** September 1, 2016 REMAC Protocol revisions go into effect. **

Continuing Medical Education - News & Information
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Exam Calendar

Journal CME Newsletter
FDNY - Office of Medical Affairs
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From the Editor

New Journal Editor and NYC REMAC Liaison
This month the FDNY Office of Medical Affairs bids farewell to this Journal’s editor, Paramedic Samuel Jimenez. For the brief time we had him as the REMAC Liaison, he made a positive impact and improvements to the position. Please congratulate him on his promotion to FDNY Lieutenant.

The new Journal editor and REMAC Liaison is Joshua Bucklan, RN, EMT-P, who has worked in pre-hospital care in NYC for 14 years. As he assists the paramedics of New York City with their certification needs, it is his goal to maintain the standards of professionalism and integrity exhibited by his predecessors. The staff of this Journal wishes him the best of luck.

** All candidates must now meet CME requirements **

- All REMAC paramedics and candidates should review Certification & CME Information on page 3 journal and plan accordingly.
- All upcoming exam candidates, see registration instructions at the bottom of the last page of this journal.

Candidates who will not have a CME letter at the time of their REMAC exam must email Joshua.Bucklan@fdny.nyc.gov ASAP.
REMAC Exam Study Tips

REMAC candidates have difficulty with:  REMAC Written exams are approximately:

* 12-lead EKG interpretation  10% BLS  15% Adult Trauma
* ventilation rates for peds & neonates  10% Adult Arrest  15% Pediatrics

Certification & CME Information

- By the day of their exam, all REMAC paramedics and candidates must present a letter from their Medical Director verifying fulfillment of CME requirements.
- Upcoming candidates without a CME letter ASAP must email Joshua.Bucklan@fdny.nyc.gov
- FDNY paramedics, see your ALS coordinator or Division Medical Director for CME letters.
- CME letters must indicate the proper number of hours, per REMAC Advisory # 2007-11:
  - 36 hours - Physician Directed Call Review
    - ACR Review
    - QA/I Session
    - Emergency Department Teaching Rounds - **Maximum of 18 hours**
  - 36 hours - Alternative Source CME - **Maximum of 12 hours per venue**
    - Online CME (see examples below) - Clinical rotations
    - Lectures / Symposiums / Conferences - Associated Certifications – 4 hours each:
      - Journal CME

- Failure to maintain a valid NYS EMT-P card will suspend your NYC REMAC certification until NYS is recertified.

REMAC certification exams are held monthly for new and expired candidates, and for currently certified paramedics who may attend up to 6 months before their expiration date.

REMAC CME and Protocol information is available and suggestions or questions about the newsletter are welcome. Call 718-999-2671 or email Joshua.Bucklan@fdny.nyc.gov

[www.EMINET.com](http://www.EMINET.com)  [statenislandem.com](http://statenislandem.com)
**FDNY ALS Division Coordinators**

<table>
<thead>
<tr>
<th>FDNY ALS Division Coordinators</th>
<th>Citywide ALS</th>
<th>718-999-0732</th>
<th>Division 4</th>
<th>718-281-3392</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lt. Telina Lloyd</td>
<td>Division 1</td>
<td>212-964-4518</td>
<td>Mike Romps</td>
<td></td>
</tr>
<tr>
<td>Anthony Kendall</td>
<td>Division 2</td>
<td>718-829-6069</td>
<td>Krista O’Dea</td>
<td></td>
</tr>
<tr>
<td>Michael Sullivan</td>
<td>Division 3</td>
<td>718-968-9750</td>
<td>EMS Pharmacy</td>
<td>718-571-7620</td>
</tr>
</tbody>
</table>

**FDNY EMS Medical Directors**

<table>
<thead>
<tr>
<th>FDNY EMS Medical Directors</th>
<th>Dr. Nikolaos Alexandrou</th>
<th>718-999-0124</th>
<th>Dr. Dario Gonzalez</th>
<th>718-281-8473</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Response Division 3</td>
<td></td>
<td></td>
<td>Field Response Division 2</td>
<td></td>
</tr>
<tr>
<td>OLMC Director</td>
<td></td>
<td></td>
<td>USAR/FEMA Director, OEM Liaison</td>
<td></td>
</tr>
<tr>
<td>Dr. Glenn Asaeda</td>
<td>718-999-2790</td>
<td></td>
<td>Dr. Doug Isaacs</td>
<td>718-281-8428</td>
</tr>
</tbody>
</table>

| Chief Medical Director     |                        |              | Field Response Division 1 |          |
| REMAC Coordinator          |                        |              | EMS Fellowship & Rescue Medic Director |          |
| Dr. David Ben-Eli          | 718-999-0404          |              | Dr. Bradley Kaufman  | 718-999-1872 |  

| Field Response Division 4  |                        |              | EMD & EMS Training Director |          |
| Haz-Tac, PASU & EMS Resident Director |            |              |                               |          |
| Dr. Nathan Reisman         | 718-999-1919          |              | Dr. Pamela Lai               | 718-999-2899 |  

| Field Response Division 5  |                        |              | QA/QI Medical Director      |          |
| EMS Fellows - Field Response Division 5 |            |              |                               |          |
| Dr. Richard Menaik         | 718-999-0364          |              | Dr. Meredith Masters        | 718-999-0351 |  

