

Decontamination Training

Finger Lakes Regional Resource Center
RA Lawrence Poison & Drug Information Center
University of Rochester Medical Center
Rochester, NY

Instructors

- Thomas Fletcher, PA
- Eileen Spezio

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- USAMRICD, USAMRIID
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Hazard Recognition

Hazardous Substance

- Is any substance to which exposure may result in adverse effects on the health or safety of employees. (OSHA)
- Includes:
 - ◆ Substances defined by CERCLA
 - ◆ Biological agents with disease causing potential
 - ◆ US DOT substance listed as hazardous
 - ◆ Substances classified as hazardous waste

Chemical Hazards

- 75% occur at fixed sites (ATSDR)
- 91% involve one substance
- Most are liquid (40%) or vapors (41%)
 - ◆ Corrosives
 - ◆ Pesticides
 - ◆ Gases
 - ◆ Paints and dyes
 - ◆ Volatile organic hydrocarbons
 - ◆ Other inorganic chemicals

Contamination Event

- VERY common
- Patients go to CLOSEST hospital
- Risk to hospital
 - ◆ Contamination of staff and facilities
 - ◆ Need emergency plan
 - ◆ Need decontamination facility and team

Emergency Response Plan

- ASSUME all are contaminated
- Train everyone for RECOGNITION of patients presenting to ED with contamination
- ALERT charge nurse and/or decontamination team, AND activate “code decon”

Knowledge

- Recognition/awareness (everyone)
 - ◆ How to know if someone...
 - ◆ How to keep safe
 - ◆ How to alert

Knowledge

- Operations level (Decon Team)
 - ◆ Recognition of chemicals
 - ◆ PPE
 - ◆ Recognition of symptoms
 - ◆ Clean up

Labels/warnings...

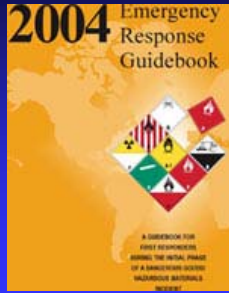
- CAS numbers
(Chemical Abstract Service #)
- Shipping manifesto/label
- Container label
- DOT placards
- Name of product on container

Other patient's warning...

- It smelled like...
- It is used for...
- You **HAVE TO USE A RESPIRATOR** to...
- It tasted like...
- There's a <color> warning/placard on it...

Initial ID/precautions

- Emergency Response Guidebook
- Quick guide
 - ◆ General ID
 - ◆ Occasional specific ID
 - ◆ General guidance for class of chemical



Placards and Labels



Notification System

- Notifies all in ED area
 - ◆ specific responsibilities for all
- Activates Decon team
- Keeps patient at safe distance and outside
- Decontaminates as appropriate to circumstances

Notification System

- Decon Team Leader
 - ◆ Interviews patient from safe distance and OUTSIDE
 - ◆ Determines need for decon and PPE
 - ◆ Uses Poison Center as reference
 - ◆ Alerts and discusses with charge nurse/faculty MD
 - ◆ If in doubt: DECONTAMINATE

Notification System

- Decon Team members and support staff
 - ◆ Gets decon room ready
 - ◆ Gets partially dressed, except respirator
 - ◆ Finalizes PPE and decontaminates victim(s) upon final say of Decon Team Leader

Incident Command System

- ICS should be followed at ALL levels
- Hospital
 - ◆ Departmental
 - ◆ Specific team (i.e., Decontamination)
- At each level, designated person to communicate with.

ICS – Decon Team

- **Command** (Decon Team Leader)
- **Operations** (Decon team members)
- **Logistics**
(Decon team suit/equipment support)
- **Liaison** (Decon Team Leader or designee)

CBRNE

- Define
 - ◆ WMD
 - ◆ NBC
 - ◆ CBRNE
- Nuclear Devices
- Biological Weapons
- Chemical Weapons



NBC/CBRNE Agent Sources

- Home production
- Laboratory / commercial production
- Industrial facilities
- Military sources
- Medical / university research facilities

The Fallacies

- It can't happen to us
- NBC agents are so deadly the victims will all die anyway
- There is nothing we can do

End of Module 1

Complete Module 1 Questions

Chemical Agents



Tokyo Sarin Attack 1995

- Numbers seeking medical care:

