Biomedicine & Prevention
An Open Access Transdisciplinary Journal

Mass Decontamination of Vulnerable Groups Following an Urban CBRN (Chemical, Biological, Radiological, Nuclear) Incident

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Introduction

When addressing CBRN incidents, the first thing we must consider are casualties, contamination, cross contamination and most importantly after such an unconventional attack/incident ***Decontamination***. Contaminants may be chemicals such as Toxic Industrial Chemicals (TICs) like ammonia, chlorine, oxidizers etc., Chemical Warfare Agents (CWAs) such as nerve agents, blister agents, blood agents, choking agents, and incapacitating agents; Biological Warfare Agents (BWAs) such as viruses, bacteria, spores, fungi, prions, toxins, etc., Radiological Isotopes (radioactive sources and radioactive materials) such as caesium-137 (Cs-137), cobalt-60 (Co-60), barium-133 (Ba-133), strontium-90 (Sr-90), iodine-131 (I-131), Americium/Beryllium (Am-241/Be), etc. and finally Nuclear Materials (fissile materials) such as uranium-235 (U-235), plutonium-239 (Pu-239), and uranium-233 (U-233).

Following a CBRN attack First Responders/CBRN Operators take into account the priority of decontamination, where humans are always priority one. Moreover, in priority-1 there are also priorities under the definition of vulnerable groups (e.g., children, pregnant women) that must be decontaminated and evacuated from the Red Zone (contaminated area) before other victims (if other victims do not require limb or lifesaving) due to their fragile situation. Also people with physical or mental impairments, as well as the elderly, are considered part of the vulnerable group and additional equipment, methods, protocols, measures, and procedures must be adopted to facilitate their decontamination and prevent further damage due to their mental or physical impairments. For example, deaf people rely on signs and lights in their ordinary life, therefore, they can't hear First Responders (FRs) verbal instructions nor sirens during emergencies. Unlike deaf people, blind individuals rely on oral instructions and guides such as people or guiding/service dogs. Here starts what is called triage that prioritizes the decontamination and evacuation from the Red Zone (RZ) according to the fragility of the victim (e.g., age, mental, and physical state), and the severity of its wounds. Hence, in order to accomplish this mission, additional resources, studies, procedures, efforts, and proactive measures are required from governments, associations, and CBRN Operators, for their readiness in case of a CBRN incident, since during such incidents stakeholders cannot improvise methods as time is precious and stress levels are very high.

CBRN Decontamination

Decontamination is the process of removal of hazardous material (the contaminant) from personnel, equipment, buildings, food, and the environment and is based on one or more of the following principles:

- To physically screen-off the CBRN agent so that it causes no further damage to personnel;
- To physically remove CBRN agent by evaporation, washing, or absorption;
- To convert CBRN agent into less harmful or harmless products by chemical reaction (e.g., destruction, neutralization), or by shielding (for R/N agents).

CBRN agents' contamination should be avoided if possible. However, when this is impossible, contaminated victims, equipment, buildings, ground, food etc. must be decontaminated as soon as practicable to reduce or eliminate the risk to personnel and to make equipment serviceable. Decontamination procedures will not degrade the performance of personnel or equipment and will not harm the environment where the purpose of decontamination is to rapidly and effectively remove or render harmless poisonous, infectious, and radioactive substances with which people, animals, material, buildings, ground, and food may be contaminated.

Special and Vulnerable Groups Decontamination

Dealing with **special and vulnerable groups** in normal life is quite special, since it requires different approaches and techniques, where not all society members are familiar with. That's why FRs must be prepared to deal with these groups in order to facilitate their duties on the spot, decrease the number of victims, and prevent further injuries. In addition to logistics (material, decontamination tents, decontaminants etc.) special procedures must be adopted since the existing ones are designed to fit the large category of the society and not the special and vulnerable ones. Bear in mind that some CBRN/HAZMAT substances may

affect people in ways that hinder their movements, so in many situations many victims will have "special needs."

Children and infants decontamination

Children are the most vulnerable during incidents, events, and catastrophes, and since they are still undergoing development (are still growing up). Many of the anatomical and physiological characteristics which are unique to children make them more vulnerable to the effects of CBRN agents.

