New York City Regulations

• The safe use of radiation is governed by Article 175 of the Rules of the City of New York

• CUMC and NYP employ radiation under licenses and permits issued by the New York City Department of Health

• Applicable regulations, radioactive materials licenses, x-ray registrations, conditions, information notices, bulletins, etc. are available for review by any CUMC and NYP employee by contacting Radiation Safety at 305-0303 or by e-mailing

  rso-clinical@columbia.edu
New York City Regulations

<table>
<thead>
<tr>
<th>Personnel Category</th>
<th>Annual Dose Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Exposure</td>
<td>5000 mRem / whole body</td>
</tr>
<tr>
<td>Declared Pregnant Worker</td>
<td>500 mRem / entire pregnancy</td>
</tr>
<tr>
<td></td>
<td>50 mRem / any month of pregnancy</td>
</tr>
</tbody>
</table>

Average annual exposure of dental personnel is less than 10 mRem
Declared Pregnant Workers

• The embryo and fetus have a heightened sensitivity to radiation

• CUMC provide a voluntary program for workers who are pregnant. The program provides for enhanced protection and dosimeter monitoring of the unborn child

• All individuals interested in the program should set up a confidential consultation with the Radiation Safety Officer (305-0303)
Personnel Dosimetry

- Dosimeters must not be removed from the CUMC campus
- Dosimeters must only be worn by the individual whose name appears on the badge
- Once the new dosimeter is received, the old dosimeter must be returned promptly
- Do not return the dosimeter holder. The new dosimeter snaps into the same holder
<table>
<thead>
<tr>
<th>Deterministic Effects</th>
<th>Stochastic Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Severity of effect increases with increasing dose</td>
<td>✓ Severity of effect is unchanged with increasing dose</td>
</tr>
<tr>
<td>✓ Threshold dose below which effect is not observed</td>
<td>✓ No threshold dose associated with effect</td>
</tr>
<tr>
<td>✓ <em>Cataracts, erythema, fibrosis, hematopoietic damage</em></td>
<td>✓ <em>Leukemia, breast cancer, lung cancer, osteosarcoma, thyroid carcinoma</em></td>
</tr>
</tbody>
</table>
Potential Hazards Associated with Radiation

The single best estimate life-time of radiation-induced mortality at low exposure levels:

\[0.2\% \text{ per } 100\ \text{mRem}\]
**ALARA**

- **ALARA - As Low As Reasonably Achievable.**

<table>
<thead>
<tr>
<th>Time</th>
<th>Distance</th>
<th>Shielding</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Less time exposed, less dose received.</td>
<td>✓ Greater the distance, less dose received</td>
<td>✓ a barrier can absorb photons</td>
</tr>
<tr>
<td>✓ Only use machine when you have to</td>
<td>✓ Stand outside room during exposure</td>
<td>✓ Wear lead apron when in room with exposure</td>
</tr>
</tbody>
</table>
Nomad Units

What:
- An x-ray unit
- Used in Dr. Calev’s class in the lab
- Held by operator during exposure

Special Precautions:
- Operator must wear a dosimeter on their lapel
- Operator must wear a lead apron
- End of device must be in containment box
Obligations of CUMC Personnel

• Each employee has an obligation to report unsafe conditions to the Radiation Safety Office

• Each employee has the right to be informed of occupational radiation safety exposure and bioassay results

• Each employee has an obligation to return personal radiation dosimeters to the Radiation Safety Office in a timely manner
Thank You

*fun fact: Cherenkov radiation is blue and not green.