- ◆ 5,510 total at 278 health-care facilities

- ◆ Mild: 984
- ◆ Moderate: 37
- ◆ Severe: 17
- ◆ Deaths: 12
- ◆ Status unknown: >300

- No secondary contamination of health-care workers, but 2 vapor-exposed physicians



Characteristics and Behavior

- Generally liquid (when containerized)
- Normally disseminated as aerosol or gas
- Present both a respiratory and skin contact hazard
- May be detectable by the senses (especially smell)
- Influenced by weather conditions

Routes of Entry

- Inhalation - vapor or aerosol
- Skin (percutaneous) - liquid or vapor (vapor if prolonged contact with skin)
- Ingestion - liquid or solid
- Injection - intravenous or intramuscular

Volatility

- Tendency of a liquid agent to form vapor
- Volatility proportional to vapor pressure
- Affected especially by:
 - temperature
 - wind
 - method of delivery

Persistence

- Tendency of a liquid agent to remain on terrain, other surfaces, material, clothing, skin
- Affected especially by:
 - temperature
 - surface material
- Persistence is inversely proportional to volatility

Examples

- Non-persistent agents (less than 24 hours)
 - tabun, sarin, soman, cyanide, phosgene
- Persistent agents (greater than 24 hours)
 - mustard, VX

PULMONARY AGENTS

- Chlorine and Phosgene classic examples
 - ◆ Gases at STP
 - ◆ Mechanism: pulmonary
 - ◆ Non-cardiogenic pulmonary edema
 - ◆ Adult Respiratory Distress Syndrome (ARDS)
 - ◆ Treatment: supportive



CHLORINE CYLINDERS



Ypres, Belgium, April 1915

CHLORINE - Civilian Uses

- Chlorinated lime (bleaching powder)
- Water purification
- Disinfection
- Synthesis of other compounds
 - ◆ synthetic rubber
 - ◆ plastics
 - ◆ chlorinated hydrocarbons



PHOSGENE

- 42 y/o female
- 2 hrs post exposure
- rapidly inc. dyspnea
- PaO₂ 40 torr (room air)
- CXR: infiltrates -
 - ◆ perihilar
 - ◆ fluffy
 - ◆ diffuse interstitial



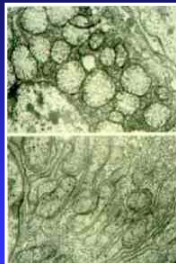
PHOSGENE - Uses/Sources

- Chemical industry
 - ◆ foam plastics (isocyanates)
 - ◆ herbicides, pesticides
 - ◆ dyes
- Burning of:
 - ◆ plastics
 - ◆ carbon tetrachloride
 - ◆ methylene chloride (paint stripper)
 - ◆ degreasers



“BLOOD” AGENTS (CYANIDE)

- Hydrogen Cyanide (AC)
- Cyanogen Chloride (CK)



CYANIDE (BLOOD AGENTS)

- Hydrogen Cyanide (AC), Cyanogen Chloride (CK)
- Gas at STP, lighter than air
- Mechanism: blocks cell utilization of oxygen
- Old treatment: amyl/sodium nitrite and sodium thiosulfate
- New treatment: hydroxocobalamin

Cyanide treatment

Nitrites + Hemoglobin → MetHemoglobin

metHgb + CN → cyanomethemoglobin

CNmetHgb + thiosulfate → Hgb + thiocyanate

Thiocyanate eliminated renally!

Cyanide treatment

CN + hydroxocobalamin → cyanocobalamin (vit. B12)

- Expensive
- Easier to use
- Less toxic
- Eliminated renally
- But interferes with some blood tests x 24 hours!

BLISTER AGENTS (VESICANTS)

- Sulfur Mustard (H,HD)
- Nitrogen Mustard (HN1, HN2, HN3)
- Lewisite = chlorovinylchloroarsine (L)
- Mustard / Lewisite mixtures (HL,HT,TL)
- Phosgene oxime (CX)



VESICANTS: SULFUR MUSTARD

- Sulfur Mustard, Nitrogen Mustard, Lewisite
- Oily liquid, heavier than air and water, persistent
- Mechanism: alkylating agent, DNA and proteins most sensitive targets
- Treatment: supportive

BLIND LEADING THE BLIND



Convalescence 2wks-6months

MUSTARD TOXICITY

Liquid
Blister 10ug
Death 100 mg/kg
7 gm/70 kg (on skin surface)
(350 mg absorbed)



MUSTARD: EYE



VESICANT EFFECTS



Iran/Iraq War: 90-95% burns, pulmonary injury, bone marrow suppression, sepsis, and eventually died.

