Magen David Adom
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Radiation Accidents & Emergencies: Lessons Learned

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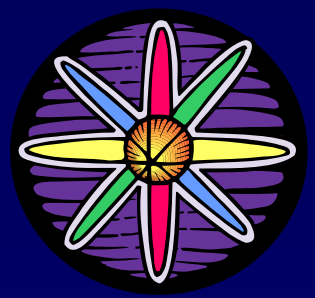


Identifying Key Lessons Learned

- In reviewing
  - New research
  - Practical experience with large-scale radiation incidents
- Some important “lessons learned” for emergency responders and emergency response organizations

Lesson Number One

- Radioactive materials incidents can produce tremendous psychosocial impacts, including ripple effects on the broader society

Radiation

- Risk perception research has consistently shown that radiation is one of the most feared of all hazards
- “Situations involving radioactive materials have a remarkable capacity to produce widespread fear, a profound sense of vulnerability, and a continuing sense of alarm and dread”

Becker SM. Communicating risk to the public after radiological incidents. British Medical Journal 335(7630):1106-7; 2007; Slovic P ed. The perception of risk. London: Earthscan Publications Ltd; 2001; Becker SM. Emergency communication and information issues in terrorism events involving radioactive materials. Biosecurity and Bioterrorism 2004(2): 195-207.

Individual Psychological Impacts

- Chernobyl
  - 6 1/2 years after disaster, found significantly higher level of mental health problems among people in exposed region as compared to those in control area; higher risk of DSM-III-R psychiatric disorders among women with children <18.

N=3044

Havenaar JM, Rumyantzeva GM, van den Brink W, et al. Long-term mental health effects of the Chernobyl disaster: an epidemiologic survey in two former Soviet regions. *Am J Psychiatry*. 1997 Nov; 154(11):1605-1607.

Potential Consequences

Saturation of emergency medical services system by people who fear they may have been exposed or contaminated

Goiania Accident

Cesium 137

244 contaminated

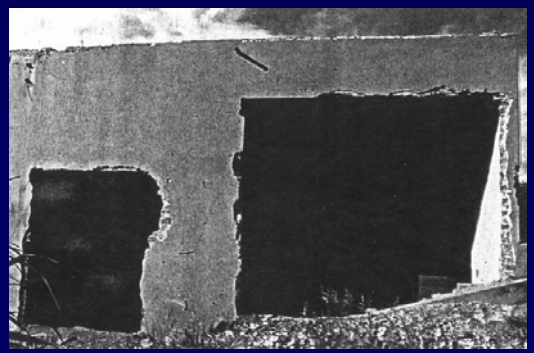
54 treated

4 deaths

800 acres contaminated

112,000 sought monitoring

Psychogenic symptoms



Source: IAEA

Population Flight

- TMI
  - For every person advised to leave, about 45 actually did (Erikson, 1994)
  - Some 150,000 people took to the highways

Photo: Three Mile Island: A Report to the Commissioners and the Public. NUREG/CR-1250, Volume 1. U.S. Nuclear Regulatory Commission.

Spontaneous Evacuation

- Could be large
- Could be chaotic
- Potential to create traffic congestion and difficulties for movement of emergency vehicles

Social Stigma

- The Example of Goiania
  - "Hotels in other parts of Brazil refused to allow Goiania residents to register. Some airline pilots refused to fly airplanes that had Goiania residents aboard. Cars with Goiania license plates were stoned in other parts of Brazil" (Kasperson & Kasperson, 1996)
- The Example of Chernobyl
  - "It was very unpleasant…they shunned us"

    10th form pupil at the Karpovichi secondary school (TOTBW, 1996)

Social Stigma

The Example of the 1999
Tokaimura Accident in Japan

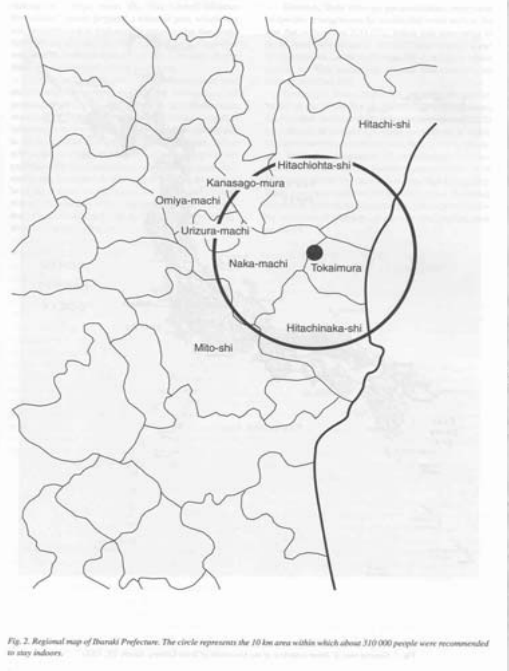


Fig. 2. Regional map of Ibaraki Prefecture. The circle represents the 10 km area within which about 310 000 people were recommended to stay indoors.

Lesson Number Two

- Emergency responders often have deep concerns about radiation and radioactive materials incidents

Emergency Responders

- Emergency responders are the front line of emergency preparedness.
- Many responders face risk and danger on a regular basis, and they do so with skill, courage and dedication.
- At the same time, a growing body of research suggests that emergency responders have major concerns related to incidents involving radioactive materials.

Emergency Responders

Key Concerns & Information Needs

- Family – “family first”
  - First responder: “The first thing you think of is, I need to do something with my family.”
  - Hospital ED nurse: ““My first concern would be my family.”
  - Public health: “I would be concerned with my family and not myself. I would want to make sure that my family was protected….”

