Developing My X-ray Vision

An Honors Thesis (HONRS 499)

by

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Abstract

Radiography is an important profession that many people do not understand or even know exists. Ball State University has an excellent program in conjunction with Clarian Health-Methodist Hospital in Indianapolis. This memoir describes the role of a radiographer and the program in detail. I share my experiences because this is a paper I wish I could have read before starting the program. I reveal some things that caught me by surprise in hopes that future students will be prepared in advance. I have tried to answer some of the questions that one might not think to ask. Although there will be different twists and turns along each student’s way, I hope that my memoir will offer a glimpse of some things to expect.
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I get a lot of confused looks when I tell people that my major is radiography. I cannot even begin to count the times I have heard the joke about repairing radios! Radiography is actually the process of recording an image with x-rays. Radiographers, or radiologic technologists, are the professionals educated in using radiation to create an image in order for radiologists, physicians who interpret the images, to diagnosis a variety of medical conditions. The radiology department functions as the eyes of the hospital, anywhere from the emergency room to a surgical procedure. I have had exposure to the medical profession of radiography since I was very young. I have a condition known as scoliosis, a curvature of the spine, which required numerous trips to Riley Hospital for Children for x-rays and doctor visits during my growing years. Seeing the images of my spine always fascinated and intrigued me. As I grew older I decided I wanted to be a part of the advancing technology of the medical field in the radiology department.

I found out that Ball State University offered a radiography program in conjunction with Clarian Health-Methodist Hospital in Indianapolis, one of the nation's leading health organizations in patient care and research. Through the program individuals will earn an Associate in Science degree in radiography. Thirty hours of prerequisite courses are taken at the Ball State campus and include English, speech, computer science, math, anatomy, physics, psychology, chemistry, physiology, medical terminology and physical education. The thirty-five remaining hours required for the Associate degree are fulfilled by the fourteen-month clinical phase of the program at Methodist Hospital. Individuals must schedule an observation and then apply to the clinical portion of the program. Twenty students
are accepted each year. During this clinical portion there are also didactic classes in radiographic procedures, physics, radiation protection, patient care, and pathology where individuals will learn all the information needed to become radiologic technologists. Students then take the concepts taught in the classroom and put them into practical application in the clinical setting.

While radiography at Ball State is an Associate degree and requires a little over two years to complete, individuals always have the option of attending more classes to earn a Baccalaureate degree. I chose the latter since I had been accepted into the Honors College and wanted to complete the requirements in order to graduate with honors. I chose to obtain a Bachelor of General Studies with General Studies being my major and Humanities being my minor. I then added an emphasis in Health Science and Radiography. Since I decided to extend my education to four years, my college experience has been very diverse. I have received broad and expansive knowledge along with my specialty area of radiography. This provided the opportunity to take courses in theater, history, classic cultures, literature, and philosophy that I would have otherwise missed had I only attended college for two years. There is a wide variety of choices when considering how to reach educational goals. Explore every opportunity that comes your way.

Once ready for the clinical portion and upon being admitted to the program, it is highly recommended to move down to Indianapolis or the surrounding area. There are early mornings and late evenings when it would be to one’s advantage to live nearby if possible. This is an extreme change especially for those who have
never lived on their own. However, it is possible to find a roommate that is also in
the program so rent expenses can be shared. I chose to live on the west side of
Indianapolis because it is not only close to Methodist, but it is also closer to the
other rotational sites in Danville and Plainfield. I also decided that I would live in an
apartment by myself. I had never had a roommate before, besides my little sister,
and I did not want to be distracted if I needed to study or had work to complete.
Personally, I have really enjoyed having a place of my own even though it is quiet
and lonely at times. The arrangement has worked out well as many of my fellow
classmates also live on the west side. Spending fourteen months in the same
program and going through very similar experiences allows the class to become a
fairly tight-knit group. We were always making plans to go out for some fun after a
long week at the hospital.