NERVE AGENTS (ANTICHOLINESTERASES)

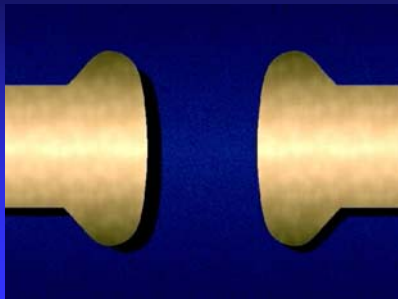
- Tabun (GA)
- Sarin (GB)
- Soman (GD)
- GF
- VX (3 LD)



NERVE AGENTS

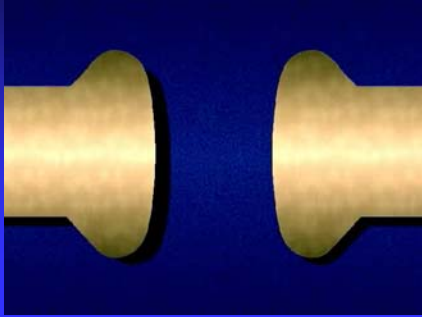
- Sarin (GB), VX (persistent)
- All liquids initially at STP
- Mechanism: inhibits acetylcholinesterase, causes massive cholinergic crisis
- Treatment: atropine, oxime, diazepam

Normal (cholinergic) synapse



But why does the acetylcholine disappear?

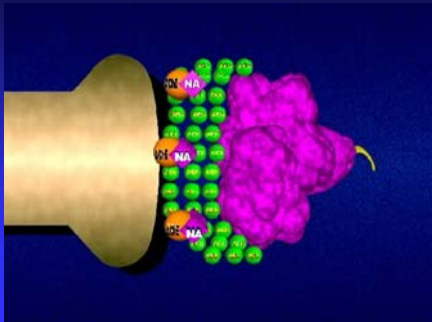
...because of
acetylcholinesterase!



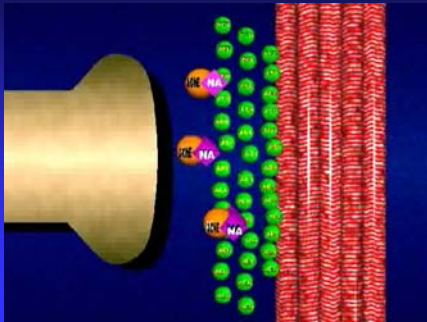
Signs and Symptoms

- D iarrhea
 - U rination
 - M iosis
 - B radycardia
 - B ronchospasm
 - B rhochorrhea
 - E mesis
 - L acrimation
 - S alivation
- and:
- Seizures
 - Coma
 - Death

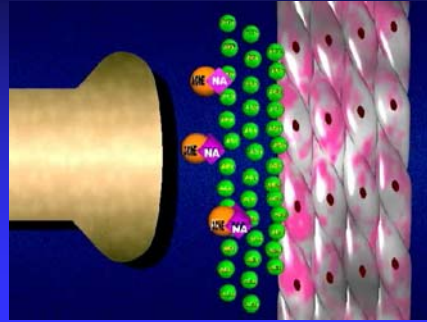
Gland...



Skeletal muscle...



Smooth muscle...



MARK I Kit



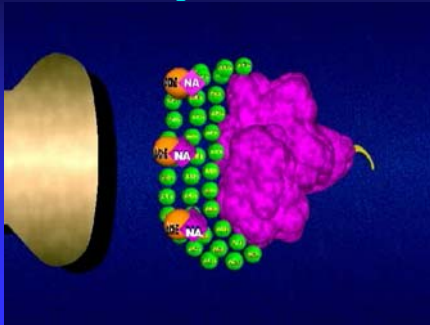
MARK I Kit (atropine use)



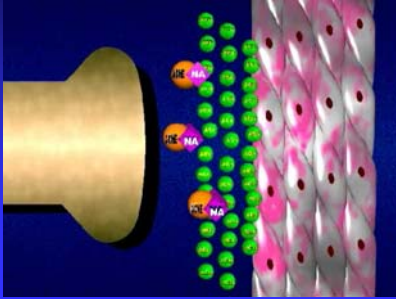
MARK I Kit

- Take out contents
- Hold in left hand
- Use #1 first (atropine)
- When pulled from base, ARMED
- Stick into lateral thigh, and hold 10 sec.
- Dispose

Rx with atropine



Rx with atropine...