Key Concerns & Information Needs

- Self-protection
  - First responder: “How can I do my job and help other people, and protect myself from getting hurt or killed?”
  - Hospital ED: “Do we have the proper protective equipment?”
  - Public health: “What do I do? What is the smartest thing for me to do first and next?”

Key Concerns & Information Needs

- Concerned about “newness” of incidents involving radiation
  - “This one is going to involve radiation or nuclear materials, this is a new one.” (first responder)

Key Concerns & Information Needs

- Serious concerns about individual and organizational preparedness
  - "This is where we are most vulnerable." (nurse)
  - "I just wonder if the training and equipment is up to it." (emergency responder)
  - "Although we have drilled on this, I would be concerned about how prepared we are to take this on." (healthcare professional)

Key Concerns & Information Needs

- For all professional groups, radiation scenarios appeared to generate more anxiety and uncertainty than did scenarios involving chemicals or disease agents
  - "We know so little about radiation." (nurse)

Key Concerns & Information Needs

- Potassium Iodide

  Self-protection issues:

  – “Like the KI, where can I get this, because right off the top of my head I wouldn’t have a clue.”

  – “Should I take potassium iodide? Where can I get it?”

  Public reaction issues:

  – “Everybody's going to want it.”

  – “It doesn't matter that it's not recommended. They're not going to care.”

Commitment to Help in Non-Hospital Field Medical Facilities (Hawaii)

	Physician	Nurse
Natural Disaster	83 %	90 %
Explosion Incident	67 %	70 %
Chemical Incident	59 %	59 %
Biological Incident	56 %	53 %
Contagious Epidemic	56 %	49 %
>> Radiological Incident	52 %	45 %

Lanzilotti SS, Galanis D, Leoni N, Craig B. Hawaii medical professionals assessment. Hawaii Medical Journal 61(8):162-73; 2002.

Willingness of Health Care Workers to Report During Various Disasters (New York)

	Type of Disaster	Percent Indicating Willing to Report
	MCI	86 %
	Environmental Disaster	84 %
	Weather Emergency	80 %
	Chemical Event	68 %
	Smallpox Epidemic	61 %
>>	Radiological Event	57 %
	SARS Outbreak	48 %

Quereshi K, Gershon RR, Sherman FM, Straub T, Gebbie E, McCollum M, Erwin MJ, Morse SS. Health care workers' ability and willingness to report to duty during catastrophic disasters. J Urban Health 2005; 82:378-88.

Lesson Number Three

- Effective risk communication is one of the most crucial components of preparedness and response for radioactive materials events

Negative Examples

- Importance of risk communication in radiological/nuclear incidents is usually underlined by reference to negative examples.

- When information is unclear, confusing or in short supply, the result can be a dramatic amplification of the effects of the incident.

Negative Examples

- Chernobyl
  - Soviet authorities kept information about the situation from their own citizens, from citizens of nearby countries, and from the world
- Three Mile Island
  - Inadequate and conflicting information

Recent Experience: London Polonium Incident

- November 2006 incident involving polonium-210
- Alexander Litvinenko
  - former colonel in Russia's Federal Security Service
  - outspoken critic of Russian officials and policies
  - had been granted asylum by Britain and was living in London.
- Became seriously ill after a meeting in a hotel sushi bar; hospitalized
- Died 23 November

Recent Experience: London Polonium Incident

- A short time later, health authorities confirmed that they had found radioactive polonium-210 in his urine.
- In addition, police announced that they had found traces of radioactive contamination at the hotel, in the sushi bar and at Litvinenko's home.
- Later, as the incident continued to unfold, small traces of polonium would also be found in other locations and even on several planes that had flown international routes.

Potential for Fear

- Radioactive materials involved
- Traces of contamination found in various London locations
- Gripping, headline-making news
  - Photos of victim showing pale skin, sunken eyes, yellow skin and loss of hair.

Research Findings

- Rubin et al. gathered data people's reactions and perceptions of risk during the polonium incident.
- Results showed that only 11% of the 1000 Londoners surveyed believed their health to be at risk from the incident.

Rubin GJ, Page L, Morgan O, Pinder RJ, Riley P, Hatch S, Maquire H, Catchpole M, Simpson J, Wessely S. Public information needs after the poisoning of Alexander Litvinenko with polonium-210 in London: cross sectional telephone survey and qualitative analysis. British Medical Journal 335 (7630):1143-1146; 2007.

Becker SM. Communicating risk to the public after radiological incidents. British Medical Journal 335(7630):1106-7; 2007.

Research Findings

- Two factors responsible for low level of concern:

1. Most people did not perceive the incident as a public health threat or a personal threat. Instead, they saw it as something associated with spying, crime and espionage and as being targeted at one, or a few individuals, rather than at the general public.

Research Findings

2. Nearly three quarters of respondents agreed with the statement that, “if you have not been in one of the areas known to be contaminated with polonium 210, then there is no risk to your health.”

   This point – that there was no risk to people who had not been at one of the locations where traces of polonium had been found – was “one of the key messages of the public information campaign undertaken by health agencies, and the findings suggest that those efforts were successful.”

Conclusions

Conclusions

- Fear of radiation in the general public is high
- Potential to translate into
  - increased likelihood of population flight
  - social stigma
  - overwhelming of emergency medical services
- Effective public information and emergency messages will be vital to prevent such response
  - Messages should be pre-developed and pre-tested for effectiveness

Conclusions

- Urgent need to acknowledge and address emergency responder concerns
- Additional information, training, exercises important to raise capabilities and level of confidence
- Key needs include
  - Use of radiation detection equipment
  - Decontamination protocols
  - Self-protection
  - Medical management of radiation victims