Planning & Preparedness for and response to-chemical incidents

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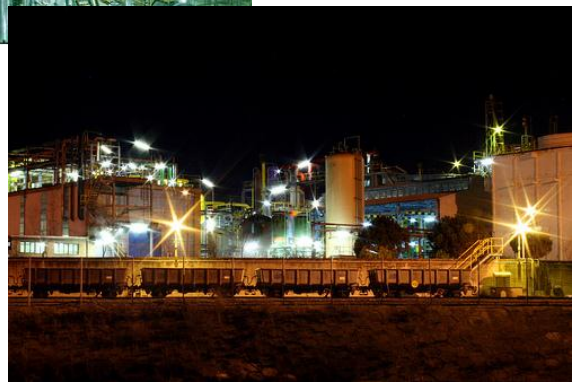
World Health Organization

The Chemical Industry

- Third largest manufacturing industry in Europe; market value € €586 bn .
- Chemicals stored at 850,000 sites in USA.
- Dominant industry in South Africa.
- World chemical sales in 2004 €1736 bn.
- 200-300 new chemicals per year in the EU.
- Total global production in 2020 85% higher than in 1995 (OECD).



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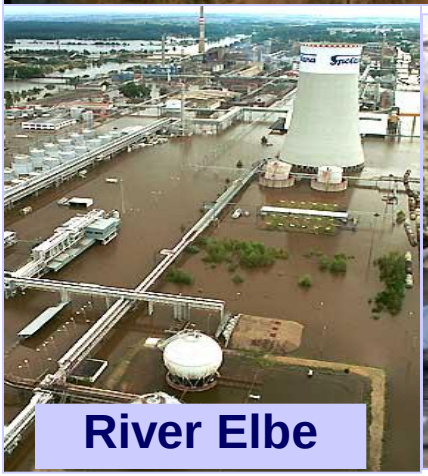
"Types" of chemical incident

- Technological
- Complex
- Deliberate
- Natural
- Disease outbreaks



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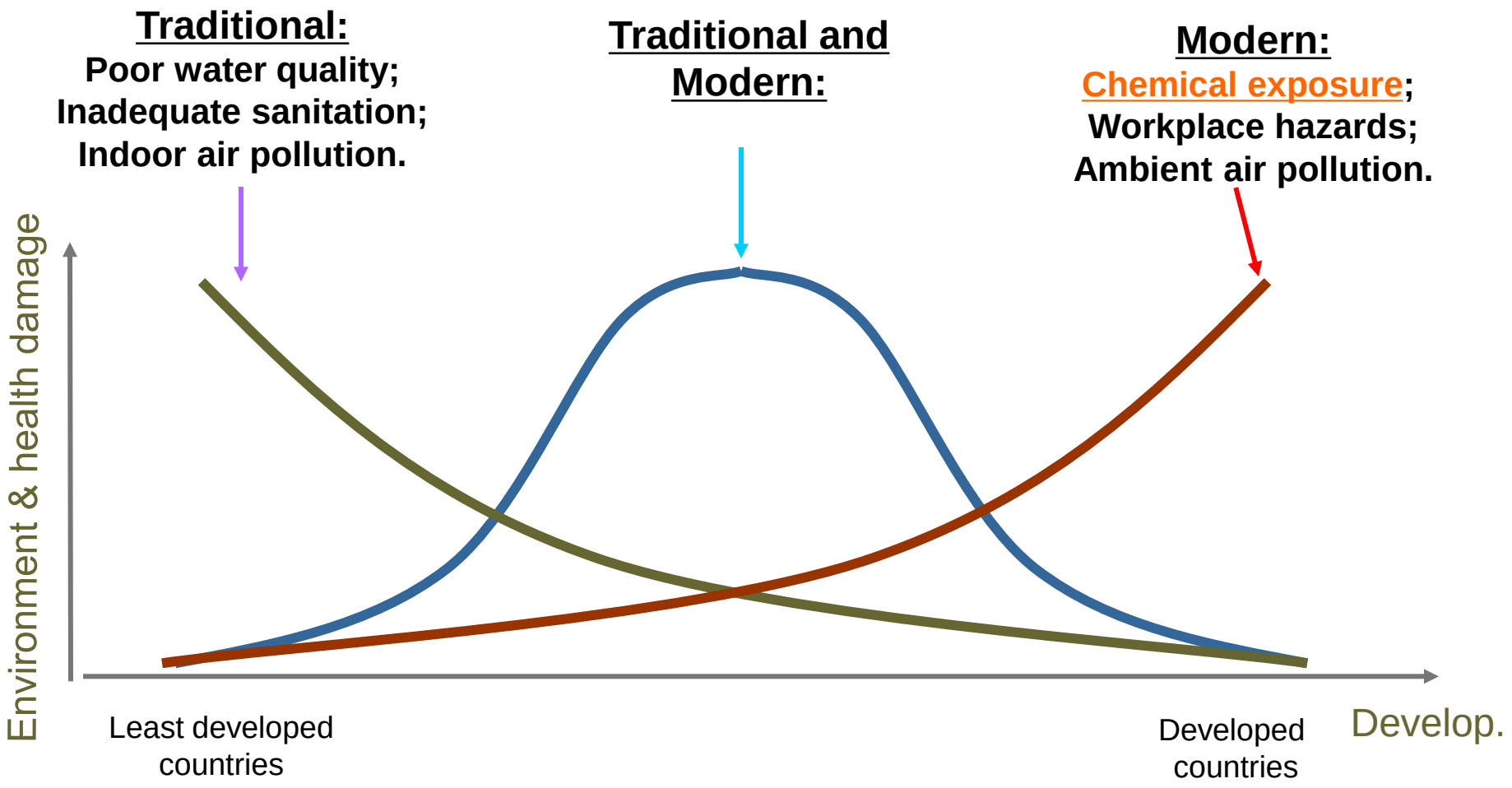
Environmental health risks