According to the American Academy of Paediatrics, Committee on Environmental Health, and Committee of Infectious Diseases, (2006),[1] children have a higher respiratory rate than adults, which may result in a larger amount of inhaled aerosolized or evaporated agents. Moreover, CWAs, TICs, have a greater density than air, consequently they always tend to sink toward low areas (e.g., grounds, trenches, ravines, etc.) after being released. Braue et al. (2009), noted that airborne toxins with greater than air density will hang closer to the ground. Since young children are generally shorter than adults, hence closer to the ground, they are at increased risk of exposure and inhalation of the released agents. We would say that the same conclusion could be adopted for short people and dwarfs.

As laid down in the APP publication, (2006),[2] the soft, less keratinized, and more permeable skin of babies and young children, if exposed to contaminants, will absorb a larger amount of toxins especially from agents such as VX, HD, HN and L than the skin of an adult.

Moreover, infants/toddlers are also more sensitive to beta burns caused by beta particles that are usually released in an R/N incident (dust or debris) due to their permeable and less Keratinized skin, and therefore their burns could be worse than adult burns.[3]

The children's immature immune system is also a reason that puts them at greater risk when they are targeted by infectious BWAs. Furthermore, according to Mueller, (2006),[4] BWAs and CWAs may have different symptoms and signs in infant and young children than adults.

In addition to the greater impact of contaminants in children, they are also subject to hypothermia during a mass casualty followed by mass decontamination event according to Chung and Shannon, (2005).[5] The thin subcutaneous layer of fat seen in children is also a reason to enhance their risk of hypothermia. In normal life children tend to shiver and become very cold relatively quickly when they shower outdoors. This was also illustrated by Fertel et al. (2009),[6] during their paediatric decontamination drill. Although drills took place in the summer and warm water was used in the decontamination showers, many of the children had goose bumps during the exercises, and it is medically known that goose bumps or shivers are early signs of hypothermia. For this reason, we recommend multiple stage tents as they are better for children than outdoor or improvised showers, since there is a warming system inside and the shower water is warm especially during winter time. Furthermore, children are subject to psychological effects, following any emergency and especially a CBRN emergency, and FRs would face various challenges with them including communication challenge, triage and disrobing difficulties, etc.

Recommendations for infants and children decontamination

We highly recommend that CBRN decontamination process are introduced to children before an incident occurs. For example, the most appropriate way is to organize decontamination exercises/drills at schools or during summer camps, as entertainment activities after dividing them into groups according to their classes and ages. We also suggest that drills at schools or in summer camps include inflatable swimming pools, water hoses, showers, and other activities which include playing with mud, ketchup, or other friendly products (as contaminants).

Several scenarios could be adopted by organizers. For example, asking the children to throw "contaminants" mentioned above at each other (we bet that rare are the children who will refuse to participate in such games), and then after finishing the "battle" ask them again to stay in cues according to gender (to facilitate their showering) and wait for the next step which is the decontamination process. Since the sight of FRs in PPE is disturbing (even for adults), children will not accept them, and may refuse to be sprayed by water, as they are afraid of strangers especially in strange uniforms and masks. Therefore, we suggest that FRs combined with their teachers (both genders), who are watching the game, should get dressed in their PPE in front of them before starting any activity (spraying activities), in order to let them know that people wearing PPE are friendly and they don't mean to cause any harm to them. Our suggestions are that such activities or drills must be repeated on a regular basis, and photos should be taken during the drills and posted inside the school or in each classroom like other activities organized by the school.

Unlike pre-school and school-age children, infants need special care from emergency services personnel, their parents, or caregivers to ensure effective decontamination since they are non-ambulatory. In this case and according to Freyberg et al. (2008),[7] two people are required to handle the transportation of infants through the decontamination shower, by putting them in a waterproof car seat (without the cushion), because this will support their head and maintain their airway in a neutral position (to prevent choking). However, if stretchers are available, it would be better to be used, because this will facilitate a total access to the infant posterior side.

Moreover, it is noted, that the infants should be placed on their side, rather than on their back to prevent aspiration of the water and therefore, choking. In some cases, it is necessary to hold the child, and a number of specific recommendations relating to the movement of infants through the decontamination showers should be taken into consideration. For example, two people should always handle the transfer of an infant through the decontamination shower, and the one who is in charge of holding him, must hold him tightly and close to his body to prevent slipping.

