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Federal Department of Home Affairs FDHA
Federal Office of Public Health FOPH
Consumer Protection Directorate

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Simplified guide to the online REMM tool for management of radiation incident victims

Based on the REMM website (https://remm.hhs.gov/index.html)

1 Background

In a radiation incident, individuals may be exposed to ionising radiation. For severely exposed individuals, specific management and care measures are immediately required. Individuals may be subject solely to exposure or additionally to external or internal contamination (incorporation) (see Figure 1).

The Federal Office for Civil Protection (FOCP) has compiled hazard files and scenarios for hazards which could potentially arise in Switzerland. Of particular relevance for the management of severely exposed individuals are the following files: “Nuclear power plant incident” (French, German), “Dirty bomb attack” (French, German), “Attack on nuclear material transport” (French, German).

Under Article 135 of the Radiological Protection Ordinance, the FOPH is responsible for the maintenance of knowledge on the treatment of severely exposed persons. As a WHO Collaborating Centre, the FOPH is part of the Radiation Emergency Medical Preparedness and Assistance Network (REMPAN). At present, Zurich University Hospital is the only Swiss centre serving as a referral hospital for medical management of individuals exposed to radiation. This guide is designed to provide guidance for other centres.

The WHO Radiation Emergency Medical Preparedness and Assistance Network (REMPAN) supports member states in building relevant national capacities. REMPAN’s scope also includes research and development of medical countermeasures against radiological and nuclear emergencies.

The US Department of Health & Human Services’ Radiation Emergency Medical Management website (REMM) provides a useful overview of radiation incidents and the appropriate countermeasures. In particular, it includes tools for individual dose estimation, and offers guidance for personnel responsible for pre-hospital and clinical management. Also available is a mobile REMM app (for iPhone and Android), which contains selected key files from the online full version.

2 Aim

The REMM website provides a valuable but extremely comprehensive and possibly bewildering array of information. The aim of the present guide is to highlight the relevant questions and to offer guidance for the management of severely exposed individuals.

This guide can serve as a checklist for procedures from initial patient contact to initial dose estimation. It should help treatment teams to identify persons exposed and/or contaminated in radiation incidents and provide guidance for pre-hospital and clinical management.

3 REMM: Overview

3.1.1 Types of radiation incident victim

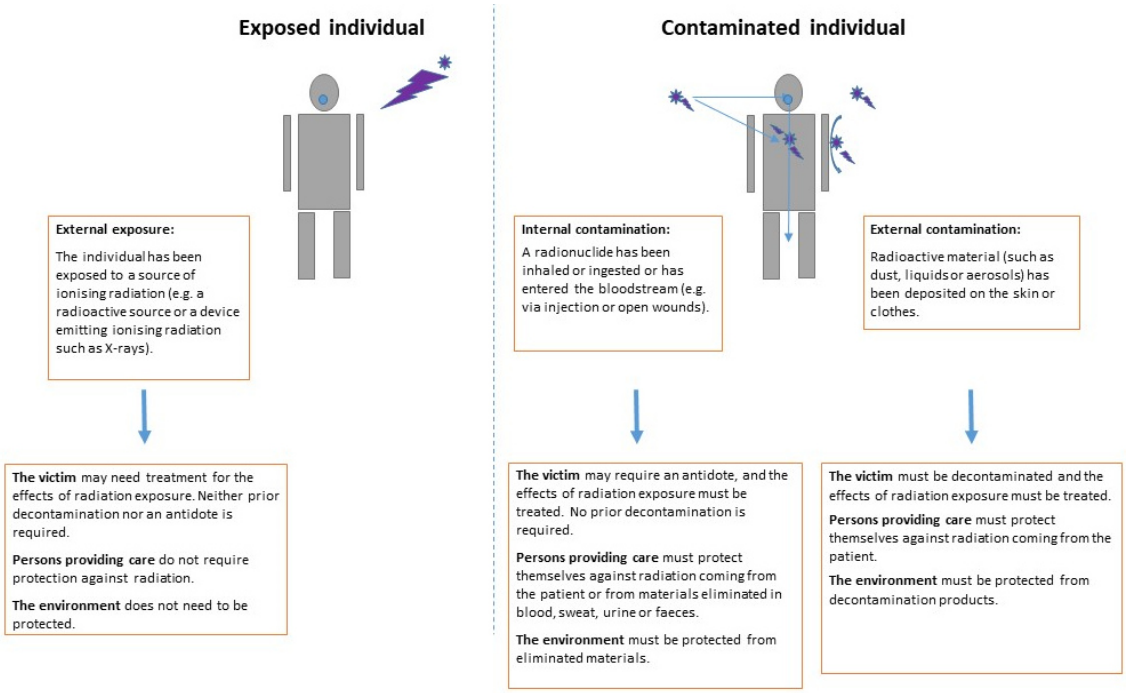

Figure 1: Different types of radiation incident victim. Exposure, internal and external contamination may occur alone or in combination.

