

Chapter 1

Introduction to Healthcare

The Texas Medical Board issues two licenses that allow a healthcare worker to perform radiologic studies in the state of Texas. This is the organization that determines the credentials needed to practice as an N.C.T.

The **Medical Radiologic Technologist** license holder sometimes called an R.T. must successfully complete a formal educational program approved by the Joint Review Committee on Education in Radiologic Technology (JRCERT). The R.T. may perform both basic and **contrast** radiographic procedures as supervised by a licensed practitioner of healing arts. The procedures may be performed in hospitals or other healthcare settings. Fluoroscopy and bedside studies also fall within the scope of practice of a **Medical Radiologic Technologist** license holder. The R.T. may, with more training, also perform MRI studies, CT scans and other advanced radiologic procedures.

The Non-Certified Technician (NCT) must successfully complete 120 clock hours of training as prescribed by the **Texas Department of State Health Services**. The NCT license is called “limited” because the scope of practice is limited. The NCT license holder may perform all nonhazardous or dangerous radiographic exams in healthcare settings in Texas. The procedures may be performed in hospitals or other healthcare settings.

Occupational Scope and Purpose Besides taking x-rays there are lots of tasks that an NCT x-ray technician may be required to do those tasks may include but are not limited to:

- ✓ Communication
- ✓ Administrative and clerical functions
- ✓ Patient care and management
- ✓ Support service duties
- ✓ Operation and maintenance of radiographic equipment
- ✓ Operation and maintenance of image processing equipment
- ✓ Radiation protection
- ✓ Radiographic imaging and patient positioning
- ✓ Radiographic exposure and quality
- ✓ Continuing education

R.T. vs. Limited License Scope of Practice	
N.C.T.	R.T.
• Chest and Abdomen	• Chest and Abdomen
• Skull	• Skull
• Spine	• Spine
• Extremities	• Extremities
	• Contrast Studies
	• Fluoroscopy
	• Bed side studies

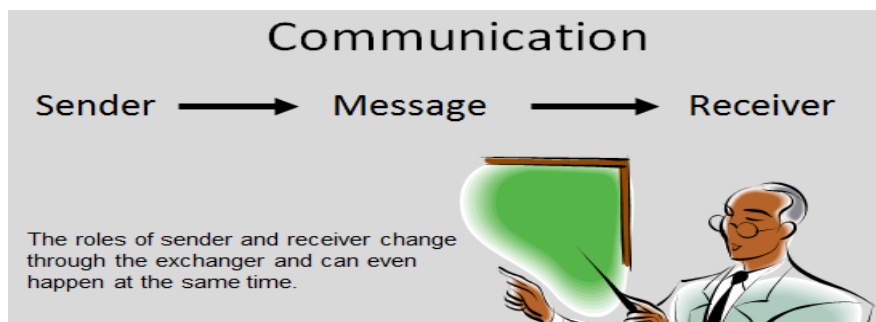


TEXAS MEDICAL BOARD

Relationships and Communication

Positive interpersonal relationships are established a foundation of affective communication, both verbal and nonverbal. This chapter presents suggestions and guidelines for establishing positive relationships with others through effective communication. These guidelines are not intended to be an intimidating list of do's and don'ts, nor are they all-inclusive. Rather, they are intended to provide practical suggestions about occupational standards of interpersonal relationships and how they relate to others in healthcare settings. The NCT x-ray technician should consider the suggestions is only a starting point, then change and adapt them as needed to specific work conditions.

Communication is nothing more than an exchange of information. The information exchanged is referred to as the “message”. The person who communicates first is referred to as the sender. The person who the message is sent to is referred to as the receiver.



This is a very simple communication model and in the real world communication is seldom as cut and dry as this model represents. A good communicator pays attention to nonverbal messages that are being sent back to the sender from the receiver. Nonverbal cues can convey a lot of information. For example if the receiver rolls her eyes or yawns, it speaks volumes about how she values the information that she is receiving.