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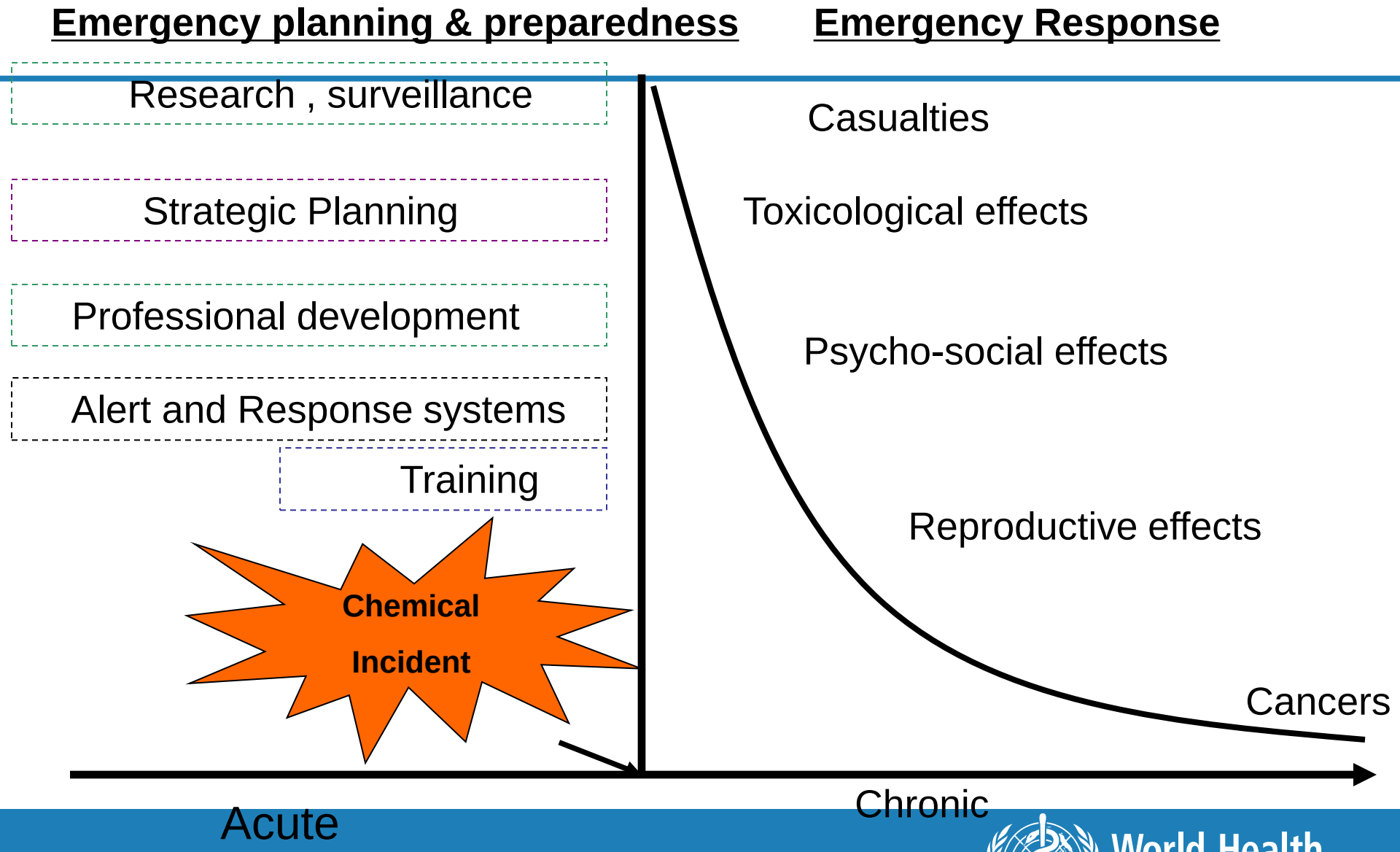
Disease burden related to chemicals