An individual victim may be of all the three types described above (exposure, internal and external contamination). The decontamination unit is responsible for ensuring that an externally contaminated person is fully decontaminated, while the treatment team is responsible for ensuring that, if necessary, radioactive contamination is completely removed from an internally contaminated person.

3.1.2 Management of victims according to exposure type

How is radiation exposure to be evaluated?

Choose the appropriate algorithm: https://remm.hhs.gov/newptinteract.htm

In the event of queries concerning radiation, radiological protection or the management of radiation incident victims, the hospital radiological protection centre should be contacted by telephone (hospital contact points are to be designated and appropriately trained).

What facilities in Switzerland can admit radiation incident victims, and how can it be established whether beds are available? (see the Information and Operations System IES) IES Factsheet (German)

<table>
<tr><th>Exposed individual</th><th colspan="2">Contaminated individual</th></tr>
<tr><td></td><td>Internal contamination (incorporation)</td><td>External contamination</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>Radiation exposure only
https://remm.hhs.gov/exposureonly.htm</td><td colspan="2">Radiation contamination only
https://remm.hhs.gov/contamonly.htm
https://remm.hhs.gov/contamalgotext.htm</td></tr>
<tr><td colspan="3">Radiation exposure and contamination
https://remm.hhs.gov/exposurecontam.htm</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">Pre-hospital management: triage
Various triage guidelines
https://remm.hhs.gov/radtriage.htm

• Adult triage
https://remm.hhs.gov/startadult.htm
• Pediatric triage
https://remm.hhs.gov/startpediatric.htm</td></tr>
<tr><td colspan="3">Clinical management of injuries and burns

Radiation and trauma
https://remm.hhs.gov/radtrauma.htm

Burns
https://remm.hhs.gov/burns.htm

See also the Swiss Conference of Cantonal Health Directors' (GDK) "Emergency planning for patients with burn injuries in Switzerland" (available in German and French)</td></tr>
<tr><td>No decontamination required</td><td>No decontamination required</td><td>Decontamination required
https://remm.hhs.gov/ext_contamination.htm

Decontamination hospitals in Switzerland (as of December 2019): AG: Aarau (KSA), Baden (KSB); BE: Bern (Insel), Biel (SHB), Burgdorf (RSB), Thun (STS); BL: Liestal (KSBL), Bruderholz (KSBL); BS: Basel (USB); LU: Lucerne (KSL); SO: Olten (KSO), Solothurn (Bürgerspital); TG: Frauenfeld (ST); TI: Lugano (ORL); VS: Sion (CHVR), Visp (SZO); ZH: Zurich (USZ); planned: St. Gallen, Altdorf,</td></tr>
</table>

		Chur See also the Coordinated Medical Services' (KSD) planning for "Decontamination of persons at emergency, transport and hospitalisation sites in the event of NBC incidents" (available in French / German)
Clinical management of the effects of radiation Clinical tools for the evaluation of acute radiation syndrome (ARS) • Dose estimator for exposure • Managing ARS subsyndromes • Scarce resources triage tool • Time/dose effects in ARS • Time phases of ARS Management of ARS https://remm.hhs.gov/ars_summary.htm https://remm.hhs.gov/ars.htm Cutaneous radiation syndrome https://remm.hhs.gov/cutaneoussyndrome.htm Hematopoietic subsyndrome of ARS https://remm.hhs.gov/hemeguidelines.htm Non-REMM mobile app: H-Module for evaluating the severity of hematopoietic ARS (H-ARS) up to three days after radiation exposure		
	Conventional measures Measures planned/authorised in Switzerland Availability of medication and procurement procedures/periods: Section B.2b of the information on antidotes in FOPH Bulletin 29/2020 (available in French / German) Medical countermeasures for treatment of internal contamination https://remm.hhs.gov/int_contamination.htm	
Patient follow-up In Switzerland: IES Factsheet		

REMM: https://remm.hhs.gov/followup.htm https://remm.hhs.gov/datacollection.htm https://remm.hhs.gov/deceased.htm

3.1.3 Further information

- How do you know a radiation incident has occurred?
  https://remm.hhs.gov/newtype.htm

- Terminology to describe radiation incidents
  https://remm.hhs.gov/describing_incident.htm

- REMM home page
  https://remm.hhs.gov/index.html

- Multimedia library
  https://remm.hhs.gov/imagegallery.htm

- Radiation units and conversion factors
  https://remm.hhs.gov/radmeasurement.htm