In communication courses students are taught that the majority of any communication is conveyed through nonverbal means. These nonverbal communications may include paralanguage which relates to

a tone of voice and cadence of speech. It may also include body language and facial expressions as well as gestures. It is very important to remember that we are communicating with others even when we are not speaking to them.

In written communication, including things like e-mails and text messages, we are unable to use nonverbal communication. Keep that in mind, so that you communicate the message that you intend to communicate.

Communicating with Patients When communicating with patients we want to call them by their name and make sure that we have the correct patient. We can do this by verifying their date of birth or checking a wristband if we're working in a hospital setting.

It is important to look our patients in the eyes when speaking to them, this shows that we are sincere. We always want to be friendly with our patients yet at the same time maintain a level of professionalism. Make sure that you tell your patients who you are by at least giving them your first name. After all, we know all kinds of personal information about our patients; it is only fair that they at least know our name.

Ask your patient why they are seeing the doctor today. This information should be on the radiography request but occasionally mistakes are made in this is a good way to verify the accuracy of your information. Make sure you tell your patient what was going to happen during the exam given information such as what is expected of them, how long it's going to take and where to go once the study is completed.

It is important to show concern for your patients. They never come to see you on a good day. When a patient is visiting the doctor is because they are sick or injured or afraid they might be sick. When dealing with a patient it can be helpful to remember a little spin on the "Golden Rule". Rather than treating your patients the way you would like to be treated, treating them the way you would want the person that you care about most to be treated. Remember every patient is someone's most important person.

All patients deserve to be treated equally regardless of gender, age, religion, or socioeconomic background.

Dealing with children can present some unique challenges. It is very helpful to establish the relationship and communicate directly with the child. Rather than telling the parent what you need to child to do and then having them relate information to the child is much easier to communicate directly with your patient. Sometimes it is even helpful to kneel down to the child's level we're trying to give them instructions or to communicate information to them.



It is critical that we always react in a professional manner. Whether it is to something that we see on the radiograph or to something that the patient says to us we are always to maintain the highest level of professionalism. We are never to try to provide a patient with a diagnosis based on what we see on a radiograph. That is the responsibility of the physician.

Remember when communicating with patients that Federal HIPPA laws and. HIPAA Laws and Regulations are divided into five Rules:

- Privacy Rule
- Security Rule
- Transactions Rule
- Identifiers Rule
- Enforcement Rule
- HITECH Act

Never ask questions of a personal nature where others can overhear you and if you must ask personal questions is always a good idea to explain how they rate the radiographic examination.

Communicating with Coworkers NCT x-ray technicians will communicate with coworkers, physicians and supervisors about many things. Remember if you ever have a question about any aspect of a radiographic request never proceed until you seek assistance and have your questions answered. We typically spend nearly as much time with our coworkers as we do with our family each week. In some ways the people we work with become a kind of family. When you start a new job you want to become a part of the office family.

Here are a few tips that can help you to do that:

- be courteous, even when you are busy
- participate in office traditions such as birthday parties taking turns bringing doughnuts on Friday
- if you take the last cup of coffee make a new pot
- occasionally do the dishes in the break room (even if they are not yours)
- if a coworker is overwhelmed help them out
- eat lunch with your coworkers
- don't gossip
- if you have a problem with someone, try to resolve it with them before you go to a supervisor
- if you are unhappy consider finding a new job

The objective should be to make things a little bit better for the people you work with because you're there rather than a little bit harder for them.



"Your x-ray showed a broken rib, but we fixed it with Photoshop."

