Constant" was also pointed out.This constant is useful in many radiation protection applications, e.g. to calculate the strength of an unknown point source or the dose rate people might have been exposed to.



$$A = \frac{\Gamma \times d^2}{}$$

A= Activity of a point source(Bq)
Ḋ=Dose rate (Sv/h)
d=distance to source (m)
Γ=Gamma Ray Dose constant (Sv h^{-1} m^2Bq^{-1})

Table 1. Gamma ray dose constant for some common nuclides

^{137}Cs	0.096
^{60}Co	0.347
^{192}Ir	0.139

This constant is the unshielded gamma ray dose-equivalent rate at one meter from a point source. The gamma ray dose constant has been calculatedfor approximately 500 nuclides important to dosimetry and radiological assessment applications.

Next steps

Apart from providing two training opportunitiesfor first responders, the project management team recently invited national experts from the project's target countries to attend a study visit at relevant crisis institutions with CBRN expertise in Stockholm, Sweden. The study visit, with eightparticipants from eight countries (Armenia, Albania, Serbia, Croatia, FYROM, Montenegro, Moldova, Georgia), took place on 7-8 May 2015, and included presentations by a number of Swedish authorities and organizations involved in CBRN preparedness and response, including the Swedish Civil Contingencies Agency (MSB). The study visit provided the national experts with insight on the Swedish crisis management structure and CBRN preparedness, whilefacilitatingthe development of networks for strengthened regional inter-agency cooperation.

The next step of CBRN training for the CoE 14 course participants is live exercise training where they can practice their newly acquired knowledge. FutureCoE initiative projects in the region will have an even stronger emphasis on practical training, and thereby increase the capacity of all three branches to respond to CBRN events and to cooperate better on the scene.

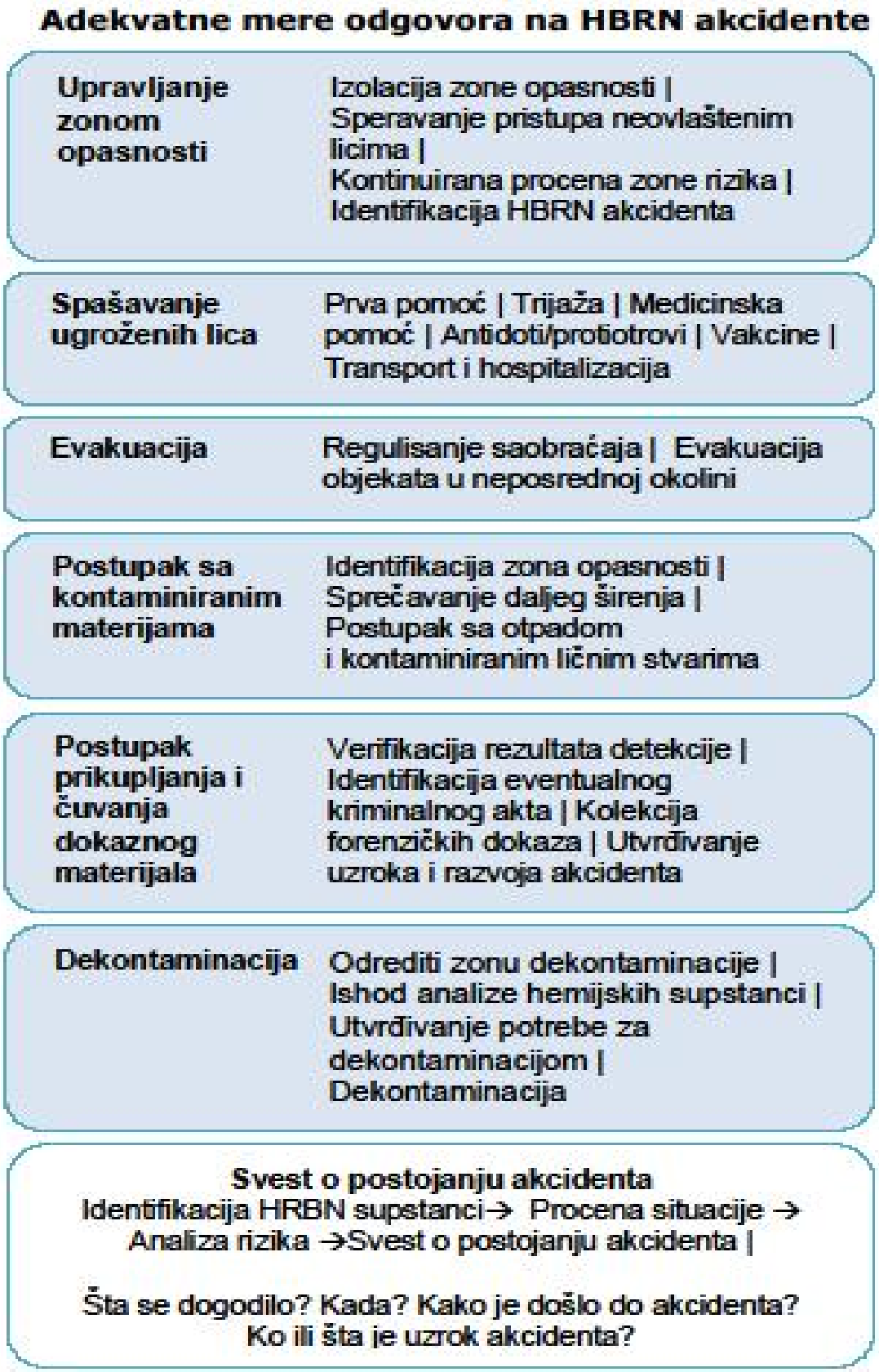
Algoritam postupaka u slučaju hemijskog, biološkog, radijacijskog i nuklearnog akcidenta