Pregnant women decontamination

Evidence shown by Depalma & Hodgson, (2009),[8] that pregnant women are at increased risk and vulnerable during disasters and conventional mass-casualty incidents. Consequently, it is very important to involve them in CBRN evacuation and decontamination drills because researchers have examined the specific vulnerabilities which pregnant women might face during a CBRN incident. Lynch, (2004),[9] noted that in this case medical staff and FRs must take care and provide the best treatment not only for pregnant women but for their foetus as well, and this is quite difficult during emergencies. This is difficult because sometimes the best treatment for a pregnant woman may be a threat to her foetus or at least not the best treatment for both of them. According to Cono et al. (2006),[10] the challenge that medical responders may face is the medical prescription or life-saving vaccination in case of biological and chemical attacks, because pregnant women may refuse to undergo any treatment or refuse to be vaccinated if they feel that this may threaten the life of their foetus.

Sela et al. (2008),[11] have well documented that pregnant women may be at risks during conventional mass-casualty incident. Attacks involving chemical and biological agents have greater effects on pregnant women due to their specific physical characteristics. Women's immune systems response are suppressed during pregnancy, to allow their bodies to tolerate the foreign presence of the foetus. Consequently, decreased immune systems response leave pregnant women at high risk from biological agents such as anthrax, smallpox, plague, botulism etc. which might be released during a biological attack. Therefore, Rao, (1972),[12] reported that pregnant women may be more likely to become seriously ill than non-pregnant ones or men of the same age following a biological attack. Furthermore, Jamieson et al. (2006),[13] added that as a result of this decrease in immune function, pregnant women may also be at high risks during biological attacks because the medical staff may be reluctant to prescribe life-saving antibiotics or vaccines to them because they may refuse to accept any medication that may have any adverse health effects on the foetus or even threaten its life. Thus, rapid and effective decontamination is very important for such a group, as pregnant women have greater susceptibility to biological agents and pathogens than non-pregnant women and other groups of victims. According to Little, (1999),[14] pregnant women also experience changes in respiratory rate and pulmonary functions during pregnancy due to the decrease in immune system. As a result, they become at higher risk following a chemical attack, as changes in respiratory rate and pulmonary functions could lead to increased exposure (like children) to toxic agents. That's why a rapid and effective decontamination following chemical attacks is very important, in order to reduce the exposure time to toxic agents, and minimize adverse outcomes resulting from the chemical agent(s) contamination. In addition to all mentioned complications, women are also subject to psychological effects following a CBRN event.

Recommendations for the showering process of pregnant women following a CBRN attack

DePalma & Hodgson, (2009),[8] recommended that all FRs during CBRN incidents be trained to ask women between the ages of 10-50 years old whether they are pregnant or not. Home Office, (2003),[15] suggested that it is necessary for pregnant women to be decontaminated before other groups in order to minimize their exposure to the CBRN agents released, as the likelihood of experiencing negative effects from such agents is high. Moreover, FRs should reassure and explain to pregnant women that prophylaxis, injections, and antibiotics may not only save their lives but their foetuses lives as well.

The decontamination of people with physical impairments

People with physical impairments belong to wide and diverse categories which include people with a broad range of disabilities. For example, categories of physical disability may include, neuromuscular disorders such as Parkinson disease, multiple sclerosis, cerebral palsy, spinal cord injury, post-polio syndrome spina bifida, and limb loss. This list represents a number of the disabilities that may be considered as physical disabilities.

According to Pichler et al. (2009),[16] physically vulnerable individuals rely on mobility aids such as wheelchairs, walking canes, and walkers to maintain their independence. Therefore, once their mobility aids are removed or even lost they will seek the assistance and help of others in case they want to move from a place to another. This category of people will also experience some anxiety or frustration in addition to the physical effects of removing a person's mobility aid, when losing the independence that they are used to. Furthermore, it is possible that this category of people would be reluctant to participate in decontamination showers if they feel threatened with the loss of the only means by which they can maintain their independence. Hence, it is important that plans are in place which make sure that the decontamination of vulnerable people is efficient, and their concerns have been taken into account.

Braue et al. (2009),[2] recommended that only individuals with physical impairment who rely on mobility aids that are mentioned above or on people to move, should be processed through the non-ambulatory line. Moreover, wheel chairs (easy to wash or decontaminate) should be placed in the undressing area before showering, and re-dressing area after showering in order to assist physically vulnerable people as well as to avoid slipping due to wet conditions. Mobility equipment should be separated from victims with mobility impairments so they can undergo a safe decontamination showering. However, they must be returned to them as soon as practicable after being decontaminated in turn, in order to let them feel independent.