MARK I Kit (pralidoxime use)



MARK I Kit

- Hold base in left hand
- Use #2 next (pralidoxime)
- When pulled from base, ARMED
- Stick into lateral thigh, and hold 10 sec.
- Dispose

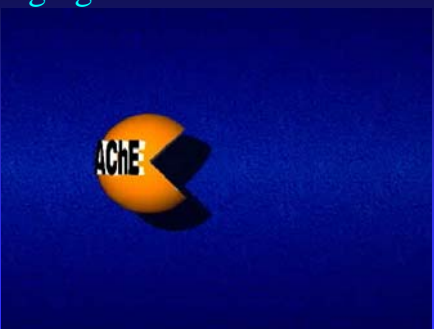
How 2-Pam works



Aging

- Permanent damage to Ache
- Onset varies with agent

Aging and NA/OP



MARK I Kit

- Finish decontamination
- Observe for further symptoms
- If needed repeat with another kit

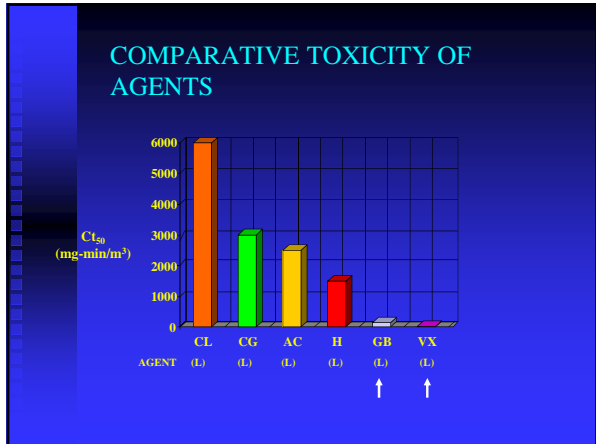
- Children
 - ◆ Will need size appropriate dosing
 - ◆ No autoinjectors at this time

Follow up care

- Notify Decon team leader
- Receiving team and rest of ED should be ready with:
 - ◆ IV
 - ◆ Atropine
 - ◆ Pralidoxime
 - ◆ Benzodiazepine
 - ◆ (airway)

Other use

- IF YOU OR YOUR DECON TEAM LEADER SYMPTOMATIC:
 - ◆ Notify Decon team leader
 - ◆ Use MARK I kit
 - ◆ Assist member to decon
 - ◆ Assist member out of decon for further care



End of Module 2

Complete Module 2 Questions



Biological Agent Characteristics

- Produce delayed effects
- Do not penetrate unbroken skin
- Do not evaporate
- More toxic than chemicals by weight
- Undetectable by senses
- Difficult to detect in the field

Biological Agent Characteristics (continued)

- Most effectively disseminated as aerosols
- Range of effects
- Obtained from nature
- Multiple routes of entry
- Destroyed by environment
- Some are contagious

Classes of Biological Agents



Agents Considered for BW

- Bacteria and Rickettsiae
Anthrax spores, Tularemia, Plague, Brucella, Q Fever
- Viruses:
Smallpox, VEE, Hemorrhagic fevers
- Toxins:
Botulinum toxin, SEB, Ricin, Saxitoxin

Acquisition of Etiological Agents

- Multiple culture collections
- Universities
- Commercial biological supply houses, e.g. Iraq
- Foreign laboratories
- Field samples or clinical specimens, e.g. Ricin

Biological Agents

- Most toxic per weight
- Production technology is easily accessible
- Inhalation threat – 1 to 5 micron aerosol
- Undetected until numerous casualties
- Incapacitating to lethal effects

BW General Properties

- Not volatile, must be dispersed as an aerosol
- Silent, odorless, tasteless
- Relatively inexpensive to produce
- Simple delivery technology
 - ◆ Point source - aerosol generator
 - ◆ Line source - moving aerosol generator: auto, airplane, etc