Communicating with Physicians and Supervisors A chain of command exists in every work environment. The physician is usually the top of the chain of command. Occasionally, however the person you answer to is not the physician but an administrator or office manager. It is an important part of your job to be familiar with all levels of your chain of command. Communicating with physicians is critical because x-ray examinations are performed only on orders issued by physicians



When you communicate with physicians or supervisors it is helpful to keep the communication positive. Remember that it is proper to always address physician by their title especially in front of coworkers or patients. Like everyone else physicians appreciate positive feedback when it is appropriate. Remember that giving common courtesy is just as important as expecting it. Always give the physicians that you work with an attitude of confidence and support for their professional integrity and ability.

Medical Ethics and Law

Medical Ethics is a system of moral principles that apply values and judgments to the practice of medicine. As a scholarly discipline, medical ethics encompasses its practical application in clinical settings as well as work on its history, philosophy, theology, and sociology. Basically, it is doing the right thing based on values and beliefs. The application of medical ethics is the basis of a trusting relationship between health care professionals and patients. There are four principles on which trusting relationships are based.



Autonomy is the right to make one's own decisions according to one's own moral principles. There are two elements of autonomy.

Informed consent means that the patient must understand all of the details of the procedure before they are able to make a decision. The information must be presented in terms that the patient can fully understand. The details of the procedure or treatment must be outlined and discussed, and consent for the treatment or procedure must be given voluntarily. An informed consent form must be signed by the patient for all experimental procedures or those that carry substantial risk.

Confidentiality is the patient's basic right to privacy. Confidentiality will be thoroughly discussed in the mandatory HIPPA training provided by your facility.

Beneficence relate to duty to others to provide improved conditions that promote physical and emotional well-being. It is our duty to improve the lives of our patients.

Nonmaleficence refers to preventing or not causing harm intentionally or not subjecting another to harm. This is our duty not to hurt our patients while we are trying to help them.

Medical law By definition, ethical behavior relates to moral or good conduct. Legal behavior is what the law or government says we must do. There are distinctly legal and distinctly moral issues involved in providing medical services. Sometimes what must be done and what should be done seem to be diametrically opposed concepts.

Legal/Ethical Definitions

Assault is any willful attempt or threat to inflict injury upon the person of another.

Battery is unlawful touching of another without justification or excuse.

False Imprisonment is the conscious restraint of the freedom of another without proper authorization, privilege, or consent of that individual.

Negligence is the omission to do something that a reasonable person would do for the doing of something which a reasonable person would not do.

Gross Negligence involves a stronger case of duty. It is the intentional failure to perform a manifest duty in reckless disregard of the consequences as affecting the life or property of another.

Defamation is the act of bringing harm to another person's reputation through *libel* (written word) or *slander* (spoken word).

Res Ipsa Loquitur or “the thing speaks for itself” is a situation where the injured person in no way contributed to his or her injury. That is, the whole incident was under the control of the offender or defendant.

Respondeat Superior “the master speaks for the servant”; the master (employer) is liable in certain cases for the wrongful acts of his or her servant (employee).

Codes of Ethics A code of ethics is a document that sets forth standards of correct behavior for a profession. X-Ray Technicians agree to abide by the Code of Ethics of The American Registry of Radiologic Technologists and have an obligation to apply those principles to ensure that the patients entrusted to them receive the best possible care. Whenever an issue arises that may compromise that care, RTs must know how to advocate for the patient. In order to do so effectively, they must be well-acquainted with the principles, rules, and policies governing their profession as well as understand that continuing education is vital to fulfill the duties and responsibilities appointed to them.