- Chemical exposures cause loss of 7.4 million years of healthy life per year.
- Unintentional poisoning causes >350,000 deaths
  - >94% occur in low- and middle-income countries



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Case Study: Hungarian mud spill, October, 4 Oct 2010

- 9 people died and 150 affected from burns of skin and eye.
- Concern of transnational health and environmental impacts from trans-boundary movement of chemicals.
- 150 similar dams along the Danube.

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Case Study: Mass bromide poisoning, Angola, 2007

- Disease outbreak of unknown cause.
- More than 450 victims; mainly children.
- Symptoms suggested toxic origin.
- Industrial chemical confused with table salt.

Case Study: Heavy metal poisoning from mining, Zamfara, Nigeria.

- Event detected by international medical team (MSF).
- Extraction of gold from ore with high lead content.
- Over 1000 children poisoned. 207 deaths. In some villages, 10-30 % of the children under 5 years old dead.
- Death + illness caused by lead exposure.
- In some villages, 70-100% of children need emergency medical treatment.
- Long-term health consequences, in particular for children.

Case Study: Toxic waste dumping, Cote d'Ivoire, 2006

- 500 tons of toxic waste dumped around the city.
- Several fatal cases reported.
- 100,000 persons seeking medical attention.
- Health System overwhelmed.
- Panic and anxiety among the population.

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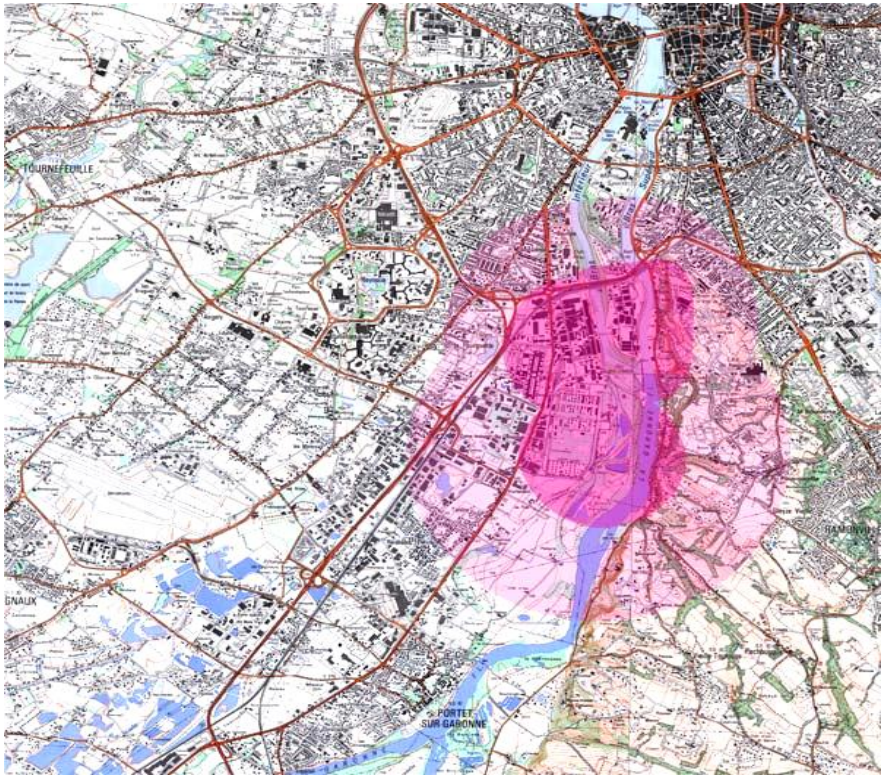
Case Study:Toulouse, France (Sept 2001).

