TMT Handbook – Triage, Monitoring and Treatment of people exposed to ionising radiation following a malevolent act

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Abstract

In the aftermath of the Chernobyl accident European national emergency response plans have been concentrated on dealing with accidents at nuclear power plants. The perception of the increased threat has shifted the focus to being prepared also for malevolent use of ionising radiation. The European Commission through the Euratom Sixth Framework Programme is co-sponsoring the specific targeted research project TMT Handbook, aimed at producing the practicable tools needed for an adequate response to such incidents. The handbook gives advice on how to prepare the response for such incidents and how to handle the situation starting at the scene of the incident, going through the response at hospital level and public health interventions including criteria for the long term follow up.

Keywords: radiation emergency, malevolent act, triage, monitoring

1 Introduction

Until recently European national emergency response plans concentrated on accidents at nuclear power plants. Several terrorist acts carried out by disaffected groups have shifted the focus to being prepared also for malevolent use of ionising radiation aimed at creating disruption and panic in the society. The casualties of these kinds of acts will most likely be members of the public. The radiation exposure can range from very low to substantial and it could be combined with conventional injuries. It might also be the case that the magnitude of the incident is such that, the national response capability results are overwhelmed, and the international assistance plans need to be called upon.

The European Commission through the Euratom Sixth Framework Programme was co-sponsoring the specific targeted research project TMT handbook. The main objective of this project was to produce a practicable handbook for the effective and timely triage, monitoring and treatment of people exposed to radiation following a malevolent act. The TMT handbook project started with the collection of already published material to identify useful practices and provide a basis on which to build a clear handbook that was consistent with the current thoughts in this field. There are a number of recent publications that have started to address some of the issues raised in responding to malevolent use of radiation.
For example, ICRP Publication 96: Protecting people against radiation in the event of a radiological attack [1] focuses on protection criteria for responders and the public. US NCRP [2] provides a review of the consequences and management of terrorist events involving radioactive material. A number of international publications [3-9] including the advice for first responders [10] and for medical response [11] provide useful guidance on the early response and generic treatment options available. In addition to the published articles in journals [12, 13, 14] there are some guidance and protocols produced at a national level available. However, the information on triage, monitoring and treatment of people is scattered in several documents, especially with regard to a malevolent event scenario. As no single reference source existed on dealing with these issues the need for TMT handbook was clear.

The TMT handbook contains both general information and detailed recommended actions to be taken at the scene of the incident and in hospitals by specialised response teams in radiation protection, monitoring, dosimetry and medical management. It gives advice on how to plan the response for such incidents and how to handle the situation starting at the scene of the incident going through the response at hospital level and public health interventions including criteria for the long term follow up. It also provides guidance on public information and communication strategies. The TMT Handbook is a useful tool for training purposes. The aim of this paper is to give an overview of the contents of the TMT handbook.

2 Consortium

In order to produce the TMT Handbook a project consortium was drawn together including, Belgian Nuclear Research Centre, the Norwegian Radiation Protection Authority, Radiation and Nuclear Safety Authority of Finland, the UK Health Protection Agency, the Central Laboratory for Radiological Protection of Poland and the World Health Organization. Enviros Consulting was acting as the technical secretariat for the project. The TMT handbook was drafted by the consortium members with input of subject-matter experts and circulated for feedback to European emergency response institutions that would play a part in the handling of malevolent acts using radioactive material. These institutions were given a consultation time with encouragement to test and evaluate the handbook content through national emergency response exercises and stakeholder consultations. A workshop was held in December 2008 in Lillehammer, Norway to obtain feedback from the end users on the content, structure and usefulness of the handbook before the final version was produced. The received comments and suggestions helped in improving and harmonising the handbook for the use in European countries.

3 Contents of the TMT Handbook

The Handbook content focuses on topics specifically related to the radiological triage, monitoring and treatment necessary to respond to a malevolent act, while ensuring the appropriate protection of responding personnel. The handbook is not intended as a complete check list for first responders, but instructions are given for actions and it can be used in the training of such personnel. Nor is the handbook intended to include exhaustive descriptions of medical treatment of conventional injuries since hospital staff is already trained for this. The handbook includes twelve chapters, annexes, references and a glossary:
Chapter A introduces the handbook.

Chapter B gives an explanation on the handbook structure and guidance on how to use it. It is recommended to read this carefully before proceeding to chapters E through K. Chapters E-K give direct guidance for incidental and accidental situations. The structure of the handbook is such that the direct instructions to be used by the incident responders are separated from more general information.

Chapter C gives a short summary of possible malevolent scenarios. The chapter does not include detailed descriptions of scenarios in order not to facilitate malevolent acts by disaffected groups. The scenarios are not meant to indicate the probability or possibility of any such event actually occurring. Neither should it be assumed that the scenarios described are an exhaustive list of the possible incidents that could occur. It is the responsibility of each country to carry out its own threat assessments as a basis for developing national radiation emergency and response plans.

Chapter D gives general guidelines on public information and communication strategies. Public communication should be considered a key function in any response involving the malevolent use of radiation. For public communication to be credible and trustworthy, the organisation providing it must be seen as open and transparent. To be effective, a public information response should be planned in advance. These plans will need to be integrated within the overall planning for managing malevolent acts and should detail the roles and responsibilities to be carried out during the response. It should also be recognised that there exist cultural differences between countries and therefore similar means and techniques for communication may not be effective in all countries, any approach would need to be tailored to the specific situation and location.