The decontamination of people with sensory impairments

A recommendation made by Rotondi et al. (2018),[17] says that short messages on mobile phones and short videos on social media (up to 150 sec.), and TVs conveying written recommendations and instructions following a CBRN incident or any emergency would be appreciated by deaf people because it would be very helpful and would guide them during an emergency while everyone else is busy with his own safety and live saving. Moreover, the type of masks used by CBRN operators following a CBRN event should be taken into account. Using masks with big glasses see Fig. 10 where the biggest part of the human face and its sensory organs are visible to victims, especially deaf people, would facilitate the reading of face expressions of FRs by the victims, and prevent any misunderstanding.

Unlike people with hearing impairments, individuals with visual impairments cannot see us, however, they can feel our presence, as they can hear our actions and steps. That's why the US Centre for Development and Disability (no date) recommends that FRs are requested to announce their presence and introduce themselves before starting any required action toward the victim. All written instructions should be communicated to the victim verbally without any shouting. Then, before initiating any assistance, individuals with visual impairments should be asked about the assistance they require. If any is required, CBRN operator(s) should offer an arm which can be grasped lightly for guidance.

The decontamination of elderly people

Torgusen & Kosberg, (2006),[18] highlighted that in addition to their low immune system, sensory, cognitive, and physical impairments, hypertension, dementia, depression, stroke, cancer, and heart disease are one of the main conditions that could also impair the mobility of elderly during CBRN events. The Governor's Office of Emergency Services, (2006),[19] suggested that repeating the instructions will ensure that elderly people and other groups with cognitive impairments are able to understand and follow the instructions and required procedures. Moreover, a short video rehearsing the instructions could be watched at the entrance of the decontamination facility to enhance the elderly's understanding of the decontamination process.

The decontamination of people with chronic illness

Asthma, diabetes, epilepsy, arthritis, heart disease, and high cholesterol which are considered chronic diseases require medica-

tion to keep them under control. Therefore, individuals suffering from the diseases mentioned are reliant on medication that they should always carry with them in order to take them at the correct time. If the required medication is not accessible or available at the time, casualties will suffer adverse health consequences which can impair their mobility and will also require additional medical care to relieve their symptoms. Consequently, CBRN medical staff should ask casualties if they suffer from any chronic illness and its type in order provide them with the right medication to overcome or alleviate the symptoms related to their disease. In this case we recommend that medications such as insulin (for diabetic individuals) and Ventolin or oxygen (for individuals suffering from asthma) and many other medications related to groups suffering from chronic illnesses be stocked in the CBRN medical staff ambulances, as casualties with chronic illness are prone to lose their medication during a CBRN attack due to chaos that usually follows such incidents. Candies, chocolate bars, and other kinds of sweets could be also useful as diabetic people may suffer from low blood glucose level that could lead them to coma.

Tourists' special consideration

According to Richter & Waugh, (1986),[20] as are present in an unfamiliar environment, away from relatives, friends, and acquaintances, tourists might be psychologically vulnerable to the effects of any terrorist attack. Taylor et al. (2009)[21] suggested that tourists who speak the same language should stay in groups while undergoing a decontamination process because this would likely decrease stress and anxiety and lead to a thorough decontamination as they would support each other especially if some of them speak the local language in addition to English. Edkins et al. (2010),[22] speculated that an alternate solution could also be adopted if tourists are separated, FRs may try to pair up a local resident with a tourist (buddy scheme) from the same gender. This step would probably alleviate the tourist's anxiety and may prevent his feelings of isolation. We suggest that at least 5% of FRs present on the crime scene should be fluent English or at least speak on of the five languages adopted by the UN.

The homeless decontamination process

The Estimation of US Conference of Mayors, (2007), says that approximately 22% of the homeless experience mental illness and 30% are substance abusers, and their mental illness could exacerbate during a CBRN mass casualty decontamination. Moreover, illiteracy, trauma, mental illness, impairments, chronic diseases, substance abuse (alcohol, drugs), may hinder their decontamination/shower process an additional resources should be used. Some of them may have juridical records or may have been in custody previously (for committing crimes) or who are undocumented, may try to escape from a decontamination process as FRs have to have records about each victim and this may reveal their identities to the authorities or uncover them, and consequently, this could lead to arrests. This delay and non-cooperation may postpone their decontamination showering, which increases their exposure to the CBRN agent that has been used against them and increases the probability of ill effects.

Our recommendations for FRs are to try identifying mentally ill individuals in this group of people in order to respond to their needs and provide them with the required medical care, moreover, Edgington, (2009)[23] suggests that clear verbal communication if used in addition to written instructions will increase the understanding of instructions among people with reading difficulties. Clear, simple and short messages should be used on large fronts including diagrams. Same decontamination procedures used for individuals with acute or chronic health conditions could be used for homeless people suffering from the same illness in addition to assistance during the decontamination showering.