First days are always a mixture of excitement and nervousness. These are
the emotions I remember feeling when I showed up for orientation on a Monday
morning. I was surrounded by eighteen people I did not know in a new environment
that was much different than a college campus. However, I began to relax a little
when I looked at the faces around me and could perceive that comparable
sentiments were felt by all. After waiting for what seemed like an eternity, seeing as
how we all had arrived exceptionally early not wanting to be late on the first day, our
instructors appeared and led us into a lecture hall. Once we all found a seat,
introductions began with the program director, Donna Thaler. She welcomed us to
Methodist and told us a little bit about herself. She then introduced us to our clinic
and classroom instructors, Dawn Smith and Liz Studor. They briefly shared
information concerning themselves and the program. Methodist security came in to briefly explain parking and we filled out the needed information for our permits. The radiation safety officer, Debby LeMay, came in to give a short presentation on the badges we would be receiving to monitor the radiation dose to which we would be exposed. She and all of the instructors repeatedly stressed that certain precautions are taken to limit this dose and we would learn all about radiation protection for ourselves and our patients throughout the program. This certainly eased my mind since I had little knowledge about radiography at the time and had already been considering the negative effects of radiation.

After these introductions and presentations, we were taken upstairs to the classroom in which we would meet for the majority of our classes. Along with all the tables and chairs, this room contained an old x-ray tube, table, and wall unit. We were told that this was the equipment on which we would practice positioning, but not to worry because it was not hooked up to make an exposure. There were also numerous view boxes, lighted devices used to see x-rays, and a cabinet with folders that were packed full of films.

We all took a seat and the instructors began passing out the program handbooks. These manuals contained all the routines and positioning for each exam as well as all the details of the program. Just about everything you would want to know about the radiography program is in this book. For the rest of the day on Monday and the entire day Tuesday we went through that manual from beginning to end reading every single page verbatim. I understand why this needs to be done and is important, but I am glad that I do not have to do that again.
There was so much information and I kept wondering what I had gotten myself into. I will not go into specifics about the contents of the handbook, especially for those who will be going through the program themselves. Just keep in mind that others have been through it and survived.

The instructors informed us of some important changes that had been made in the program from the previous year and that more changes are always possible. We needed to be flexible and adapt to any adjustments that might occur throughout the next fourteen months. One change was the new uniform required for the program. The dark, navy scrubs are much more appealing than the light green scrubs worn by previous students. My favorite thing about the scrubs is that they can be worn without tucking in the shirt whereas it was mandatory with prior students to have the scrub shirts tucked in at all times. Another change that was not quite as welcomed was the disposal of comp time. Comp time was additional time off that could be earned by attending educational meetings of radiologic societies or other qualifying events. One could use the hours collected to take time off during clinical rotations much the same way personal time is used in the workplace. Instead of obtaining comp time, we only work six hours every Friday as opposed to an eight-hour day. This arrangement is very nice since it makes for longer weekends. However, we still had a few, select opportunities to earn comp time, but not in the large quantity as in previous years.

Perhaps the biggest of the adjustments is one that included the whole radiology department as well as the radiography program. The hospital had just finished installing digital radiography equipment and the areas were now capable of
producing images without film. Digital systems are helpful since they allow for the manipulation of an image after the x-ray exposure which gives the technologists a wider range of error and decreases the need for repeats. PACS is the system which stores the images on a computer network. This network allows multiple people in different sections of the hospital to view the exact same image of a patient at the same time. It is an amazing development in radiologic technology.

After sitting down for two straight days it was nice to learn that we would be spending some time in clinic that week. The class would be split in half and some would come in on Wednesday and have Friday off and the rest would take Wednesday off and come to clinic on Friday. During our assigned day, we would rotate through six areas: besides, general, pediatrics, fluoroscopy, the outpatient Methodist Professional Center, and the emergency room. This was mainly to practice clocking in and out using the computerized timeclock, find our assigned lockers, and begin familiarizing ourselves with the department. Of course with my luck I had to come in on Friday. Even though a long weekend would have been great, it was nice to have a day off in the middle of the week following the explosion of information given to us on the first two days.