Code of Ethics

- 1 The radiologic technologist conducts herself or himself in a professional manner, responds to patient needs and supports colleagues and associates in providing quality patient care.
- 2 The radiologic technologist acts to advance the principal objective of the profession to provide services to humanity with full respect for the dignity of mankind.
- 3 The radiologic technologist delivers patient care and service unrestricted by concerns of personal attributes or the nature of the disease or illness, and without discrimination on the basis of sex, race, creed, religion or socioeconomic status.
- 4 The radiologic technologist practices technology founded upon theoretical knowledge and concepts, uses equipment and accessories consistent with the purpose for which they were designed and employs procedures and techniques appropriately.
- 5 The radiologic technologist assesses situations; exercises care, discretion and judgment; assumes responsibility for professional decisions; and acts in the best interest of the patient.
- 6 The radiologic technologist acts as an agent through observation and communication to obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient and recognizes that interpretation and diagnosis are outside the scope of practice for the profession.
- 7 The radiologic technologist uses equipment and accessories, employs techniques and procedures, performs services in accordance with an accepted standard of practice and demonstrates expertise in minimizing radiation exposure to the patient, self and other members of the health care team.
- 8 The radiologic technologist practices ethical conduct appropriate to the profession and protects the patient's right to quality radiologic technology care.
- 9 The radiologic technologist respects confidences entrusted in the course of professional practice, respects the patient's right to privacy and reveals confidential information only as required by law or to protect the welfare of the individual or the community.
- 10 The radiologic technologist continually strives to improve knowledge and skills by participating in continuing education and professional activities, sharing knowledge with colleagues and investigating new aspects of professional practice.

Revised and adopted by the American Society of Radiologic Technologists and the American Registry of Radiologic Technologists, February 2003



Patient's Bill of Rights One of the most important documents to become familiar with in today's healthcare delivery is the patient's Bill of Rights. Most hospital systems have their own patient's Bill of Rights. The document is based on both ethical and legal concepts of autonomy and most of you are Texas hospital systems patient's Bill of Rights.


Texas Health Resources Patient's Rights and Responsibilities

1. You have the right to a reasonable response to your request and need for treatment or service, within the hospital's capacity, its stated mission, and applicable laws and regulations.
2. You have the right to be informed about which physicians, nurses and other health care professionals are responsible for your care.

3. You have the right to the information necessary for you to make informed decisions, in consultation with your physician, about your medical care including information about your diagnosis, the proposed care and your prognosis in terms and a manner that you can understand before the start of your care. You also have the right to take part in developing and carrying out your plan of care.
4. You have the right to consent to or refuse medical care, to the extent permitted by law, and to be told of the risks of not having the treatment and other treatments which may be available.
5. You have the right to reasonable access to care.
6. You have the right to care that is considerate and respectful of your personal values and beliefs. The hospital strives to be considerate of the ethnic, cultural, psychosocial, and spiritual needs of each patient and family. The hospital acknowledges that care of the dying patient includes care with dignity and respect, management of pain, and consideration for the patient's and family's expression of grief.
7. You have the right to have a family member or representative of your choice and your own physician notified promptly of your admission to the Hospital.
8. You have the right to have your family take part in your care decisions with your permission.
9. You have the right, to the extent permitted by law, to have your legal guardian, next of kin, or a surrogate decision maker appointed to make medical decisions on your behalf in the event you become unable to understand a proposed treatment or procedure, are unable to express your wishes regarding your care, or you are a minor. The person appointed has the right, to the extent permitted by law, to exercise your rights as a patient on your behalf.
10. You and your appointed representative have the right to take part in ethical questions that arise during your care.
11. You have the right to communicate with family, friends and others while you are a patient in the hospital unless restrictions are needed for therapeutic effectiveness.
12. You and your legal representative have the right to access the information contained in your medical record in a timely manner subject to state and federal law.
13. You may request an explanation of your hospital bill, even if you will not be paying for your care.