**FDNY OLMC Physicians and ID Numbers**

| Alexandrou, Nikolaos       | 80282       | Jacobowitz, Susan | 80297 |
| Asaeda, Glenn              | 80276       | Kaufman, Bradley  | 80289 |
| Barbara, Paul              | 80306       | Lai, Pamela       | 80311 |
| Bayley, Ryan               | 80314       | Munjal, Kevin     | 80308 |
| Ben-Eli, David             | 80298       | Redlener, Michael | 80312 |
| Freese, John               | 80293       | Rotkowitz, Louis  | 80317 |
| Friedman, Matt             | 80313       | Schenker, Josef   | 80296 |
| Giordano, Lorraine         | 80243       | Schneitzer, Leila | 80241 |
| Gonzalez, Dario            | 80256       | Silverman, Lewis  | 80249 |
| Hansard, Paul              | 80226       | Soloff, Lewis     | 80302 |
| Hegde, Hradaya             | 80262       | Van Voorhees, Jessica | 80310 |
| Hew, Phillip               | 80267       | Williams, Alan    | 80316 |
| Huie, Frederick            | 80300       | Zabar, Benjamin   | 80323 |
| Isaacs, Doug               | 80299       | Zimmerman, Jason  | 80324 |
Introduction

The topic of radiological emergencies usually evokes the image of a mushroom cloud, observed in the aftermath of a nuclear attack, or a Nuclear Accident, similar to the one triggered by a tsunami in Fukushima, Japan. In reality, a radiological emergency can come from several sources that include transportation accidents, industrial and medical overexposures or accidents, or acts of terrorism. Because these situations are rare, we may not feel prepared in the event of a radiological incident, and have exaggerated fear of radiation. This Journal will cover radiological emergencies and introduce a new dosimeter, the RadEye GF-10-EX Gamma Survey Meter. This dosimeter is ideal for use by emergency responders because it is not sensitive to radio frequency (RF) and electromagnetic interference (EMI) common to hand-held radios, cell phones, and mobile data terminals that can cause false alarms in other dosimeters.

Radiation is a common and valuable tool in medicine, research and industry. It is used in medicine to diagnose illnesses, and in high doses, to treat diseases such as cancer. In addition, high doses of radiation are used to kill harmful bacteria in food and to extend the shelf life of fresh produce. Radiation produces heat that is used to generate electricity in nuclear power reactors. Radioactive materials are used in a number of consumer products, such as smoke detectors and exit signs, and for many other research and industrial purposes.

Where May You Encounter Radiation

Radiation can be encountered anywhere. The average American receives approximately 360 mR per year. This is from normal everyday background radiation that is emitted from the earth (terrestrial) and outer space (cosmic). TVS, computers, cell phones, rocks, soil, and even drinking water contain low levels of radiation.
What is Radiation?

Radiation is the emission of energy as electromagnetic waves or as moving subatomic particles, especially high-energy particles that cause ionization.

Types of Radiation:

Ionizing Radiation:

Ionization is the process in which a neutral atom or molecule gains or loses electrons and thus acquires a negative or positive electrical charge. Ionizing radiation produces ionization (ions) in its passage through body tissue or other matter. This causes physical change in atoms due to the change in charge. Ionizing radiation can affect the atoms in living things, so it poses a health risk by damaging tissue and DNA in genes. Ionizing radiation comes from radioactive elements, cosmic particles from outer space and x-ray machines.

Non-Ionizing Radiation:

Non-ionizing radiation refers to any type of low-frequency electromagnetic radiation without enough energy to break off electrons from their orbits around atoms and ionize (charge) the atoms. Visible light, heat, radio waves, and microwaves are examples of non-ionizing radiation. This type of radiation does not have sufficient energy to cause ionization or direct injury.
**Types of Ionizing Radiation:**

- **Alpha Radiation:** Particles travels about 1-2 inches and can be stopped by paper, and are primarily an inhalation hazard. Alpha particles come from the decay of the heaviest radioactive elements, such as uranium, radium and polonium. Even though alpha particles are very energetic, they are so heavy that they use up their energy over short distances and are unable to travel very far from the atom.

- **Beta Radiation:** Particles travels about 10 feet, can be stopped by clothing, and are primarily an inhalation hazard. These particles are emitted by certain unstable atoms such as hydrogen-3 (tritium), carbon-14 and strontium-90. Beta particles are more penetrating than alpha particles, but are less damaging to living tissue and DNA because the ionizations they produce are more widely spaced. They travel farther in air than alpha particles, but can be stopped by a layer of clothing or by a thin layer of a substance such as aluminum. Some beta particles are capable of penetrating the skin and causing damage such as skin burns. However, as with alpha-emitters, beta-emitters are most hazardous when they are inhaled or swallowed.