Thursday of the first week arrived and classes formally began. We were given a syllabus for each of the four classes in which we would be participating for the duration of the first semester in addition to Clinic 1. These courses were Procedures 1, Radiation Physics and Protection, Patient Care, and Introduction to Radiography.
Radiographic Procedures 1 includes the anatomy, positioning, and criteria needed for each image that is produced during any given exam. Detailed skeletal anatomy of the upper and lower extremities as well as the routine for each part is discussed. I remember a feeling of being overwhelmed in the beginning as we started learning all the terminology and routines that needed to be memorized. I had no idea that more than one image was taken for any given body part. For example, a hand x-ray requires three different images with the hand positioned three different ways. I was a little intimidated by some of the exams as they seemed awkward and difficult. I soon found that the more exams I performed, the better I became at being able to visualize how to position the patient to obtain an excellent image.

Procedures 1 also included a lab where we would actually get hands-on opportunities to practice positioning for routine exams. For these labs the class was divided in half and some, like myself, spent all day every Monday in clinic and had lab on Wednesday afternoons while the other half had lab Monday afternoons and would be in clinic all day on Wednesdays. As everybody arrived for lab we would write our name on the board in what order we wanted to complete our exams. Then Miss Studor would come and we drew cards that listed what exam we would be performing. We would act as each other's patients and position one another just as we would if we were in clinic completing that exam on a real patient. I always enjoyed lab because, even though it was part of the grade for that class, it was a great time to practice positioning and centering without some of the stress clinic can bring when you are just beginning. I also used the time to study films that we had
reviewed in class. Film critique is a very important part of being a radiographer as one must know how to correct an image that needs to be repeated. This reviewing has helped me numerous times when I have been in clinic and needed to repeat a film because I knew how to move the patient in order to correct the positioning. In addition, many of these images showed up on tests throughout the program.

Radiation Physics and Protection is taught by Mrs. Smith and you never know what may be in store for you in this class on any given day since she utilizes some creative methods to teach certain concepts. We were always told that students in this program are studying to be professionals and therefore must know every aspect of the profession. This is why we learned all about the design of the x-ray equipment and the circuit path by which x-rays are created. However, we did not just look at the diagram in the textbook, we became the human x-ray circuit. We were each assigned a specific part and we marched outside to spread out and form the circuit. Although it seemed a little crazy, I did find this very helpful to have a visual in mind when trying to remember the circuit path. Be prepared because this class is when you realize you will be using all those physics laws and principles you never thought you would.

Radiation protection is extremely important and probably the first concern of those just beginning. I remember feeling somewhat anxious about my exposure to radiation and how it would affect me. I quickly found out that every precaution is taken to assure the safety of the patient and radiographer. Numerous lead aprons that provide a protective barrier against the x-rays can be found throughout the department. Since cells are the basic unit of living organisms, protection education
starts with cell biology and the effects of radiation at the cellular level. We learned that radiation affects different types of cells in different ways as some are more sensitive to the radiation. Special care must be taken to keep the dose as low as possible. Dose limits for patients, health care workers, and different body parts are discussed as well as the details of how the badges used to monitor our dose of radiation work. I use the information gained from this class on a daily basis and allow the knowledge of the effects of radiation to prompt the provision of a safe environment for every patient to which I attend.