14. You have the right to issue advance directives and to have doctors at the hospital and hospital staff follow your directives in accordance with state and federal law.
15. You have the right to personal privacy and for your medical information to be kept confidential within the limits of the law.
16. You have the right to receive care in a safe setting.
17. You have the right to be free from abuse or harassment.
18. You have the right to be free from restraints that are not medically necessary; restraints include physical restraints and medications.
19. You have the right to be free from seclusion and restraints for behavior management except in emergencies as needed for your safety when less restrictive means may have been ineffective.
20. You have the right to consent or refuse to take part in any human research or other educational project affecting your care. You also have the right to be given information about the expected benefits and risks of any research you choose to take part in and any alternative treatment that might benefit you. Refusing to take part in the research or project will in no way affect your care.
21. You have the right to have your pain assessed and managed properly and to receive information about pain and pain relief measures.
22. You have the right to obtain information concerning the relationship of the hospital to other health care facilities as they relate to your care.
23. You have the right to submit a complaint to the hospital regarding your care or regarding any belief you have that you are being discharged too soon. Your care will not be affected by submitting a complaint. The steps for doing so are at the end of this statement.
24. You have a right to request and/or be provided language assistance i.e. Interpreter services, if you have a language barrier or hearing impairment. This will be provided at no cost to you to help you actively participate in your care.

Radiology Request Form



PROVIDENCE IMAGING CENTER
www.provimaging.com
3340 Providence Drive, Anchorage, AK 99508 • 17101 Snowmobile Lane, Eagle River, AK 99577

FOR BOTH LOCATIONS:
General Scheduling: (907) 212-3151 • Toll-free: (888) 458-3151
MRI, CT, PET-CT Scheduling: (907) 212-3146 • Fax For All Orders: (907) 212-5828

Today's Date: _____ Exam Date: _____

REPORTING INSTRUCTIONS

STAT Call Report – ph# _____

STAT Fax Report – fx# _____

Pt. to return with CD

PATIENT LAST NAME (REQUIRED)	FIRST	M	DATE OF BIRTH (REQUIRED)	PT. HM. PHONE	CELL PHONE
ORDERING CLINICIAN (REQUIRED)			CLINICIAN SIGNATURE (REQUIRED – NO STAMPS)		CLINICIAN PHONE
SEND ADDITIONAL COPIES OF REPORT TO				PREGNANT? <input type="checkbox"/> YES <input type="checkbox"/> NO	
HISTORY/SYMPTOMS/DIAGNOSIS (REQUIRED) – PLEASE INCLUDE ICD-9 CODE(S)					

CT ANCH & EAGLE RIVER

BUN/Creat.

With IV Contrast Without IV Contrast

With & Without IV Contrast

Head Abdomen

Neck Renal Stone Study

Chest Pelvis

PE Study Abdomen and Pelvis

Chest Hi-Res CT IVP (urogram)

(interstitial lung disease) CT Enterography

Maxillo Facial (small bowel)

Sinus Complete Sinus Limited

IACs/Temporal Bone/Pituitary

Orbits

C-Spine T-Spine L-Spine

Extremity

CT Angiogram

Carotids (aortic arch to Circle of Willis)

Intracranial/Circle of Willis

Thoracic Angiogram

Renal Angio

ABD/Pelvic Angio (for AAA)

ABD Aortogram & Lower Extremity Runoff

Other

ULTRASOUND ANCH & EAGLE RIVER

Abdominal (GB, Liver, Pancreas, Spleen, Kidneys, Aorta)

Aorta Biophysical Profile

Cranial

Hysterosonogram

Obstetric EDC _____ LMP _____

Pelvic w/Transvaginal

Renal/Bladder Testicular

Thyroid Thyroid Biopsy/FNA

Vascular Screening (self pay)

Doppler Studies

Mesenteric Porto-hepatic Renal Arterial

Venous Doppler

Arms R L Legs R L

Carotid Doppler Liver Transplant

Renal Transplant

Ankle Brachial Index (ABIs)

(Segmental, Resting & Exercise pm)

Groin Doppler (Post Heart Cath)

Vein Mapping

Arms R L Legs R L

Other

PET – CT ANCH

Special order form required, call 212-2879.