- **Gamma / X-Ray Radiation:** Photons/waves travel greater than 200 feet, and can be stopped by dense materials (lead, concrete and steel). Unlike alpha and beta particles, which have both energy and mass, gamma rays are pure energy. Gamma rays are similar to visible light, but have much higher energy. Gamma rays are often emitted along with alpha or beta particles during radioactive decay. Gamma rays have so much penetrating power that several inches of a dense material like lead, or even a few feet of concrete may be required to stop them. Gamma rays can pass completely through the human body. As they pass through, they can cause ionizations that damage tissue and DNA. Penetrating gamma radiation cannot be stopped by PPE, however dose control tools (such as survey meters and electronic dosimeters) can provide protection by warning the user of radiation levels that exceed safety guidelines.
- **Neutron Radiation**: Particle travels greater than 200 feet, and can be stopped by high hydrogen content materials. The most effective shielding materials are hydrocarbons, e.g. polyethylene, paraffin wax or water. Concrete (where a considerable amount of water molecules are chemically bound to the cement) and gravel are used as a cheap and effective shielding due to their combined shielding of both gamma rays and neutrons.

![Types of radiation and penetration]

**Indications of a possible radiological emergency (hazard):**

- Suspected or actual bomb.
- Credible threats or threatening messages.
- Device that appears intended to spread contamination.
- Signs of possible contamination (e.g. spill).
- Medical symptoms of radiation injuries (such as burns without an apparent cause).
- Building / area marked with the radiation symbol.
- Results of assessment of a radiological assessor.
- Neutron radiation.
- Dangerous source that is lost, stolen, damaged, in a fire, leaking, or potentially involved in a terrorist act or explosion.

**Indications of a dangerous source:**

- A heavy container with the radiation symbol.
- Device used for cancer treatment (teletherapy or brachytherapy).
- Radiography cameras or sources.
- Well logging sources used in drilling operations.
- Dangerous quantity of material, as assessed by a radiological assessor

Only a trained and properly equipped radiological assessor can perform a complete assessment of the radiological hazards. Federal and State agencies (REAC/TS, NRC DHS, FEMA, etc.) are available to respond with assistance.
**Exposure versus Contamination**

**External Radiation Exposure:** Radiation exposure occurs when a person is near a radiation source. Persons exposed to a radiation source do not become radioactive. For example, an x-ray machine is a source of radiation exposure. However, you do not become radioactive when you have an x-ray taken. Exposure from an external source stops when a person leaves the area of the source, the source is shielded completely, or the process causing exposure ceases.

**Contamination:** Radioactive contamination results when loose particles of radioactive material settle on surfaces, skin, or clothing. Internal contamination may result if these loose particles are inhaled, ingested, or lodged in an open wound. Contaminated people are radioactive and should be decontaminated as quickly as possible. However, the level of radioactive contamination is unlikely to cause a health risk to another individual and can be controlled through respiratory protection and clothing that can be easily washed or discarded.

**Radiation Exposure and Contamination Events**

There are **four types** of radiation accident victims:

1. **A person who has received a significant dose from an external source(s).** This includes an exposure to a large radiation source over a short period of time or exposure to a smaller radioactive source over a longer time period. Such exposure will cause symptoms that depend on the amount of exposure. This includes nausea, reddening of the skin and fatigue. An extremely high exposure may result in death of the victim. These symptoms may not appear immediately; it may take several days or weeks before symptoms are observed. *Externally exposed patients do not become radioactive and therefore they do not pose a risk to EMS or other first responders. Do not delay medical attention.*

2. **Internal contamination from inhalation and/or ingestion of radioactive material.** Patients are not likely to exhibit any symptoms related to radiological contamination. It is extremely unlikely that the level of internal contamination would be sufficient to cause an external exposure hazard from the patient to EMS and other first responders. A person who has inhaled and/or ingested radioactive material is very likely to also have external contamination.

3. **External contamination of the body surface and/or clothing by liquids or particles.** Patients are not likely to exhibit any symptoms related to radiological contamination. A person who is externally contaminated is likely to also have internal contamination from breathing contaminated dust/dirt/air. The amount of radioactive material expected to be on the surface of the victim is not likely to cause a radiation hazard to EMS or any first responder. In most cases, external skin contamination is not life threatening and can be removed with soap and water.