BW - General Properties 2

- Inhalation is the most significant route of transmission for BW
- Aerosol - 1 to 5 microns ideal size
- Other routes of entry: oral, dermal abrasion, or intentional percutaneous

Impact of a BW Release

- Extensive and prolonged need for medical services
- Increased need for PPE in hospitals
- Possibility of a quarantine for BW agents
- Problems handling remains/mortuary facilities
- Multiple jurisdictional challenges in disaster response
- Responding to a “hoax” can be expensive

Physical Protection

- Only foolproof means of protection
- Present equipment is effective
- Problem is knowing when to put protective mask on
- No universal protection for civilian populations
- Limited education programs for civilian populations

Possible Epidemic Syndromes in BW

- Influenza syndrome
- Pulmonary syndrome
- Jaundice syndrome
- Encephalitis syndrome
- Rash syndrome or cutaneous lesions
- Unexplained death or paralysis
- Septicemia/toxic shock

Cutaneous Anthrax



Anthrax - Prevention

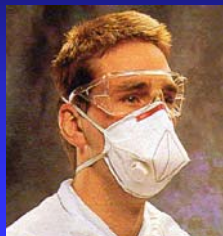
- No documented cases of person-to-person transmission of inhalational anthrax has ever occurred
- Cutaneous transmissions are possible
- Universal precautions required

Plague - Pathogenesis

- Humans develop disease from either the bite of an infected flea or by inhaling the organism
 - ◆ Bubonic - infection of a lymph node (usually lower legs)
 - ◆ Pneumonic - infection of the lungs
 - ◆ Septicemia - generalized infection from bacteria escaping from the lymph node: toxic shock
 - ◆ Oropharyngeal infections are rare, but reported

Pneumonic Plague Prevention

- Secondary transmission is possible
- Standard, contact, and aerosol precautions for at least 48 hrs until sputum cultures are negative or pneumonic plague is excluded



Tularemia - Pathogenesis

- Infectious via inhalation, ingestion, or absorption
- Inhaling only 10 to 50 organisms produces most lethal form of disease, typhoidal form
- Ingestion or absorption causes ulceroglandular form of disease



Q Fever - Pathogenesis

- Causes disease in animals (sheep, cattle, goats)
- Humans acquire disease by inhaling aerosols contaminated with the organism.



Viruses as Biological Agents

- Smallpox
- Venezuelan Equine Encephalitis (VEE)
- Viral Hemorrhagic Fevers



Smallpox - Clinical Course

- 7-17 day incubation period followed by myalgias, fever, rigors, vomiting, HA, and backache
- May have mental status changes
- Discrete rash with pustules develops over face and extremities and spreads to trunk
- Infectious until all scabs healed over
- All contacts quarantined for at least 17 days

Smallpox



Terrorist Use of Infectious BW Agents

- Provisional diagnosis needs to be made quickly
- High index of suspicion that BW agents have been used
- No time to wait on laboratory results to establish a definitive diagnosis
- The time course of the epidemic may aid in diagnosis

Toxins as Biological Agents

- Think of them as chemicals!
 - ◆ Botulinum
 - ◆ Ricin
 - ◆ Staphylococcal Enterotoxin B



Toxins General Characteristics

- Poisons produced by living organisms that cause effects in humans, animals or plants
- More toxic per weight than chemical agents
- Not volatile and minimal absorption in intact skin
- Not prone to person-to-person transmission
- Sudden onset of symptoms, prostration or death
- Effects: interfere with nerve conduction; interact with immune system; inhibit protein synthesis
- **THINK OF IT AS A CHEMICAL!!!!**

Botulism Poisoning - Epidemiology

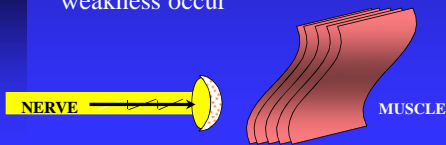
- Most outbreaks of foodborne botulism result from eating improperly preserved home-canned foods, with vegetables canned in oil being the most common source.
- 34 cases were reported in the U.S. in 1994.
- Toxin can be harvested and delivered as aerosol