The refugee's decontamination

The United Nations High Commissioners for Refugees (UNHHR) statistics in 2018 showed that 991,165 Syrians were registered with UNHCR Lebanon. 52% females and 48% males with a total of 55% children below the age of 18 in addition to a significant number of pregnant women (due to religious believes).[24]

The negative consequences of the Syrian crisis on the mental health of the refugees are the results of traumatic events experienced during the war (e.g., CBRN attacks in 2015, bombing of civilians, torture, disappearances, sexual violence, etc.), daily stress of displacement, and loss of family members and identities which were left behind. For example, the Syrian refugees in Lebanon are also suffering from several diseases such as water and food disease (cholera), scabies, due to the absence of hygiene education among them and due to ignorance (common latrines are very close to their tents), and rheumatism due to the cold weather in the Beqaa region. Despite the presence of all these mental and physical problems, the pregnancy rates among women living in these camps remain very high, which require additional medical care and resources to make sure that these women are receiving the right and timely care (e.g., echography, vitamins etc.). New born among refugees are also a big concern to NGOs, as they require special care such as warm places, vaccination, reinforced milk and timely examination by paediatricians. Regarding communication same strategy used with homeless people could be also used with refugees. Trust and confidence promoted by CBRN operators when speaking to refugees are the keys to communication to prevent any reluctance and hesitation when undergoing decontamination, moreover, some FRs should speak the refugee's mother language or interpreters must be involved. If both previous communication strategies couldn't be applied, CBRN operators should focus on alternative modes of communication instead of focusing on verbal ones.

Conclusion

After the adoption of new SOPs and protocols for these groups, drills/exercises must be conducted on a regular basis involving individuals from special and vulnerable groups in all stages of the drill, as consultants, advisors, "victims" etc. taking into consideration the recommendations mentioned above to facilitate the decontamination of each group or category, as these people are the only ones who can provide the organizers with the correct feedback, highlight their needs, and show them the exact techniques that could be used to facilitate their decontamination process.

The only hope is that law enforcement and intelligence services all over the world remain proactive in taking some necessary steps ahead of any organization or lone wolf actors preparing for CBRN attacks, and share amongst them any information available that could help other countries in preventing such attacks by neutralizing the adversaries before they succeed in hitting any target, whether it is a civilian or politician. Exercises and drills are extremely important for the preparedness of any emergency, although the hopes are always that they remain in the category of "drills" rather than being applied in real emergencies, since the consequences that result from a CBRN attack could be transboundary, difficult to control (especially if a BWA has been used), and devastating.