4. **A combination of the above.** In this situation, using the guidance for external contamination is warranted.
The most important consideration in the medical evaluation of people involved in a radiation incident is the medical stability of the affected individuals, the number of victims and the resources needed to address the emergency. **Small scale** incidents are those occurring in laboratories, hospitals, nuclear power plants, etc., involving small amounts of radioactive materials with the potential exposure and/or contamination of one or a few individuals. **Large scale** incidents are those involving relatively large quantities of radioactive materials and the potential exposure or contamination of large numbers of people, e.g., terrorist attacks with radiological weapons, nuclear weapons detonation, and large scale nuclear power plant disasters

**Personal Protection**

**ALARA** (As Low As Reasonably Achievable) is the underlying philosophy associated with protecting people from ionizing radiation. It basically means that one should not unnecessarily expose oneself to radiation without the benefit outweighing the risk. Time, distance, and shielding are widely considered to be the primary concerns. Even without the results of radiological assessment, a person who follows basic guidelines will be adequately protected for virtually all radiological emergencies. For First Responders, the **International Atomic Energy Agency (IAEA)** recommends adhering to the following basic principles:

- Avoid touching suspected radioactive items;
- Perform only life saving and other critical tasks near a potentially dangerous radioactive source;
- Avoid the smoke or use available respiratory protection equipment within 100 meters (328 feet) of a fire or explosion involving a potentially dangerous radioactive source;
- Keep the hands away from the mouth and do not smoke, eat or drink until your hands and face are washed (to avoid inadvertent ingestion);
- Change clothes and shower as soon as possible.

**Contamination: Universal Precautions** should be used in any situation where the presence of radioactive materials is suspected. Persons entering a radiological area "Hot Zone" must have special training and should move victims out of the hazard area to a location where responding EMS units can attend to the victim’s medical needs.

**External Radiation Exposure:** The three cardinal rules of radiation protection for external radiation exposure (not contamination) from a radiation source are time, distance and shielding.

- **TIME** – The less time you spend near the radiation source, the lower your exposure will be.
- **DISTANCE** – The greater your distance from the source, the less your exposure will be. Radiation exposure decreases with distance according to the inverse-square law. That is, if you triple your distance from the radiation source, your exposure will decrease by a factor of 9 (three squared).
• SHIELDING – External exposure to radiation can be partially blocked by the use of shielding. Traditionally, shielding is made of lead or concrete. However, staying behind vehicles, buildings, or other objects will also decrease exposure.

It is important to understand that a person who has been exposed to radiation is unlikely to pose a radiological health risk to any other person. However, if a relatively high activity gamma source (external exposure) is present at the emergency site, it is possible for an individual to receive a radiation dose that could pose a health risk. It is anticipated that hazardous materials (HAZ-MAT) personnel will have made an initial radiological assessment, and specific safety precautions will be given.

**Routes of Exposure:**

- Absorption
- Puncture/Injection
- Inhalation
- Ingestion

**Effects of Radiation:**

<table>
<thead>
<tr>
<th>Dose</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 50,000 mR</td>
<td>No symptoms</td>
</tr>
<tr>
<td>Between 50,000 &amp; 100,000 mR</td>
<td>Temporary lowering of white cell count</td>
</tr>
<tr>
<td>Between 100,000 &amp; 200,000 mR</td>
<td>Hours Later: nausea, vomiting, &amp; diarrhea</td>
</tr>
<tr>
<td></td>
<td>No permanent disability</td>
</tr>
<tr>
<td>Between 200,000 &amp; 450,000 mR</td>
<td>Vomiting, diarrhea, &amp; hair loss</td>
</tr>
<tr>
<td>*200,000 mR</td>
<td>Lethal for 5% people in 60 days</td>
</tr>
<tr>
<td>*450,000 mR</td>
<td>Lethal for 50% people in 60 days</td>
</tr>
<tr>
<td>*600,000 mR</td>
<td>Death for most people</td>
</tr>
</tbody>
</table>

As we see with the doses, the health effects of radiation vary drastically. For us to understand how radiation affects the body, we must reference back to the concept of ionization. Due to ionization, our cells are damaged and caused to mutate as their electrical charges are physically changed.

Dose alone, however, is not the only determination as to how cells will be damaged. We must also factor in the type of radiation (alpha, beta, gamma, neutron, medical grade or industrial grade), the person’s age, cell sensitivity, individual sensitivity, and a person’s general state of health. Our treatment as medical professionals is heavily dictated by the type of isotope exposure. Like different ailments, certain isotopes have specific target organs or effects. **Pregnant females and children** are the most susceptible to these types of mutations and injuries. The reason is that a fetus, or a young child, is undergoing rapid reproduction on a cellular level. Radiation shows its effects more readily in rapidly reproducing cells such as hair follicles, blood cells, sperm cells, as
well as intestinal tracts. Long-term effects to the reproductive system can produce infertility, miscarriage, birth defects, low birth weight, developmental disorders, and childhood cancers. Individuals who receive a large dose of radiation in a very short time period may suffer “radiation sickness,” also known as **Acute Radiation Syndrome (ARS)**. ARS is an acute illness that varies in onset from a few hours to weeks. Signs and symptoms may include nausea, vomiting, diarrhea, and mild fever, which may not develop for hours or days after the exposure. For ARS to occur the person must receive the large dose externally and it must penetrate, covering almost the entire body. In some cases of ARS the person may become asymptomatic and seem to have recovered. However, the symptoms will reappear and become more severe, usually hours or days later. Depending on the dose received, the person may die within a few days. The cause of death in most cases is the destruction of the person's bone marrow, which results in infections and internal bleeding. For survivors of ARS, the recovery process may last from several weeks up to two (2) years.