Botulinum Toxin - Pathogenesis

- Neurotoxins produced by Clostridium botulinum - Botulism
- Most lethal compounds per weight - 15,000 times more toxic than VX
- Similar effects whether inhaled or ingested
- Onset of neurologic symptoms:
After inhalation, 24-72 hours
After ingestion, 12-36 hours

Botulism - Pathogenesis 2

- Blocks the release of ACh at the presynaptic terminal of the neuromuscular junction and autonomic nervous system
- Bulbar palsies and skeletal muscle weakness occur



Botulism - Signs & Symptoms

- Descending paralysis
- Bulbar palsies first
 - ◆ blurred vision
 - ◆ mydriasis
 - ◆ diplopia
 - ◆ ptosis
 - ◆ photophobia
 - ◆ dysphagia
 - ◆ dysarthria

Botulism - Signs & Symptoms 2

- Soon skeletal muscles become weak, starting in the upper body and moving symmetrically downward
- Symptoms progress acutely to respiratory failure in 24 hours to 2 days (try to obtain antitoxin)
- Patients usually awake and alert



"Floppy" baby
flaccid paralysis

Ricin - Pathogenesis

- Potent cytotoxin - a by-product of castor oil production: 5% of mash after oil removed
- Over a million tons of castor beans are processed yearly into castor oil
- 200 times more toxic by weight than VX
- Blocks protein synthesis within the cell and thus tissue death
- Causes airway necrosis and edema when inhaled

Ricin - Pathogenesis

- Toxic by multiple routes of exposure
- Can be dispersed as an aerosol
- Effective by inhalation, ingestion, injection



Ricin - Signs & Symptoms

- Fever, chest tightness, cough, SOB, nausea, and joint pain 4 to 8 hours after inhalation
Airway necrosis and edema leads to death in 36 to 72 hours
- Ingestion causes N, V, severe diarrhea, GI hemorrhage, and necrosis of the liver, spleen, and kidneys - shock and death within 3 days
- Injection causes necrosis of muscles and lymph nodes with multiple organ failure leading to death

Ricin - Diagnosis & Treatment

- DIAGNOSIS
 - ◆ Difficult
 - ◆ Routine labs are nonspecific
- TREATMENT
 - ◆ Supportive - oxygenation and hydration
 - ◆ No antitoxin or vaccine available

Staphylococcal Enterotoxin B (SEB) Pathogenesis

- Fever producing exotoxin secreted by *Staphylococcus aureus* - has endotoxin effects
- Common cause of food poisoning in improperly handled foods
- Symptoms vary by route of exposure
- Causes proliferation of T-cells and massive production of various interleukins and cytokines, which mediate the toxic effects

SEB - Pathogenesis 2

- Incapacitating - even at sublethal doses
- 80% of exposed develop symptoms
- May be aerosolized and inhaled
- May be introduced into the food supply and ingested

SEB - Signs & Symptoms

- 3 to 12 hours after inhalation
 - ◆ Sudden onset of high fever, HA, chills, myalgias, and nonproductive cough
 - ◆ Severe SOB and chest pain with larger doses
 - ◆ Chest x-ray usually nonspecific - ARDS in severe cases
- Ingestion - Nausea, vomiting and diarrhea develops, which may be severe

Defense Against BA – Self-Protection

- Treat every patient with respiratory complaints, a rash or open wounds as an “Infectious Source”
- Normal standard universal precautions for most biological agents
- HEPA filter mask upgrade for Pneumonic Plague/Smallpox/VHF
- Special protective garments are not necessary
- Precaution upgrades in areas of the hospital where aerosols could be generated: Lab centrifuges, autopsy facilities.

Defense Against BA - Triage

- Initial triage of all biological casualties is Immediate
- Highest priority will be allocating existing resources
 - ◆ Isolation rooms away from other patients
 - ◆ Mechanical ventilators
 - ◆ Personal protective equipment for staff
 - ◆ Medications

Key Points

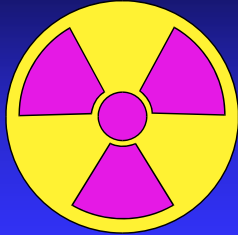
Medical Approach to BA Attack

- Mandatory universal precautions with all infectious patients prevents spread of infection by containing all bodily fluids and utilizing barrier-protection nursing procedures
- Decontamination as appropriate (toxins)
- Initiate therapy for what is treatable, but do not delay for infectious identification
- Report concerns to HOSPITAL ICS (they will report to Public Health Officials, Law Enforcement, and FBI)

