

## Preadmission Information



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The following information may be of value to you as you conduct your research regarding the medical radiography profession and the BCIT program.

### **Professional Organizations**

The Canadian Association of Medical Radiation Technologists (CAMRT) is the national professional body for medical radiation technologists (MRT). Graduates of the BCIT Medical Radiography program are eligible to write the CAMRT National Certification exam. Members of the CAMRT are recognized within the health system as leaders in the profession.

The provincial professional association is the BCAMRT. This professional body works in conjunction with the CAMRT to support and advance the profession.

### **Glossary**

Knowledge of the following terms and procedures will enhance the interview experience.

#### **Basic Terms in Medical Radiography**

<i>Anatomical Position</i>	Images are viewed in the anatomical position which refers to the patient standing erect, facing forward with the palms of the hands facing forward.
<i>Bucky</i>	A mechanism for moving the grid. (Potter-Bucky Diaphragm) — also see grid.
<i>Central Ray</i>	The geometric center of the beam of radiation emitted from the x-ray tube.
<i>Chart</i>	The complete record of past and current data kept for each patient containing details such as history, results of diagnostic tests, signs and symptoms, vital signs, physician’s findings, nurse’s notes, medications administered.
<i>Collimation (Coning)</i>	A term used by technologists to refer to limiting the field of radiation produced. This is performed with an adjustable shutter system mounted over the tube “window” for the purpose of limiting and shaping the field of radiation; can be automatically programmed to the imaging plate (cassette) size.
<i>Computed Radiography</i>	CR uses digital technology with a photostimulable phosphor plate within a cassette in order to produce digital images.

## Basic Terms in Medical Radiography

<i>Consent Form</i>	Legal document completed and signed by patient and technologist/radiologist. This confirms invasive radiographic procedure has been explained and patient is agreeable to continue.
<i>Contrast Media</i>	A group of substances utilized for introduction into a body organ, cavity, or vessel to make visualization possible on the resultant radiograph.
<i>Control Panel</i>	The areas of the x-ray machine where kilovoltage, milliamps, exposure time, etc. is selected and monitored. The equipment component used to regulate radiation by adjusting kilovoltage, milliamperage, and exposure time.
<i>Digital Radiography</i>	DR uses digital technology and special electronic detectors to produce digital images.
<i>Digitizer/CR Reader</i>	Converts the scanned electronic signal from the imaging plate for image display on a monitor.
<i>Emergency Cart (Kit)</i>	A container with contents systematically organized for use during patient emergencies, providing necessary emergency medications, syringes, swabs, tourniquet, blood pressure cuff, etc.
<i>Exposure Factors</i>	Safe exposure to the patient requires specific selection of a variety of parameters to obtain a diagnostic image. These factors are: kVp — kilovolt peak mAs — milliamperere seconds D — distance
<i>Filter</i>	A compensating device used to absorb radiation to provide a more uniform image when the patient's body part is of uneven thickness. It is commonly placed between the patient and the x-ray tube or between the patient and image receptor.
<i>Fluoroscopy (radioscopy)</i>	A method of radiographic examination in which a continuous and immediate image is produced and displayed on a television monitor.
<i>Gonad Shield (lead shield)</i>	A device or apron composed of lead impregnated rubber, which will stop radiation. Used primarily for protection of the ovaries or testicles during radiography.
<i>Grid</i>	A device composed of alternating thin strips of lead and a radiotransparent material. Mounted between the patient and the image plate (IP) to absorb scattered radiation. This prevents scatter from reaching the IP.

## Basic Terms in Medical Radiography

<i>Image Plate or Image Receptor (Cassette)</i>	IP, IR or cassette, are special plates that stores the latent image until it is converted into a digital image. The device that converts the x-ray beam into an image.
<i>Mobile X-Ray Machine</i>	Movable x-ray machine can be brought to patient's bedside.
<i>OID</i>	Object-to-image distance is how far the body is to the image receptor.
<i>OSL or TLD</i>	Optical Stimulated Luminescence or thermoluminescent dosimeter, is a device worn by radiation workers for measurement of radiation dose.
<i>PACS</i>	Picture archiving and communication system permits the acquisition, interpretation, and storage of images.
<i>Patient Position</i>	Refers to the position of the patient when radiographed: supine — patient lying on their back prone — directly on their abdomen lateral — directly on their side oblique — at any angle in between prone/supine and lateral
<i>Patient Requisition</i>	Legal document completed by a physician requesting a radiographic examination of the patient.
<i>Radiolucent</i>	Objects or tissue that allows radiation to pass through to the IP rather than being absorbed. Usually appear black on an image and has a low atomic number.
<i>Radiopaque</i>	Radiation is absorbed by the object and are visualized as white on an image.
<i>SID</i>	Source image distance is the distance from the source of the radiation to the image receptor (from the x-ray tube to the cassette).
<i>Standard Precautions</i>	Specific clinical techniques to reduce/prevent the spread of communicable disease. These include hand washing, protective apparel, patient placements, management of medical equipment and supplies.
<i>Suction Unit</i>	A vacuum bottle with tubing attached for the purpose of withdrawing fluid from a body cavity.
<i>Traffic Desk (not at all sites)</i>	Area of x-ray department that handles processing of patient requisitions. Designated person organizes booking times/rooms/technologists for daily workload.