Individuals exposed to ionizing radiation are susceptible to developing cancers. At lower doses, they may be asymptomatic and only have a small increase of the risk of development of cancer. At higher doses, there can be a significant increase in the risk of cancer, even at doses not high enough to lead to signs or symptoms of ARS. After direct contact with radiological materials, the skin receives high doses of radiation. When this occurs, the skin may turn red and look puffy, or may turn a bronze-like color. These signs may not appear until hours after the exposure. The initial lack of visible radiation burns does not mean the person was not contaminated by a large dose of radiation. These burns may not be painful while the damage is occurring. The skin may only be itchy initially before becoming painful. The burns may also seem to heal, then return a few days later with increased severity. Victims may also begin to have signs and symptoms of ARS.

In the photo above, a 26 year-old male presented to an Emergency Department after placing a metallic object in his pocket. The object was a Cesium 137 source that was placed in a restaurant and picked up by the patient, who was unaware that it was a radiation source. Two days later, he reports to the nearest hospital complaining of redness to his right buttock and mild tingling in the area. Moderate vomiting begins two (2) hours later.

Treatment goals for ARS are to prevent further contamination, treatment of life-threatening injuries, reduction of the symptoms, and pain management. If EMS encounters a patient with critical injuries (documented as a **Red Tag** victim) contaminated with radiological materials, life-threatening injuries should be treated and the victim transported without decontamination. In this case, proper precautions should be taken by the crew to prevent further contamination (EMS Operating Guide 105-01, Addendum 4 - Radiological Operations, Section 5.3.4):

- Wear respiratory protection
- Keep contaminated patient wrapped as much as possible
- If irrigation of a wound is necessary, irrigate distally and laterally and contain the runoff solution, if possible
- Avoid opening compartments in and on the vehicle; use mobile technician kits as much as possible
• Close all internal compartments prior to loading the patient
• Cover the ambulance floor with disposable paper, cloth, pads, plastic, etc.

**Potassium Iodide**

Potassium iodide (KI) is a chemical compound that can be used to protect the thyroid gland from possible radiation injury caused by radioactive iodine (radioiodine). Some radiological emergencies may release large amounts of radioiodine to the environment. Since iodine concentrates in the thyroid gland, inhalation or ingestion of food contaminated with the radioiodine can lead to radiation injury to the thyroid. This includes increased risk of thyroid cancer and other thyroid diseases. Thyroid cancer is curable in most cases, but taking measures that reduce the chance of developing cancer are still preferable. Taking KI saturates the thyroid gland with stable (non-radioactive) iodine. This prevents or reduces the amount of radioiodine that can be taken up by the thyroid. While it protects the thyroid, it will not prevent the effects of other radiological materials nor other parts of the body from radioactive iodine. To be most effective, KI should be taken before or shortly after exposure to radioiodine. Even if taken three to four hours after exposure, it still would reduce the uptake of radioiodine by the thyroid. However, its effectiveness would be reduced. Some people may be allergic to KI. There are alternatives to KI, but they should be discussed with the individual’s personal physician.

Potassium Iodide tablets are stored in the WMD kit on each ambulance, and are for self-treatment of the FDNY member only, and are not to be administered to patients. Haz-Tac EMTs and Paramedics can utilize Haz-Tac Treatment Sub-Protocol K: Radiation Treatment for further treatment options. The State and County health departments monitor all radiation emergencies and issue advisories informing the public whether KI should be taken.

**Dirty Bombs**

A dirty bomb, or radiological dispersion device (RDD), is a bomb that combines conventional explosives, such as dynamite, with radioactive materials in the solid, liquid or gaseous form. A dirty bomb is intended to disperse radioactive material into a small, localized area around an explosion. The main purpose of a dirty bomb is to frighten people and contaminate buildings or land. Because the material will disperse after the explosion, areas near the blast will be contaminated. The level of contamination will depend on how much radioactive material was in the bomb, as well as the weather conditions at the time of the blast.

The primary danger from a dirty bomb containing a low-level radioactive source would be the blast itself. Gauging how much radiation might be present is difficult when the source of the radiation is unknown. However, at the levels created by most sources, there would not be enough radiation in a dirty bomb to cause severe illness from exposure to radiation. Certain radioactive materials dispersed in the air could contaminate several city blocks, create fear and require costly cleanup.

