Radiation Safety

College of Dental Medicine

Tzlil Rozenblat, MS
Associate Health Physicist
Radiation Safety Office
Training Outline

- Sources of Radiation Exposure
- NYC Regulations
- Potential Hazards of Radiation
- Principles of Radiation Protection
- Obligations of CODM Employees
Sources of Radiation Exposure to CODM
The safe use of radiation is governed by Article 175 of the Rules of the City of New York.

CUMC and NYP use radiation under licenses and permits issued by the New York City Department of Health and Mental Hygiene.

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.
### NYC Regulations

<table>
<thead>
<tr>
<th>Exposure Type</th>
<th>Annual Limit (mrem)</th>
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<tbody>
<tr>
<td>Whole Body (Deep)</td>
<td>5,000</td>
</tr>
<tr>
<td>Lens of Eye</td>
<td>15,000</td>
</tr>
<tr>
<td>Whole Body (Shallow)</td>
<td>50,000</td>
</tr>
<tr>
<td>Extremity</td>
<td>50,000</td>
</tr>
<tr>
<td>Any Individual Organ</td>
<td>50,000</td>
</tr>
<tr>
<td>Embryo/Fetus (DPW)</td>
<td>500 /entire pregnancy</td>
</tr>
<tr>
<td></td>
<td>50 /month of pregnancy</td>
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</tbody>
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Average annual exposure of CODM personnel is less than 10 mRem*
Potential Hazards for Radiation Workers

High Dose Risks
Deterministic Effects

- Threshold dose below which effect is not observed
- Severity of effect increases with increasing dose
- e.g. Cataracts, erythema, fibrosis, hematopoietic damage

Low Dose Risks
Stochastic Effects

- No threshold dose for effects to appear
- Severity of effect is unchanged with increasing dose
- e.g. Cancer
Putting Risk Into Perspective

Best estimate of life-time of radiation-induced mortality at low exposure levels: 0.2% per 100mrem

<table>
<thead>
<tr>
<th>Health Risk</th>
<th>Estimated Life Lose Expectancy</th>
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<tbody>
<tr>
<td>Smoking 20 cigarettes/day</td>
<td>6 years</td>
</tr>
<tr>
<td>Overweight by 15%</td>
<td>2 years</td>
</tr>
<tr>
<td>Alcohol (US average)</td>
<td>1 year</td>
</tr>
<tr>
<td>All accidents</td>
<td>207 days</td>
</tr>
<tr>
<td>All natural hazards</td>
<td>7 days</td>
</tr>
<tr>
<td>Occupational dose of 300 mrem/yr</td>
<td>15 days</td>
</tr>
</tbody>
</table>

Average annual exposure of CODM personnel is less than **10 mRem**
Principles of Radiation Protection

- **ALARA = As Low As Reasonably Achievable**

**Time**
- The less time exposed, the less dose received
- Only use machine when you have to

**Distance**
- The greater the distance, the less dose received
- Stand outside room during exposure

**Shielding**
- A physical barrier of high-Z material (i.e. lead or concrete) can absorb photons
- Walls of most dental offices provide adequate shielding from x-rays
Nomad Units

- An x-ray unit hand-held by the operator during exposure

Special Precautions:
- Operator must wear a dosimeter on their collar
- Operator must wear a lead apron
Declared Pregnant Workers

- The embryo and fetus have a heightened sensitivity to radiation.

- CUMC provides a voluntary and confidential program for workers/students who are pregnant while working with radiation.

- 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.
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 may request a dosimeter.
- Each employee has an obligation to return personal radiation dosimeters to the Radiation Safety Office in a timely manner.
Clinical Radiation Safety Contact Information

Location:
601 W 168th st
Suite #56
Phone: (212) 305-0303

- Tzil Rozenblat  
  Associate Health Physicist  
  Email: tr2405@Columbia.edu

- Kostas Georgiou  
  Associate Health Physicist  
  Email: kg2537@cumc.columbia.edu

- Eugenio Silvestrini  
  Senior Health Physicist  
  Email: es3064@Columbia.edu

- Daniela Nicoletti  
  Dosimetry Coordinator  
  Email: dn2347@Columbia.edu

- Max Amurao  
  Radiation Safety Officer  
  Email: ma3272@Columbia.edu
Thank you!