## Basic Terms in Medical Radiography

### *X-Ray Tube*

A glass envelope containing an anode and a cathode. When the cathode is heated it emits electrons which on striking the anode result in the production of radiation.

## Specialized Imaging Procedures

In addition to routine x-rays of bones, chest, and abdomen, medical radiographers may also be involved in taking x-rays in the operating room and specialized procedures in the department. Below are samples of specialized medical imaging procedures.

### Specialized Procedures

#### *Barium Enema*

An examination of the large bowel (colon) by introducing a liquid contrast medium called barium sulphate. To examine the bowel, it must be completely empty, so the patient is requested to fast for eight hours prior to the examination. The radiologist observes the passage of the barium sulphate with fluoroscopy and radiographs any area of interest.

**Please note:** A **double contrast examination** may be performed when doing a barium enema or barium meal. In this case, two types of contrast media are used together — barium sulphate and air. Barium sulphate will appear white on the radiograph and coat the lining of the digestive tract; air will appear black on the radiograph and fill the structure being examined. Details of the digestive lining will be visualized.

#### *Stomach and Duodenum (S & D or OS&D also known as Upper GI (UGI))*

Also known as Upper GI or Upper Gastrointestinal series. These images are used to evaluate the esophagus, stomach, and small intestine. The patient is required to drink various suspensions of barium sulphate in addition to taking gas producing tablets. Images are taken under the direction of the radiologist using fluoroscopy in various positions.

#### *Small Bowel Follow Through (SBFT)*

An examination of the small bowel often follows the examination of the upper gastrointestinal tract, including esophagus, stomach, and duodenum. The patient is requested to drink several glasses of liquid contrast medium called barium sulphate. A timed sequence of radiographs of the patient's abdomen is obtained. For example, 15 minutes, 30 minutes, 1 hour, 2 hours, 4 hours. The series is continued until the barium sulphate has passed to the final portion of the small bowel.

## Specialized Procedures

<i>Computed Tomography (CT)</i>	Computerized Tomography (CT scanning) combines a fan-shaped x-ray beam traversing the patient and detectors receiving the beam. The beam received is digitized and a computer uses the measurements to reconstruct a cross-sectional image of the patient. A method of obtaining an image of a thin section of the body, without superimposition of structures above and below the plane of interest, e.g., "slice."
<i>Cystography</i>	An examination of the urinary bladder by filling with a contrast medium introduced through a small tube passed via the urethra to the bladder. Radiographs of the bladder and urethra are obtained during the procedure. For careful examination, the bladder must be empty, so the patient is asked to void immediately before the procedure begins.
<i>ERCP (Endoscopic Retrograde Cholangiopancreatography)</i>	ERCP is a procedure used to examine the biliary and pancreatic ducts. The patient is sedated. This procedure is done by passing a fiber optic endoscope through the mouth into the duodenum under fluoroscopic control. Contrast is injected into the common bile duct and pancreatic duct and radiographs taken with the patient in different positions. This examination is usually done following an ultrasound which indicates abnormalities of the biliary system.
<i>Mammography</i>	A radiographic examination of the breast. Patient/equipment is placed in two or three different positions.

## You-tube Video of Specialized Imaging Procedures

The following You-Tube clips provide an insight of specialized procedures completed in the medical imaging department.