The biggest risk to those exposed is from the force of the explosion itself and puncture wounds from shrapnel that could transmit radiological material into the body. The goal of a dirty bomb is to increase terror and disrupt routine access and egress and impede caregivers. People who were not exposed, contaminated or injured, but have concerns about their health (worried well) will go to
local hospitals on their own, thus interfering with the ability of the hospitals to treat those who were injured (especially if those injured arrived later). Emphasize that risk is relatively low to help address these concerns.

**The Meter:**

- **Acknowledge/Silence Button** - Button located at top of meter used to acknowledge an alarm and to silence the audible alarm.
- **Battery Life Indicator** - Indicator that gives the current power level of the meter's batteries.
- **Bar Scale** - A linear view of the current rate the meter is being exposed to. The first triangle is 2mR/h and second triangle is 50R/h.
- **Dose Button** - When pushed this button will show the wearer's accumulated dose.
- **Menu/Scroll Buttons** - These buttons cycle through the menu options.
- **Heartbeat Indicator** - This is an indicator that the meter is functioning properly. A solid heart means meter is working correctly. A broken heart indicates there is a problem with the meter and it needs to be sent to meter services for repair/replacement.
- **Power Button** - Used to turn the meter on as well as to invert the display screen for a few seconds.
- **Radiation Rate** - Shows the speed at which radiation is being absorbed into the body.

The RadEye GF-10 EX is a gamma survey meter, rate meter, and dosimeter. This meter will only read gamma radiation and industrial sources. This meter will not read medical sources and will not read alpha, beta, or neutron radiation. The RadEye GF-10 EX does not read in MicroRem (µR),
and will **only** read in MilliRem (mR) and Rem (R). It is to be worn by non-HazTac units on a daily basis. The meter will read up to 300 R/h. The RadEye GF-10 EX runs on two “AAA” batteries.

**How to Turn the Meter On:**

Press and hold the down symbol (▼) for at least 1 second. The meter will alarm and begin a “self-test”. It will show last calibration date, battery voltage and Firmware version. The meter is now ready for use.

**Note the heart symbol (upper left hand side) must be “beating”. This indicates that the cycle tasks (e.g. calculating measurement values or checking alarm thresholds) are active.

The default screen is Rate in mR/h

**Displays:**

**Dose:**

To display the Dose, press the “Info” button. This will change the display from the default Rate screen to Dose. Additionally, pressing the button labeled “Dose” will also show your accumulated dose.

1st Click = Dose
Peak Rate Value:

To display the peak rate value, press the “Info” button twice. This will change the screen from dose to the peak rate value. The peak rate value is the highest rate of radiation rate you encountered during your tour or the highest rate you encountered during a radiological event.

2<sup>nd</sup> Click (Two (2) Total) = Peak Rate Value

How to Clear the Dose:

To clear the dose, press the Menu button. Using the down arrow, scroll to “Clear Dose”. The meter will ask “Clear Dose?” Press Menu button for Yes. It will then ask, “Are you sure?” Press the Menu button again to confirm.

Clearing the Dose:

The dose on the Meter must be cleared at the start of every tour. Simply turning the meter on and off will not clear the dose. The previous dose value will remain in the Meter memory. Once it has been zeroed out, it will show that there is a dose of 0 mR. After approximately three (3) seconds, the meter then reverts to the default screen.

Alarms:

The RadEye GF-10 EX has both rate and dose alarms.

<table>
<thead>
<tr>
<th></th>
<th>Low Alarm: 2 mR/h</th>
<th>High Alarm: 50 R/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose:</td>
<td>Low Alarm: 5 R</td>
<td>High Alarm: 10R</td>
</tr>
</tbody>
</table>
**FDNYs Action Level for Radiation is 1 mR/h**

When alarming, the meter will sound an audible high to low tone, vibrate, and the LED lights will flash intermittently. As the radiation readings increase, the audible tone, LED lights, and vibration will get stronger and louder. If it alarms, note the area where the alarm sounded (using landmarks is a great reference) and the rate displayed on the meter. Members shall identify that the source is not from an obviously legitimate source (e.g., portable x-ray machine in hospital, patient who underwent medical testing involving radioactive medium). **Immediately move away from this area to a safe location** (until the alarm deactivates). Using your borough frequency request a “mixer off message.” Once the dispatcher confirms and acknowledges your request, give your location, and the location of the highest meter readings.

* To silence the meter, depress the “acknowledge” button on top of the meter. When silenced, the LED lights and vibration will continue until the member is in a safe area or the dose is cleared.

**How to Wear the Meter:**

The meter shall be assigned at the start of every tour. The meter will be worn by the member who is designated as the Technician, positioned on the portable radio strap or the member’s belt, utilizing the case and clip provided. The meter shall be placed in the case with the screen facing the member to provide the highest level of protection for the glass.