End of Module 3

Complete Module 3 Questions

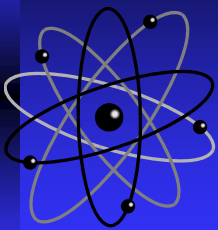
Radiological Materials







Terms and Definitions

- Ionizing Radiation
- Radioactive material
- Rem
- Contamination
- Exposure

Ionizing Radiation



- Alpha particles 
- Beta particles 
- Gamma rays 
- Neutrons 

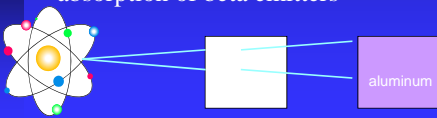
Ionizing Radiation - Alpha

- Alpha particles only travel 1 to 2 inches in air and microns in tissues
- Cannot penetrate the dead layer of the skin
- Can be shielded by a sheet of paper
- Greatest danger is from inhalation or ingestion



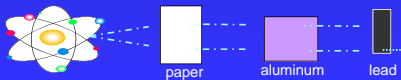
Ionizing Radiation - Beta

- Free electrons
- Penetrate skin but not vital organs
- Shielded by thick clothing or aluminum
- Greatest danger is through inhalation or absorption of beta emitters



Ionizing Radiation - Gamma Rays

- High energy rays
- Penetrate deep into tissue; require dense shielding
- Primary cause of radiation sickness
- Produced from radioactive decay and are a by-product of a nuclear weapon explosion or reactor accident



Ionizing Radiation - Neutrons

- Uncharged particles
- **Can damage cells on contact**
- Can make material they strike radioactive
- Result of a nuclear weapon explosion
- Penetrates extensively; require special shielding



Radiation Exposures



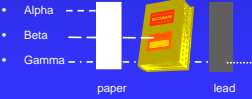
Average Annual Exposure	360 mrem per year	Chronic
Chest x-ray	10 to 30 mrem	
Flight	0.5 mrem every hour	
Smoking 1.5 packs per day	16,000 mrem per year	
Mild radiation sickness*	200,000 mrem	Acute
Lethal Dose*	450,000 mrem	
* single acute exposure		

DOE maximum annual occupational limit = 5,000 mrem
DOE maximum emergency dose (for saving property) = 10,000 mrem
Maximum emergency dose (for saving life) = 25,000 mrem

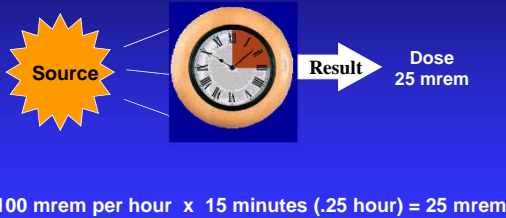
Health Risks

- Risks depend on:
 - ◆ Amount
 - ◆ Rate
- Categorized as:
 - ◆ Acute
 - ◆ Chronic

Exposure Protection

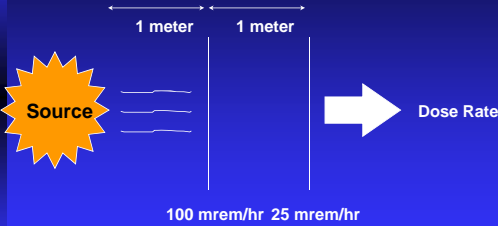
- Time 
- Distance 
- Shielding 
 - Alpha --- paper
 - Beta --- lead
 - Gamma ---

Time



100 mrem per hour x 15 minutes (.25 hour) = 25 mrem

Distance



100 mrem/hr 25 mrem/hr

Shielding

- Alpha ----- paper
- Beta ----- dictionary
- Gamma ----- lead

Contaminated vs. Exposed

- Contaminated victims pose a risk to others
- If you are contaminated, you are also exposed
- Exposed victims are not necessarily contaminated
- Geiger counter to determine if victims are contaminated

End of Module 4

Complete Module 4 Questions

Decontamination Team

- ### Decon Team Duties
- Decon Team Leader (senior RN, maintenance, etc)
 - ◆ Interview patient (if already arrived without notification)
 - ◆ Brief team
 - ◆ Organize response
 - Decon Operations Team (2, must have training)
 - ◆ At least one clinical person
 - ◆ Other member
 - Suit/equipment Support Team (2-4, all must have training)
 - ◆ Help dress/undress team members
 - ◆ Equipment assistance

- ### Decon Team Leader
- Direct patient(s)
 - ◆ to staging area
 - ◆ remove clothes
 - Brief Team
 - Monitor team
 - ◆ Operations Team
 - ◆ Suit/equipment support
 - Chemical ID (use poison center)
 - Decon team member ONLY communicate with Team Leader!