Chapter E describes immediate actions specific to the radiological emergencies to be taken at the scene mainly during the first hours after notification or discovery of an incident. These actions include monitoring to confirm a radiation emergency, establishing zones and controlling the exposure situation. In the initial stages of the response, there will be little time to carry out detailed planning of the response, and minimal information on which to base such plans. The actions given in this chapter may be implemented automatically without the need to develop plans that are specific to the incident.

Chapter F is dedicated to the best practice for triage and monitoring of people for the purpose of screening. “Triage” is the use of simple procedures for rapidly sorting people into groups based on (a) their degree of physical injury and (b) on actual or potential effects on health, and the allocation of care to these people so as to expedite treatment and maximise the effective use of resources. Conventional trauma triage may be required following incidents involving the malevolent use of radiation or radioactive material in a public place. However, the scope of triage is broader for such incidents and includes a group of actions that can be termed “radiological triage”. These actions are intended to sort people rapidly into groups depending on actual or potential effects on their health resulting from radiation exposure. In the handbook the objectives of the triage process are presented. The term “monitoring” describes the measurement of radiation dose or contamination for reasons related to the assessment or control of exposure to ionising radiation or radioactive material, and the interpretation of the results.

Chapter G gives practical advice on decontamination of people in the field. In this chapter only the removal of radioactive contamination is considered. People who have only been externally irradiated do not require decontamination. Decontamination should be carried
out as soon as possible but does not require the same immediacy as chemical or biological contamination, except in extreme circumstances where the contamination is sufficient to cause deterministic effects. People involved in an incident where radioactive material is present in the environment will be prioritised for decontamination using the procedures detailed in the chapter F. Decontamination of injured people will take place either in hospital or adjacent to the incident, depending on the severity of injuries.

**Chapter H** provides instructions for monitoring of ionising radiation for the dose assessment purposes. The TMT Handbook is mainly concerned with individual monitoring, but the other forms of monitoring (e.g. source monitoring, environmental monitoring) also come within the scope of the handbook. Individual monitoring is monitoring using measurements of quantities of radioactive material in or on the body of the individual, or measurements made by equipment worn by individual workers. It includes the assessment of radiation doses from the results of such measurements. The main objectives of monitoring are: to quantify absorbed doses to organs and tissues for people exposed to radiation at a level high enough to potentially give rise to deterministic health effects, to provide the dosimetric information that would allow urgent decisions to be made to remove individuals from a source of external exposure, or to remove or reduce contamination on or in the body, to quantify committed effective doses for people with lower levels of internal contamination that could result in an elevated risk of stochastic health effects, to provide dosimetric information that could be used when making decisions on medical treatment and to quantify committed effective doses for people whose exposures are very unlikely to have an effect on health.

**Chapter I** gives advice on handling on contaminated casualties and transport to hospital.

**Chapter J** is addressed at medical doctors, nurses and other health-care workers who may have to manage people affected by events involving the malevolent use of radioactive sources and would be responsible for actions to be taken at the first referral hospital level concerning diagnosis, treatment and health-care facilities management. The chapter includes the information on management of acute radiation syndrome (ARS), local radiation injuries, combined injuries and internal contamination including management of contaminated victims and decorporation techniques.

**Chapter K** provides guidance on public health response, including the role of health authorities during the emergency, initial actions to be taken, management of outbreaks of unusual disease attributable to radiation exposure, and criteria for long-term follow-up. During radiation emergencies resulting from malevolent use of radioactive sources, health authorities should make provisions for dealing with a large number of people who may self-report experiencing symptoms or even as asymptomatic patients. Those people are concerned about consequences of possible exposure to radiation, even if not actually exposed (“worried well”). Prevention and management of psychological effects are also addressed in this chapter. Psychosocial impact is one of the terrorism’s chief aims. It impacts at all levels of society and the health-care system may be totally overwhelmed by people requesting advice, assessment and care.

**Chapter L** provides guidance on existing international arrangements based on international cooperation for early warning and assistance in case of radiological accidents and nuclear emergencies. The proper handling of serious incidents, or in situations where prompt response is warranted in order to mitigate the effects of a perceived hazard, may require resources that challenge the capabilities of a single country. It is therefore important for countries to co-operate in order to better respond to such emergencies. The international
assistance arrangements are set up under frameworks of the IAEA's Emergency Conventions, WHO's International Health Regulations, and European Commission's policies. These frameworks provide for coordination of international arrangements, while do not necessarily eliminate the need for bilateral or multilateral agreements between countries relating to the information exchange or assistance.

4 Dissemination of the TMT Handbook

The first TMT training course was held in February 2009. The training was directed primarily to representatives of national emergency response organisations with responsibility for first response in emergency situations, hospitals and wider health-care infrastructure, such as public health authorities. The aim of this course was to enable participants to better understand the principles of management of malevolent events involving exposure to radiation, to strengthen national capabilities for planning and response to such events and to encourage participants to promote the incorporation of the TMT Handbook into exercise and training programmes in their countries. The course also provided a platform to identify common challenges and discuss opportunities for harmonised and coherent response strategies within the European Union.

The TMT Handbook was released in the end of March 2009. The electronic version is available on the project’s web page: www.tmthandbook.org. The handbook will contribute to the harmonisation across Europe of the approaches to triage, monitoring and treatment of people exposed to radiation following a malevolent act.

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References