### You-tube Examples

<i>Image guided surgical procedures go high tech with x-box</i>	<a href="http://www.youtube.com/watch?v=f5Ep3oqicVU">http://www.youtube.com/watch?v=f5Ep3oqicVU</a>
<i>Fluoroscopy C-arm used in the operating room</i>	<a href="http://www.youtube.com/watch?v=BmcFGO2986o">http://www.youtube.com/watch?v=BmcFGO2986o</a>
<i>Femoral angiogram / angioplasty</i>	<a href="http://www.youtube.com/watch?v=le0tB8jc1nE">http://www.youtube.com/watch?v=le0tB8jc1nE</a>

## You-tube Examples

Cardiac catheterization with angioplasty <http://www.youtube.com/watch?v=JeH4zPzQgRc>

CT guided lung biopsy <http://www.youtube.com/watch?v=w3oMgO84TtY>

## Radiation Safety

Many medical decisions are based on diagnostic x-rays. If you haven't had an x-ray yourself, you probably know someone who has had a radiographic procedure. As technologists, it is our responsibility to ensure that our patients are not subjected to more radiation than is reasonably necessary. When not medically necessary, we should prevent radiation exposure as irradiation has been linked to several adverse effects such as gene mutations, cancer and infertility. Due to historical events, we now know what the effects of exposure to high levels of radiation are; what we don't know, is the effect of exposure to low levels of radiation—such as in medical imaging. The effects depend on the amount of radiation and frequency of exposure. Any dose, no matter how small, has the potential to cause biological harm.

## Policies

BCIT Medical Radiography students are expected to comply with BCIT, Medical Radiography and clinical site policies. A few samples of these policies are identified below.

### Confidentiality of Patient Information

All information related to a patient must be treated as confidential. This information may be in written, verbal, or other forms. Even the knowledge that an individual is in the hospital must not be volunteered.

*Confidentiality extends to everything hospital personnel and students learn in the exercise of their duties. It extends to both important and unimportant information, the nature of the patient's illness, its cause, its treatment, and everything the patient discloses with a view to giving a better understanding of their ailment; everything their doctor and all other personnel learn from examination of the patient; the reactions of the patient; their condition in the hospital; everything they disclose in delirium; their financial state; the conditions in their home; domestic difficulties; etc.*

*Failure to comply with this policy will result in disciplinary action up to and including termination of your position in the Medical Radiography Clinical Education program.*

### Clinical Experience

It is desirable for students to experience a variety of clinical cultures in order to have a well-rounded education. Therefore students will be assigned to various clinical sites in the Vancouver Coastal, Fraser and Interior Health Authorities. The computerized clinical assignments incorporates student preferences. However, students will be randomly assigned to over- or under-subscribed facilities.

Students will not be permitted to go to those clinical sites where there is a potential conflict of interest. A conflict of interest is defined as any real or potential for an interest, other than the best interest of the student in pursuit of their studies, to become involved in decisions related to their success in a placement and subsequent training.

### **Personal Appearance Policy**

The following policy pertains to appearance expectations in the lab and clinical environments.

- Enclosed, non-pervious, low heeled shoes are required to meet the health and safety requirements.
- A clean and pressed uniform must be worn every day. No exposed midriffs or underwear permitted.
- Hair must be simply styled and worn *above* the collar line. All hair not secured back must be secured off the face so it does *not* fall forward.
- For personal safety reasons, no facial hair is permitted with use of N95 masks in the clinical area. Individuals who maintain facial hair may be required to provide their own safety masks.
- No artificial nails or colored nail polish is to be worn.
- Cosmetics may be worn in moderation. No perfume scents or cigarette odors are permitted and good personal hygiene must be maintained at all times.
- No jewelry, watches or clothing, with the exception of medical alert bracelets, are permitted below the elbows. No hoop facial piercings / earrings or earring bars permitted.

### **Attendance Policy**

Regular attendance is seen to be preparing the student for the workplace as well as helping the student achieve success (<http://www.bcit.ca/files/pdf/policies/5101.pdf>). A student who is absent more than 10% of the time for any class/lab for any cause can be removed from the program or given a failing grade.



## Math Requirements for the Medical Radiography Program

Students should be comfortable with the following mathematical ideas.

- sketch linear, quadratic, exponential, and  $\log^e$  functions
- solve: linear algebraic function  
 $y = mx + b$

quadratic function  
 $y = a_0 + a_1x + a_2x^2$

exponential function    power function  
 $y = Ae^{bx}$                        $y = Ax^6$

log function  
 $y = A \ln x$

- convert units

i.e., convert  $\frac{\text{Kg}}{\text{m}^3}$  to  $\frac{\text{g}}{\text{mm}^3}$

- exponential calculations

$$10^x \cdot 10^y = 10^{x+y}$$

i.e.,  $e^x \cdot e^y = e^{x+y}$

$$(10^x)^y = 10^{xy}$$

- trigonometric functions

i.e.,  $y = \sin x$

$y = \cos x$

$y = \tan x$