**Conclusion**

Initial response to a radiological incident will be similar to one involving other hazardous materials. Awareness of hazard signs, labeling or placards can alert us to the presence of radiological material. Report meter readings and on-scene observations to your borough dispatcher. Radiological response rarely represents an immediate danger to the life and health of the responder except: 1) Directly handling a sufficiently high-activity radioactive source that has not been dispersed, and 2) Fallout from a nuclear detonation (bomb), especially within the first few hours and close (< 20 miles) to the detonation location. The appearance of medical signs and symptoms
in exposed individuals, traumatic injuries, or readings from the RadEye GF-10 EX Gamma Survey Meter will guide our treatment decisions. Responders can safely care for contaminated victims. Do not underestimate the psychological effect of radioactive material.

Your personal safety is literally in your hands. Remember to always wear the meter and have it in the “On” position. Regardless of the strength of any radiological source, our best line of defense is to limit exposure to the greatest degree possible. This can be accomplished by:

- Limiting the amount of Time you are exposed,
- Increasing your Distance from the source, and
- Increasing your Shielding from the source.
Should you have an exposure, complete a Hazardous Materials Exposure Contamination Report, and APR Canister Use form (if necessary), in addition to routine paperwork.

Contributed by: EMT Kevin Rugg, Haz-Tac Training Instructor  
EMT Jane Cubilette, Haz-Tac Training Instructor  
Lt. Joan Hillgardner, EMTP, Office of Medical Affairs

References

EMS OGP 108-21, RadEye GF-10 EX Gamma Survey Meter.  
EMS OGP 105-01, Addendum 4, Radiological Operations  
EMS OGP 125-07, Hazardous Materials Exposure and Reporting

DOHMH Field Guide for Health and Safety Officers Radiological Incidents, June 2014. This is a useful Field Guide developed with the support of subject matter experts and radiation safety professionals, both local and national. https://www.remm.nlm.gov/DOHMH_Field_Guide_for_Health_Safety_Officers_-_Radiological_Incidents_Parts_I_II_Approved_for_REMM_Posting_May_2016.pdf

New York State Department of Health Radiological Threats  
https://www.health.ny.gov/environmental/emergency/dirty_bombs.htm

New York State Department of Health Radiological Terrorism  
https://www.health.ny.gov/environmental/emergency/health_care_providers/radiological_emergencies.htm

New York State Department of Health Radiation and Health  
https://www.health.ny.gov/publications/4402/

EPA  
https://www.epa.gov/radiation/radiation-basics#tab-2


International Atomic Energy Agency (IAEA) Manual for First Responders to a Radiological Emergency, October 2006  

All 10 questions for ALS and BLS Providers

1. When should the Dose on the RadEye F10 EX be cleared?
   a. When directed by HT1 or HT2
   b. At the start of the tour.
   c. At the end of the tour
   d. The RadEye GF10 EX continuously monitors until it is recalibrated by HazMat.

2. What is FDNY's Action Level for Radiation?
   a. 1 mR/h
   b. 1 R/h
   c. 2 R/h
   d. 2 mR/h

3. The low dose alarm on the RadEye GF10 EX is:
   a. 1 R
   b. 2 R
   c. 5 R
   d. 10 R

4. What type of people are the most susceptible to radiation mutations and injuries?
   a. Children
   b. Pregnant females
   c. Both A & B
   d. B only

5. When a victim suffers from Acute Radiation Syndrome (ARS), the signs and symptoms are present immediately upon contamination.
   a. True
   b. False
6. The RadEye GF10EX will read radiation in:
   a. R only
   b. mR only
   c. uR, mR and r
   d. mR and R

7. The low rate alarm on the RadEye GF10 EX is:
   a. 2 mR/h
   b. 2 R/h
   c. 1 R/h
   d. 1 mR/h

8. How does Potassium Iodide work when a FDNY member is exposed to radioactive iodine?
   a. It blocks the effects of radiation on all of the body tissues
   b. It saturates the thyroid gland and prevents the absorption of all radiological sources
   c. It saturates the thyroid gland and prevents the absorption of radioactive iodine
   d. It protects the entire body from all of the effects of radioactive iodine

9. The default display screen on the RadEye GF10EX will show:
   a. Rate in R/h
   b. Rate in mR/h
   c. Dose in mR
   d. Dose in R

10. How is the dose cleared on the RadEye GF10 EX?
    a. Press Menu, Scroll to clear dose, Press yes, Confirm
    b. Press and hold the Right and Left buttons for more than 3 seconds.
    c. Press Info, Scroll to dose, Press yes
    d. Turn the meter off and turn it back on
Based on the CME article, place your answers to the quiz on this answer sheet.
Respondents with a minimum grade of 80% will receive 1 hour of Online/Journal CME.

Please submit this page only once, by one of the following methods:
• FAX to 718-999-0119 or
• MAIL to FDNY OMA, 9 MetroTech Center 4th flr, Brooklyn, NY 11201

Contact the Journal CME Coordinator at 718-999-2790:
• three months before REMAC expiration for a report of your CME hours.
• for all other inquiries Joshua.Bucklan@fdny.nyc.gov.