BONE DENSITOMETRY ANCH

DXA L-Spine & Hip DXA with IVA

Body Fat Analysis

MRI ANCH

With & Without Contrast

With Contrast as Necessary

Neurologic/Spine

Brain Brain Without Contrast

Orbits Brain Spectroscopy

Pituitary

Internal Auditory Canal

Fifth Cranial Nerve

Pre-op Stealth Brain STRS Brain

Metastatic Spine Survey

Soft Tissue Neck

Brachial Plexus

C-Spine T-Spine L-Spine*

Reason (check one): Disc Infection MS Mets

*History of prior lumbar surgery? Yes No

Musculoskeletal	Right	Left
<input type="checkbox"/> Shoulder	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Shoulder with Arthrogram	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Wrist	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Hip	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Hip with Arthrogram	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Knee	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Ankle	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Foot	<input type="checkbox"/>	<input type="checkbox"/>

Body

Breast – special order form required, call 212-3146.

Pelvis

Pre-embolization Uterus

Liver with Eovist

MRCP

Renal Adrenal Pancreas

MR Angiogram

Carotids (from aortic arch to Circle of Willis)

Intracranial/Circle of Willis

Thoracic Aortogram


Renal MRA

Abdominal Aortogram & Lower Extremity Runoff

Other

BREAST ANCH

*Indicate location of abnormality



Digital Mammography Right Left

Screening

Diagnostic Bilateral Mammogram*

Diagnostic Unilateral Mammogram*

Cone/Magnification Views, if needed

Mammogram/Augmentation

Ductogram

Stereotactic Biopsy

Other

Ultrasound

Breast Ultrasound*

If needed

Patients 34 or Younger

Diagnostic Mamm. (if needed)

Breast Ultrasound Aspiration

Breast Ultrasound Biopsy

DIAGNOSTIC RADIOLOGY ANCH & EAGLE RIVER

Gastrointestinal

Barium Swallow (Esophagram) Upper GI

Small Bowel Series Barium Enema

Barium Enema Air Contrast

Hysterosalpingogram

Sinus Series Skull

Sinus/Waters only Facial Bones

Chest

Abdomen (KUB) Ribs

Spine Scoliosis Series

Cervical Thoracic Lumbar

Complete Limited

Extremity	#Views	Right	Left
<input type="checkbox"/> Hand	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Finger	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Wrist	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Forearm	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Elbow	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Humerus	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Shoulder	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Foot	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Toes	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Ankle	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Knee	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Tib-Fib	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Femur	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Hip	_____	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Standing Knees AP	_____	<input type="checkbox"/>	<input type="checkbox"/>

Other

OFFICE COPY (WHITE) – KEEP FOR YOUR RECORDS • PATIENT COPY (YELLOW) – PREP INSTRUCTIONS ON BACK OF YELLOW COPY ONLY

Providence Imaging Center (PIC) is an independent diagnostic testing facility with two locations: in Anchorage on the Providence Alaska Medical Center campus, and in Eagle River at the Providence Medical Building located at 17101 Snowmobile Lane.

Rev 2/10

X-Ray Identification Card

Practice Name	
Doctor Name	
Address • City, State 01234	
123-456-7890 • 123-456-7890	
Optional Text	Optional Text
Optional Text	Optional Text

X-Ray Identification Printer



Required Information

Date of the Exam

Name or Medical Record Number

Ordering Physician

Performing Facility

** Correct Side Marker*

Liability Waiver



X-Ray Patient Consent Form

Patient Consent to X-Ray

I authorize the performance of diagnostic x-ray examination of myself which Dr. William Warburton may consider necessary or advisable in the course of my examination and treatment.

Signed _____ Date _____

If Patient is a Minor

I am the parent or legal representative of _____ who is a minor, _____ years of age. I authorize the performance of diagnostic x-ray of this minor which Dr. William Warburton may consider necessary or advisable.

Signed _____ Date _____

Females: Regarding Possibility of Pregnancy

This is to certify that, to the best of my knowledge, I am not pregnant, and Dr. William Warburton has my permission to perform diagnostic x-ray examination. I have been advised that certain x-ray examinations, particularly those involving the pelvis, can be hazardous to an unborn child.