References

1. American Academy of Paediatrics, Committee on Environmental Health and Committee on Infectious Diseases (2006). Chemical-biological Terrorism and Its Impact on Children: A Subject Review. Paediatrics, 118(3), 1267-1278.
2. Braue, E.H. Boardman, C.H. & Hurst, C.G. (2009). Decontamination of Chemical Casualties. Retrieved 1 December 2009 from http://www.bordeninstitute.army.mil/published_volumes/chemwarfare/Chem-ch16_pg527-558.pdf
3. Eisenberg W. (2009). Children Are Very Sensitive to Radiation. Deutsches Arzteblatt international, 106(23), 393–294. https://doi.org/10.3238/arztebl.2009.0393b
4. Mueller, C.R. (2006). The Effects of Weapons of Mass Destruction on Children. Journal for Specialists in Paediatric Nursing, 11 (2), 114-128.
5. Chung, S. & Shannon, M. (2005). Hospital Planning for Acts of Terrorism and Other Public Health Emergencies Involving Children. Archives of Disease in Childhood, 90 (2), 1300-1307.
6. Fertel, B.S., Kohlhoff, S.A., Roblin, P.M. & Arquilla, B. (2009). Lessons from the "Clean Baby 2007" Paediatric Decontamination Drill. American Journal of Disaster Medicine, 4 (2), 77-85.
7. Freyberg, C.W., Arquilla, B., Fertel, B.S., Tunik, M.G., Cooper, A., Heon, D, Kohlhoff, S.A., Uranek, K.I. & Foltin, G.L. (2008). Disaster Preparedness: Hospital Decontamination and the Paediatric Patient - Guidelines for Hospitals and Emergency Planners. Prehospital and Disaster Medicine, 23(2): 166-73
8. DePalma, R. & Hodgson, M. (2009). Chapter 6 – Step 4: Incident-Specific Plans. Emergency Management Program Guidebook: Department of Veterans Affairs. Retrieved 17 October 2009 from http://www1.va.gov/emshg/docs/1221PF_Introduction_EMPG_2009xy.doc
9. Lynch, E.L. (2004). Disaster Medicine: Treatment of the Pregnant Patient. The 2010 Integrated Medical, Public Health, Preparedness and Response Training Summit. Retrieved 30 October from http://www.integratedtrainingsummit.org/presentations/2004/116.pps
10. Cono, J., Cragan, J.D., Jamieson, D.J. & Rasmussen, S.A. (2006). Prophylaxis and Treatment of Pregnant Women for Emerging Infections and Bioterrorism Emergencies. Emerging Infectious Diseases, 12(11), 1631-1637.
11. Sela, H.Y., Shveiky, D., Laufer, N., Hersch, M. & Einav, S. (2008). Pregnant Women Injured in Terror-Related Multiple Casualty Incidents: Injuries and Outcomes. Journal of Trauma, 64(3), 727-732.
12. Rao, A.R. (1972). Smallpox. Bombay: The Kothari Book Depot.
13. Jamieson, D.J., Theiler, R.N. & Rasmussen, S.A. (2006). Emerging Infections and Pregnancy. Emerging Infectious Diseases, 12(11), 1638-1643.
14. Little, B.B. (1999). Pharmacokinetics During Pregnancy: Evidence-Based Maternal Dose Formulation. Obstetrics and Gynaecology, 93(5), 858–68.
15. Home Office (2003). The Decontamination of People Exposed to Chemical, Biological, Radiological or Nuclear (CBRN) Substances or Material. Strategic National Guidance. First Edition.
16. Pichler, C., Myers, L. & Ross, H. (2009). Mass Casualties Decontamination Special Needs Considerations. Part 10: Mobility Impairments. Retrieved 10 January 2010 from http://www.youtube.com/watch?v=jnbsXfEOOjA
17. Rotondi et al. (2019). A Facebook Page Created Soon After the Amatrice Earthquake for Deaf Adults and Children, Families, and Caregivers Provides an Easy Communication Tool and Social Satisfaction in Maxi-Emergencies. doi 10.1017/S1049023X19000086.https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/facebook-page-created-soon-after-the-amatrice-earthquake-for-deaf-adults-and-children-families-and-caregivers-provides-an-easy-communication-tool-and-social-satisfaction-in-maxie-mergencies/47ABE5F68A276CDBA1F86C1BDE2A6368/share/a1ddc5e-9254b1c4e9bf799113d010891ae148a5a?fbclid=IwAR22LvP7Fpuzy_giwRcQoTOvwAOIwO-0sluOhDnd7p-b8SV0030RQgcV-t4
18. Torgusen, B. L. & Kosberg, J. I. (2006). Assisting Older Victims of Disasters: Roles and Responsibilities for Social Workers. Journal of Gerontological Social Work, 47(1-2), 27-44.
19. Governor's Office of Emergency Services (2006). California. Multi-Casualty Mass Decontamination Guidance Document for First Responders. Retrieved 9 January 2010 from http://www.oes.ca.gov/Operational/OESHome.nsf/PDF/Multi-Casualty%20Mass%20Decontamination%20Guidance%20Document%20for%20First%20Responders/$file/MCMD-1-2-06.pdf
20. Richter, L.K. & Waugh, A.L. (1983). Tourism Politics and Political Science: A Case of Not So Benign Neglect. Annals of Tourism Research, 10(3), 313-335.
21. Taylor, K.M., Balfanz-Vertiz, K., Humrickhouse, R. and Jurick, C. (2009) Decontamination with at Risk Populations: Lessons Learned. The Internet Journal of Rescue and Disaster Medicine, 9(1).
22. Edkins, et al. (2010). Work Package 9: Systematic Review of the Needs of Vulnerable and Minority Groups in Emergency Decontamination.
23. Edgington, S. (2009). Disaster Planning for People Experiencing Homelessness. National Health Care for the Homeless Council. Retrieved 2 October 2009 from http://www.nhchc.org/DisasterPlanning.pdf
24. Refugees=UNHCR UN High Commissioners for Refugees. (2019). Source: UNHCR. (2017). October. Update Durable: Durable Solution for Syrian Refugees. Retrieved from https://data 2. Unhcr.org/eu/documents/download/60201