Monthly receipts are not issued. You are strongly advised to keep a copy for your records.

Note: if your information is illegible, incorrect or omitted you will not receive CME credit.

check one: • EMT • Paramedic • other

Name

NY State / REMAC # or “n/a” (not applicable)

Work Location

Phone number

Email address

Submit answer sheet by the last day of February 2017
Regional CME – Sessions are subject to change. Please confirm through the listed contact.

See other opportunities at [www.nyeremsco.org](http://www.nyeremsco.org) under News & Announcements

**Note:** A potential source of Call Review is E.D. Teaching Rounds (maximum of 18 hours)
See any hospital E.D. Administrator for availability (especially HHC hospitals)

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<tr>
<th>Boro</th>
<th>Facility</th>
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<tr>
<td>BK</td>
<td>Kingsbrook</td>
<td>contact to inquire → Call Review</td>
<td>ED Conference Room</td>
<td>Aaron Scharf 718-363-6644</td>
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<td></td>
<td>Lutheran</td>
<td>contact to inquire → Call Review</td>
<td>Inquire →</td>
<td>Dale Garcia 718-630-7230 <a href="mailto:dgarcia@lmcme.com">dgarcia@lmcme.com</a></td>
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<td>MN</td>
<td>Lenox Hill &amp; Health Plex</td>
<td>contact to inquire → Call Review, Lecture</td>
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<td>Brian Lynch 512-589-9128 Lenox Hill Hospital EMS</td>
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<td>Eunice Wright <a href="mailto:eunice.wright@mountsinai.org">eunice.wright@mountsinai.org</a></td>
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<td>Steven M. Samuels 212-746-0596</td>
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<td>NYU School of Medicine</td>
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<td><a href="mailto:danielle.milbauer@nyumc.org">danielle.milbauer@nyumc.org</a> <a href="http://cme.med.nyu.edu/course">http://cme.med.nyu.edu/course</a></td>
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<td>Call Review, Trauma Rounds</td>
<td>A1-22 Auditorium 3rd Wednesdays, 0830-0930</td>
<td>Anju Galer RN 718-334-5724 <a href="mailto:galera@nychhc.org">galera@nychhc.org</a></td>
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<td>25-10 30 Ave, conf room last Tuesdays, 1800-2100</td>
<td>Donna Smith-Jordon 718-267-4390</td>
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<td>NYH Queens</td>
<td>contact to inquire → Call Review</td>
<td>East bldg, courtyard flr</td>
<td>Mary Ellen Zimmermann RN 718-670-2929</td>
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<td>Queens Hosp</td>
<td>Call Review</td>
<td>Emergency Dept 2nd &amp; 4th Thurs 1615-1815</td>
<td>Maria Jones or Julia Fuzailov 718-883-3070</td>
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<td>St John’s University</td>
<td>contact to inquire → Call Review</td>
<td>175-05 Horace Harding Expwy</td>
<td>718-990-8436 <a href="http://www.stjohns.edu/ems/cme">www.stjohns.edu/ems/cme</a></td>
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<td>St John’s Episcopal</td>
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<td>1st floor Board Room</td>
<td>Michelle Scarlett <a href="mailto:mscarlet@ehs.org">mscarlet@ehs.org</a></td>
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<td>SI</td>
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<td>contact to inquire → Call Review, Lecture</td>
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<td>Tony McKay NRP <a href="mailto:amckay@rumcsi.org">amckay@rumcsi.org</a></td>
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<td>Holly Acierno RN <a href="mailto:hacierno@SIUH.edu">hacierno@SIUH.edu</a></td>
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### 2016 NYC REMAC Examination Schedule

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<th>Month</th>
<th>Registration Deadline</th>
<th>Refresher exams&lt;sup&gt;1&lt;/sup&gt; – no fee for exam</th>
<th>Basic exams&lt;sup&gt;2&lt;/sup&gt;</th>
<th>NYS/DOH Written</th>
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<sup>1</sup> REMAC Refresher examination is offered for paramedics who meet CME requirements and whose REMAC certifications are either current or expired less than 30 days. To enroll, go to the REGISTER link under “News & Announcements” at nycremsco.org before the registration deadline above. Candidates may attend an exam no more than 6 months prior to expiration.

<sup>2</sup> REMAC Basic examination is for initial certification, or inadequate CME, or certifications expired more than 30 days. Seating is limited. Registrations must be postmarked by the deadline above. Exam fee by $100 money order to NYC REMSCO is required.

All Basic candidates must meet new education requirements. Email Joshua.Bucklan@fdny.nyc.gov for instructions.

<sup>3</sup> NYS/DOH exam dates are listed for information purposes only. Scheduling is through your paramedic program or contact NYS DOH for more information.