HBR Spremnost:
Brzi vodič za hitne službe

Inicijalna procena situacije

HBRN indikatori	Neuobičajene okolnosti | Procena | Reakcije kolega i potencijalno ugroženih na terenu | Informacija o prethodnim događajima | Ranije upućena pretnja
Određivanje nivoa sigurnosti	Određivanje sigurnosnih zona | Lična zaštitna oprema | Procena nivoa odgovora | Kontinuirana procena nivoa bezbednosti
Bezbednost članova hitnih službi	Udaljenost od zone opasnosti | Blizina građevinskih objekata | HTZ oprema | Procena sekundarne opasnosti | Kontinuirana procena rizika
Izolacija inicijalne zone opasnosti	Sprečiti pristup | Meteorološki podaci uključujući pravac vetra | Mape i karte | Informacije o karakteristikama HBRN supstanci | Detekcija | Identifikacija |Radioaktivne supstance 100 µSv /h ili 100 m | Hemijske supstance do 50 ili≥300 m u zavisnosti od pravca i brzine vetra |

Značajne karakteristike HBRN supstanci
Brzina isparavanja \| Pritisak gasa \| Tačka ključanja \| Zapaljivost \| Reaktivnost \| Stabilnost \| Rastvorljivost \| Tip zračenja\|
Vreme poluraspada radioaktivnih supstanci \| Polu̇život bioloških supstanci \| Bakterije \| Virusi \| Toksini


Adekvatne mere odgovora na HBRN akcidente
Upravljanje zonom opasnosti
Izolacija zone opasnosti | Speravanje pristupa neovlaštenim licima | Kontinuirana procena zone rizika | Identifikacija HBRN akcidenta
Spašavanje ugroženih lica
Prva pomoć | Trijaža | Medicinska pomoć | Antidoti/protiotrovi | Vakcine | Transport i hospitalizacija
Evakuacija
Regulisanje saobraćaja | Evakuacija objekata u neposrednoj okolini
Postupak sa kontaminiranim materijama
Identifikacija zona opasnosti | Sprečavanje daljeg širenja | Postupak sa otpadom i kontaminiranim ličnim stvarima
Postupak prikupljanja i čuvanja dokaznog materijala
Verifikacija rezultata detekcije | Identifikacija eventualnog kriminalnog akta | Kolekcija forenzičkih dokaza | Utvrđivanje uzroka i razvoja akcidenta
Dekontaminacija
Odrediti zonu dekontaminacije | Ishod analize hemijskih supstanci | Utvrđivanje potrebe za dekontaminacijom | Dekontaminacija
Svest o postojanju akcidenta
Identifikacija HRBN supstanci→ Procena situacije → Analiza rizika →Svest o postojanju akcidenta |
Šta se dogodilo? Kada? Kako je došlo do akcidenta? Ko ili šta je uzrok akcidenta?

Slika 1. Predavanje na seminaru - Beograd, 21-23.04. 2015. godina

Slika 2. Učesnici seminara - Beograd, 21-23.04. 2015. godina