Signed _____ Date _____

Infection Control

The goal is to protect yourself, your patients, and others from being infected and from serving as a source of infectious organisms to others

A **nosocomial infection**, also known as a **hospital-acquired infection** or **HAI**, is an infection whose development is favored by a hospital environment, such as one acquired by a patient during a hospital visit or one developing among hospital staff. Such infections include fungal and bacterial infections and are aggravated by the reduced resistance of individual patients. They are spread more often by hand than any other method. Proper hand washing is the best prevention.

In the United States, the Centers for Disease Control and Prevention estimated roughly 1.7 million hospital-associated infections, from all types of microorganisms, including bacteria, combined, cause or contribute to 99,000 deaths each year. Nosocomial infections can cause severe pneumonia and infections of the urinary tract, bloodstream and other parts of the body. Many types are difficult to attack with antibiotics, and antibiotic resistance is spreading to Gram-negative bacteria that can infect people outside the hospital.

Infection control includes various actions and procedures that reduce or eliminate the number of pathogenic (disease producing) organisms present. There are three levels of infection control: asepsis, disinfection and surgical asepsis

Asepsis – Absence of all disease producing microorganisms. (Hand washing, proper handling of contaminated linen and housekeeping) Our hands are our tools and we are expected to wash them between each patient. Frequent hand washing is our best defense against disease.

Disinfection – The destruction of microorganisms by chemical methods. (Lysol, Bleach etc.)

Surgical Asepsis – Complete destruction of all microorganisms creating a sterile field. (Autoclave)



Semmelweis; The Germ Theory of Disease The common practice of hand washing nowadays was once considered odd during the 19th century. Moreover, the diseases like malaria and typhoid were associated with the contact with water.

On the contrary, large number of women died during childbirth due to puerperal sepsis or the childbed fever. Childbed fever was largely caused by the transfer of infection due to the lack of indoor plumbing and hygiene facilities in hospitals. But thanks largely to Philipp Semmelweis who discovered the etiology and prevention of puerperal fever we now understand the importance of hand washing.

Ignaz Semmelweis introduced hand washing standards after discovering that the occurrence of puerperal fever could be prevented by practicing hand disinfection in obstetrical clinics. He believed that microbes causing infection were readily transferred from patients to patients, medical staff to patients and vice versa. Thus, Semmelweis suggested the use of chlorinated lime solution for hand washing to prevent the infectious disease from spreading. For this successful yet such simple and cost effective method, he is rightfully considered to be the savior of mothers.

Ignaz Philipp Semmelweis was born on July 1, 1818 in Taban (Budapest) in Hungary. His well-off family was perhaps of German descent and was Jewish. During 1835-1837, he went to Catholic Gymnasium of Buda for his primary education and later finished schooling at the University of Pest. In 1837, he went to Vienna to study law at the University of Vienna but switched to medicine due to personal inclination. He received his master's (Magister) degree in medicine in 1844 with specialization in midwifery. He learned diagnostic and statistical methods and took surgical training before taking a post as assistant in the Vienna General Hospital.

During his job at the hospital, Semmelweis closely concerned himself with the study of puerperal fever causing high maternal and neonatal mortality. The Vienna General Hospital operated two maternity clinics – the first clinic and the second clinic for different classes of patients. The treatment was given by the medical students and midwives in the first and the second clinic respectively. He observed that the death rate in the first obstetrical clinic was 13.10%; much higher than the 2.03% death rate in the second clinic. However, there were no explanations for the high contrasting statistics and several mysterious causes were attributed towards the disease.

During a research on the autopsy of his friend who died because of a fatal dissection wound, Semmelweis noticed symptoms similar to those of childbed fever. This observation prompted him to connect cadaveric contamination with puerperal fever. Soon after he declared that medical students carried infectious substances on their hands from dissected cadavers to the laboring mothers. This also provided the logical explanation for a lower death rate in the second clinic, operated by midwives because they were not involved with autopsies or surgery.