Decon Team members (2)

- Pre-entry assessment
- Inspect equipment
- Don PPE
- Decontaminate as needed
- Provide BLS
- Clean self/room
- Doff PPE
- Post-entry assessment
- Shower
- Debrief

Suit/equipment support

- Utilize appropriate PPE (splash protection)
- Prepare PPE
- Assist donning/doffing PPE
- Monitor team
- Assist moving cleaned patients
- Assist in PPE removal and exit of Decon team

Key questions prior to decon

- Water compatibility of substance
 - ◆ Most OK
- Level of PPE required
- Signs and symptoms of acute exposure
 - ◆ So you can detect symptomatic patients
 - ◆ So you can detect contaminated team members!
- Cleanup and disposal requirements

Chemical ID

- What was chemical(s)?
- Was it gas, liquid or solid?
- What did container look like?
- Label or placards?
- What is chemical used for?
- Where did incident occur?
- What did chemical look, smell or taste like?
- Contact poison center with above information.

Poison Center will...

- ID chemical
 - ◆ Based on placard information you find
 - ◆ Based on signs and symptoms displayed
- Healthcare information
 - ◆ Signs and symptoms to watch out for
 - ◆ Treatments that may be needed
- 585-275-3232 or 1-800-222-1222

Level A

Required when the highest potential for exposure to hazards exists and the highest level of skin, respiratory, and eye protection is called for.



VAPOR PROTECTION

Level B

Required when the highest level of respiratory protection but a lesser level of skin protection is needed.

Can be encapsulating or non-encapsulating.



LIQUID SPLASH PROTECTION

Level C

Required under circumstances that call for lesser levels of respiratory and skin protection.

Can be used with SCBA's or APR's.



DUST & SOLIDS PROTECTION

Level D

Appropriate when minimal skin protection and no respiratory protection is required



SUPPORT PROTECTION

Levels of Protection

Greater Hazard ←

Level A Level B Level C Level D



Higher Burden ←

Bunker Gear ?



Equipment Needs

- Crash cart in hallway or near tent
 - ◆ Pass to clinical team member when needed
 - ◆ Medication
 - ◆ Intubation equipment
- Maintain personnel protection!

Radios

- Must go on UNDER PPE (for those wearing PPE)
- Make sure all on ONE channel
- Test before putting on, after dressed
- Have backup procedures for communication should radios fail
 - ◆ Hand on top of head = OK
 - ◆ Hand(s) to neck = can't breathe

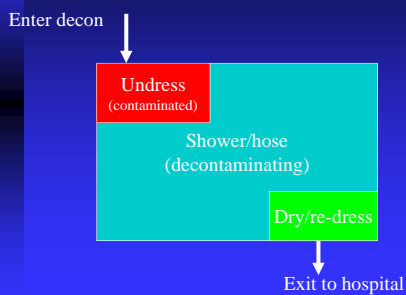
Cautions

- Risks to person in decon room!
- PPE survey & exam
- Personnel: vital signs before & after!
- Risks:
 - ◆ Heat
 - ◆ Chemical
 - ◆ Equipment malfunction

Patient Flow

- Special door from outside (ONLY!)
- “Hot” zone: by exterior door
 - ◆ Undress
 - ◆ Collect contaminated clothing
- “Warm” zone: under shower, on stretcher
 - ◆ Shower or wash
- “Cool” zone: by door to hallway
 - ◆ Pass to clean stretcher, etc
 - ◆ Assistants to help

Patient flow



Tent (if applicable)

- Additional training in setting up
- Know your facilities policy!



Conclusion

- Keep yourself safe!
- Keep institution safe!
- Only in this manner can we take care of patients.
- What is appropriate PPE?
- What is our appropriate response?

End of Module 5

Complete Module 5 Questions
