Downwinders Syndrome
Implications for the Public and Healthcare, then and now

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Objectives

By the end of this presentation the participant will be able to:

- Identify Downwinders syndrome.
- Describe signs and symptoms found in survivors of Downwinders syndrome.
- Discuss the implications on health and public safety in regards to radiological exposure, then and now.
- Identify present-day plausible threats of radiological exposure.
- Discuss workforce readiness in relation to present-day threats.
International perspectives

- Fukushima-the Global wake-up call
- Hiroshima & Nagasaki-1945
- Hanford, Washington 1944-1957
- Marshall Islands-1954
- 3-mile Island-1979
- Chernobyl-1986

- Thomas, Smith & Turcotte (2009).
Our corner of the World

- **United States**
  - 104 nuclear reactors in 31 states.

- **Texas**
  - Texas has 2 power plants, and 4 reactors.

- **Drills-how frequent are they and what is the outcome?**
  - What are the mandates?
  - Are we compliant?
Downwinders Syndrome Defined

- Downwinders syndrome refers to the signs and symptoms of individuals and communities who were exposed to radioactive contamination or nuclear fallout from atmospheric or underground nuclear weapons, testing and nuclear accidents.
Downwinders Syndrome - then (1951-1958)

- **Historical perspective:**
  - Arizona, New Mexico, Nevada, Utah, and parts of adjoining states including Texas were affected.

- **Encouraged to go and watch the detonation.**

Downwinders Syndrome

- Contrast of direct detonation and Downwinders Syndrome.
- Hiroshima and Nagasaki detonated at high altitudes above ground and produced minimal fall-out (Simon, Bouvill & Land, 2006).
  - Most injuries within 5 kilometers: due to heat and shock waves.
  - Direct radiation injuries within 3 kilometers (most studies involve these incidents).
- Downwinders: involves local, regional and global affects.
Downwinder’s Syndrome –then and now

• Genealogical impact
  ○ 1st generation
    ▷ Hiroshima (Not a test!): Autoimmune diseases: thyroid cancer; adenoma and adenomatous goiter (Negataki, et al. 1994).
    ▷ Pacific: Motor neuron disease (Nelson et al., 1995)
    ▷ Nevada Test Site-surface and above ground testing from 1951-1962. 86 tests were conducted, 14 underground. Releases of radioactive material into the atmosphere (Simon, Bouville, Land, 2006).
      ○ External radiation: Cancers thyroid and red bone marrow
      ○ Ingestion of contaminated meat and dairy products: stomach and colon cancers
      ○ Inhalation of radioactive fall-out:
Downwinders Syndrome - now

- **Genealogical impact**
  - 2\textsuperscript{nd} generation
    - Hiroshima: Prenatal anomalies of mental retardation and Intrauterine growth retardation (Bice-Stephens, 2000).
  - 3\textsuperscript{rd} generation...generations to come
    - Hiroshima: Myelodysplastic syndrome (Bice-Stephens, 2000).
  - Cancers:
    - Internal exposures: colon, stomach cancers, brain bladder, liver
    - External exposures: thyroid and red bone marrow (Leukemias)
  - Depression
  - Personality disorders
Radiological fall out from Nevada test site
Implications for Healthcare

- Fall-out from “ground zero” or detonation
  - Local 50 – 500 kilometers (greatest risk of irradiation)
  - Regional 500-3,000 kilometers
  - Global more than 3,000 kilometers
- Collectively... global fallout within the U.S.
  - Internal doses smaller for thyroid
  - Greater for the red bone marrow
- Now... we are all at risk of being “down-wind” from a dirty bomb—a conventional explosive coupled with radioactive material or improvised nuclear device (IND) or radiological dispersal device (RDD)
Implications for Healthcare

- Have a ready and willing workforce: Most not ready
- Determine where greatest incidence of cancers are coming from, contaminated soil, animals etc.
- Courage: Take a stand and determine what changes need to be made. Bring awareness to the issue.
- Have an INFORMED healthcare workforce.
  - Teach healthcare providers awareness and what to look for
  - Is your facility Chemical, Biological, Radiological, Nuclear Explosive (CBRNE) Capable?
  - Highest degree of interactions with patients worldwide.
The healthcare workforce; Are we ready?

- The nursing workforce, ready, willing and able?
- Not ready: limited training for a radiation emergency (Veenema et al., 2008).
- Willing? Positive correlation between willingness to respond and perception of safety (Veenema et al., 2008).
- Nursing makes up the largest segment of the healthcare workforce.
- Be aware of your surroundings, report suspicious behavior.
An analysis of nurses’ readiness for disasters

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<td>5.6 (2.6)</td>
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<td>Total Score</td>
<td>90.0 (31.7)</td>
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<td>.98</td>
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(* Chronbach’s Alpha)
Implications for the Public

- Empower those that you suspect may have been exposed
- Educate health care personnel (many don’t know)
  - Internal irradiation exposure:
    - fallout inhalation
    - absorption through intact or injured skin
  - Most due to consumption of contaminated food.
    - Plants, roots, soil, animals. Cooking items- pots, pans, cooking/eating utensils.
  - External irradiation exposure: from penetrating gamma rays emitted by particles on the ground.
  - Anomalies are proportional to the dose of radiation:
    - Hematopoietic
    - Gastrointestinal
    - Central nervous system
Personal preparedness...

- What can you do?
  - Be knowledgeable
  - Have a plan
    - Underground is best
    - Center of your home without windows...don’t forget your supplies!
  - Have a plan B
  - Potassium Iodide
Never forget our humanity...
References

References