- Storage of 300 tonnes of ammonium nitrate at fertiliser factory.
- Explosion resulted in crater 20-30m deep, diameter of 200m.
- Heard 80km away.
- 29 deaths (28 factory, 1 school pupil).
- 2,500 light injuries, 8,000 serious injuries
- 10% of the population homeless for a few days.



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Case Study: Harbin, China (2005)

- Explosion at a petrochemical plant in Jilin, China.
- Resulting pollution of *Songhua* river with 100 tonnes of benzene and nitro-benzene.
- 80km slick transported along *Amur* river over subsequent weeks.
- Entered Russian region of Khabarovsk Krai.
- Levels 100 times background
- Need for potable water

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Case Study: Ozhihov, Ukraine (2007)

- Derailment of phosphorous carrying goods train.
- Hundreds of Ukrainians evacuated;
- 20 people hospitalised.
- Toxic cloud reached Poland.

Some typical public health questions

Responders:

- What are the chemicals involved? What is their identity? What are their toxicological properties?
- What Personal Protective Equipment is required? How to decontaminate?

Public:

- Am I at risk to develop adverse health effects? Are my children at risk?
- What are the health effects? Can I expect delayed effects?
- What should I do in order to reduce risk of chemical exposure or in case I/my family experience(s) effects?

Role of public health - *Prevention*

Aim: Reduce likelihood of incidents and vulnerability of exposed populations in the case of an incident.

Examples:

- Influence policy and legislation.
- Influence industrial practice.
- Land use planning and product substitution.
- Scenario analyses and impact assessment.

Role of public health - *Preparedness*

Aim: Build capacities and establish working systems for detection and alert, response, and recovery.

Key elements:

- Plans (usually multiple plans).
- Roles and responsibilities.
- Training.
- Exercises.
- Stockpiles, roster of experts, laboratories.
- Coordination and collaboration.

The Plan - Should include:

- ✓ Requirements & Agreements
- ✓ Detection & Alert
- ✓ Scaling up triggers
- ✓ Response process & structure
- ✓ Command and control
- ✓ Inventory of capabilities
- ✓ Coordination with stakeholders
- ✓ Communications
- ✓ Contact list

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Role of public health - *Detection and alert*

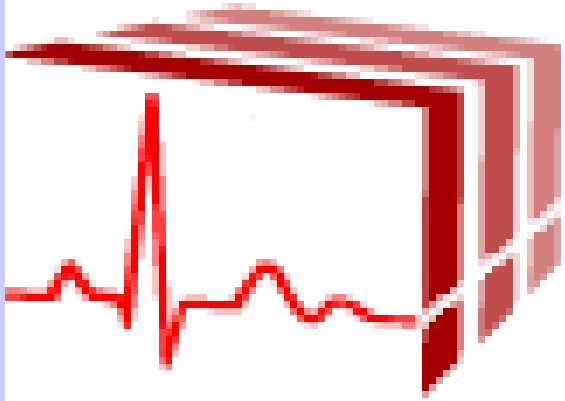
Aim: **Detect and recognize chemical incidents as early as possible and alert partners to take action.**

Detection channels:

- Reporting schemes, media, medical centers, poison centers, environmental surveillance systems, general public, industry…

Alert:

- Communication channels: Who? When? What?
- Decision tree, alert triggers.



Role of public health - *Response*

Aim: **Manage chemical incidents and emergencies effectively and efficiently once they have happened.**

Rapid assessment:

- What are the risks?
- Who may be affected?
- What can be done to minimize harm?
- What are the existing capacities?

Expanded assessment:

- Gather health and environmental data.
- Model/measure transport and fate.
- Estimate risk.