Semmelweis discovered that puerperal sepsis (a type of septicaemia) commonly known as childbed fever in new mothers could be prevented if doctors washed their hands. Based on his analysis, he established a simple but revolutionary prophylaxis system in 1847. He insisted upon the use of chlorinated lime solutions for hand washing by medical students and doctors before they treated obstetrical patients.

The application of his method instantly reduced the cases of fatal puerperal fever from 12.24% to 2.38%, while in some months there were no deaths from childbed fever at all. Besides the hands, he initiated using preventive washing for all instruments making contact with the patients which literally removed puerperal fever from the hospital. This was the beginning of an antiseptic era.

Although hugely successful; Semmelweis' discovery directly confronted with the beliefs of science and medicine in his time. His colleagues and other medical professionals refused to accept his findings mainly because they did not find it convincing that they could be responsible for spreading infections. The reaction reflected on his job as well when he was declined a reappointment in 1849.

Ignaz Semmelweis was himself reluctant to publish or demonstrate his research and findings publically but some of his students and colleagues wrote letters and delivered lectures explaining his work. But later, he somehow got convinced and during 1850, he delivered a few lectures in Vienna on the Origin of Puerperal Fever. He returned to Budapest in 1851 and joined St. Rochus Hospital remaining there till 1857. His antiseptic methods proved to be fruitful here as well. In 1861, he eventually published a book in German about his significant discovery followed by a series of letters written in reaction to his critics.

The continued criticism and lash out finally broke him down. By 1865, he was suffering from depression, forgetfulness and other neural complaints and was eventually committed to an asylum. He only lasted there for two weeks and died on August 13, 1865 at the age of 47.

Chapter 1 Quiz

Introduction to Healthcare

- To determine the credentials needed for you to practice as an N.C.T, you should contact the:
 - American Registry of Radiologic Technologists.
 - U.S. Office of Health and Human Services.
 - Texas Department of State Health Services
 - National Council on Radiation Protection.
- An NCT x-ray license is called *limited* because the:
 - scope of practice is limited.
 - salaries are limited.
 - opportunities are limited.
 - operators' competence is limited
- X-ray examinations are performed on orders issued by:
 - limited x-ray machine operators.
 - physicians.
 - radiologic technologists.
 - nurses.
- A document that sets forth standards of correct behavior within a profession is called:
 - A code of ethics
 - Professional limited liability standard
 - A code of morals and values
 - A legal conduct standard
- Which of the following are responsibilities of a limited operator?
 - Providing the patient with considerate and respectful care
 - Providing patients with complete, accurate information regarding diagnosis
 - Keeping patient information confidential
 - 1 and 2 only
 - 1 and 3 only
 - 2 and 3 only
 - 1, 2, and 3
- What signed document is required for experimental procedures or those that carry substantial risk?
 - Confidentiality statement
 - Standard of ethics
 - Informed consent
 - Living will
- Which of the following practices might be characterized as slander?
 - Telling a co-worker that one of your patient's pathology was caused by unsafe sex
 - Leaving a patient exposed while processing films
 - Using restraints on a patient without a physician's order
 - Threatening to spank a pediatric patient to force cooperation

8. The omission of reasonable care or caution defines:
- A. Libel
 - B. Slander
 - C. Defamation of character
 - D. Negligence
9. A health care worker's single best protection against disease is:
- A. Frequent hand washing
 - B. Vaccination
 - C. Barrier techniques
 - D. Protective masks
10. Asepsis is defined as:
- A. Providing an opportunity for fomite transmission.
 - B. Absence of all disease producing microorganisms.
 - C. The destruction of microorganisms by chemical methods.
 - D. Complete destruction of all microorganisms creating a sterile field.