Risk and crisis communication

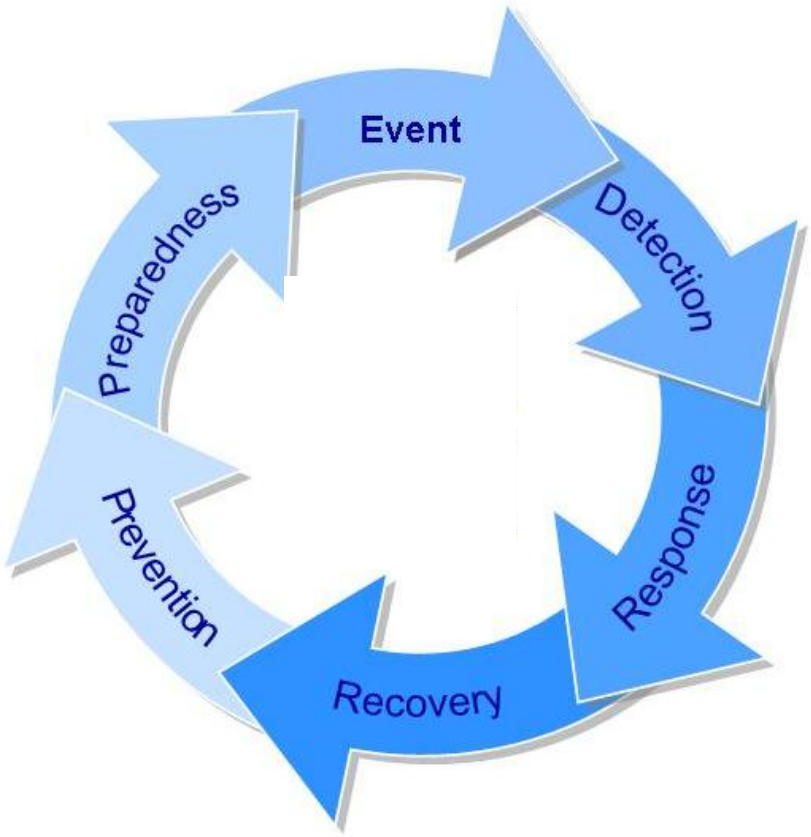
Role of public health - *Recovery*

Aim: Return to sustainable conditions.

- Support remediation or restoration activities.
- Study of intermediate and long-term risks (e.g. environmental epidemiological investigations).
- Ensure efforts are taken to prevent recurrence

Public Health Management of Chemical Incidents

- Public health has a role in each phase of the emergency cycle.
- Health sector plays an influencing, complementary and/or leadership role.
- Multi-disciplinary approach.
- Organizations responsible for those functions may differ for each nation.



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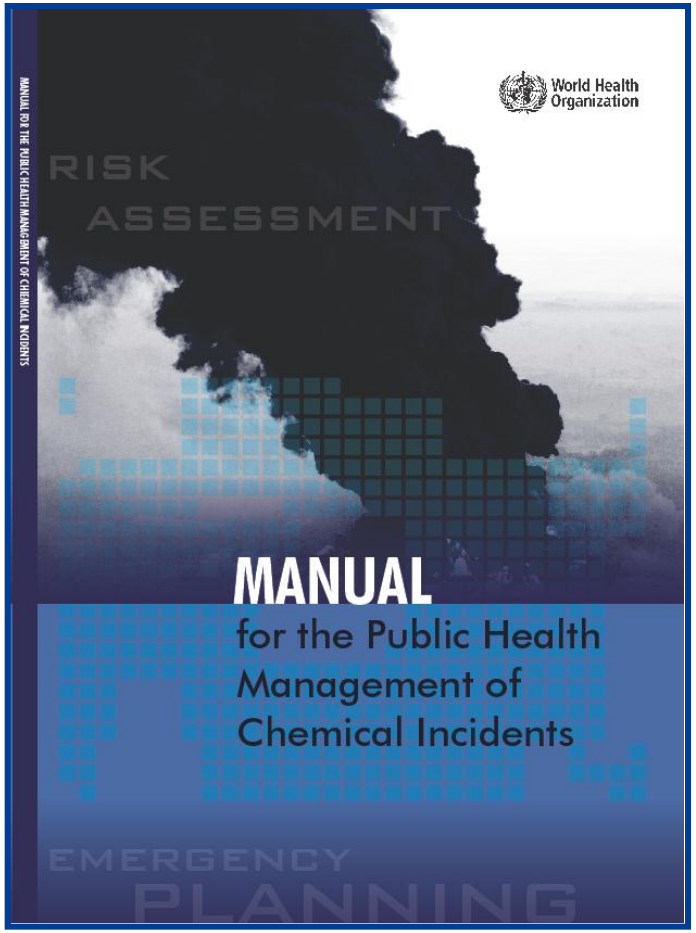
Further Reading



Target group:

Public health and environmental professionals and policy makers.

Purpose:

Introduce principles and functions of public health for the prevention and mitigation of chemical incidents.

Scope:

All types of chemical incidents that have the potential to affect the health of the public.

http://www.who.int/environmental_health_emergencies/publications/Manual_Chemical_Incidents/en/

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