Patient Care was held in a different classroom and included radiography students as well as the radiation therapy and nuclear medicine students. Two important proficiencies learned in this class are training and certification in CPR as well as learning how to check vital signs such as blood pressure, heart rate, and respiratory rate. Even though I was already certified by the American Red Cross in CPR, the program requires certification through the American Heart Association because it is valid for two years. Everyone is required to successfully complete CPR in order to be certified during the entire program. We were given the chance to practice taking vital signs on each other before we had to prove our competency on this procedure. We paired up and recorded our partner's vital signs while an instructor checked our accuracy by keeping account of the recordings as well. Taking someone's blood pressure is not always as easy as it may look. We were given two attempts to correctly record blood pressure and I took both times. I am still working on improving my skill at this procedure and have been told that it will come with practice. Looking back, I wish I would have taken more time to practice
this skill during time in clinic. Therefore, I suggest performing blood pressure tests on another student every so often just to practice and improve one’s ability to accurately record these numbers as one must test out again in the fourth semester.

The Introduction to Radiography class is the only class we had first semester with Mrs. Thaler. We only had this class once a week for just a little over an hour. In this course we used the same textbook as our Patient Care class, but focused more on the specific things we would come in contact with as radiographers. The most important procedure we learned in this class was that of venipuncture. We had a lecture in Patient Care class that briefly covered this area, but we discussed it more in detail in this Introduction to Radiography class because we use a different needle than the other programs. We also had the opportunity to practice on a fake arm before we stuck each other. This practice is an essential part of radiography due to the fact that some exams require the use of a contrast material that is injected intravenously. The thought of getting stuck by someone who is inexperienced is somewhat frightening. Worse yet, sticking another person with a needle, having never done so before, is very intimidating as well. However, everyone must participate on both ends. One should be able to successfully find a vein and draw blood up into the syringe after inserting the needle. We were also told that another reason for sticking each other is that we are experiencing the feelings similar to those of our patients when they learn they will be receiving an injection. In spite of all the stress, it is true when they say that after the first time it is no big deal when it comes time to performing the injection in clinic.
The first semester in clinic was overwhelming for me. Rotations start the second week of the program even though you really have not yet learned that much about working with real patients. However, it is very helpful that first semester students overlap rotations with fourth, and final, semester senior students. New students will be on rotations with senior students throughout the first semester only. Senior students make sure the new students get to their area, know where to get linens to stock the rooms, and become somewhat familiar with that specific area. Senior students are able to answer any questions new students may have about the program, equipment and procedures in the area, or just questions in general. Towards the end of first semester the new class will then vote on a senior student whom gave of their time in order to provide assistance in learning the ropes during the first few weeks in clinic. I remember that this was a difficult choice because with the setup of the schedule it is impossible to rotate with everyone. I was one of the three speakers at last year’s graduation to present the Senior Student Mentor Award. It was exciting to look ahead and think about the fact that I would be the one graduating in a year’s time. It was hard to believe then that I would learn so much in such a short time and be the one walking across the stage and beginning my career.

In the mean time though, my life in Clinic 1 consisted mainly of finding my way around the department without getting myself lost and getting my objectives for each rotation completed. The department seemed so big with so many hallways and doors that I thought I would never get the hang of it. I remember always feeling as though I was in someone’s way and I had no idea what to do. I got up when a
technologist went to perform an exam so I could observe and I tried to soak in everything. Objectives are assigned questions for each area that must be completed during rotations. Writing down the objectives made me realize some things on which I needed to focus and remember. I was taught early on how to flash the cassettes with the patient information and process the images on these cassettes using the digital reader. This became my main job and I eventually became very comfortable with the digital system. However, I was thrilled when an order came in on an exam that we had already learned in class because I could perform the exam with the supervision of a technologist. I remember the first x-rays that I took were those of a hand and I was proud because I did not have any repeats. This is when I realized how much I enjoyed radiography. I knew it would be hard work, but this is what I wanted to do.

Since the first summer semester is a short one, we only spend one week in every area at Methodist hospital with a float week at the end where you are in a different area every day. I was assigned to the file room the very first week of clinic and I was dreading it because I really wanted to be in an area where I could work with the machines and interact with patients. On the other hand, this is the only rotation through the file room and it is helpful because it is a good chance to become familiar with the computer system and the medical record numbers of patients. I was taken out of the file room for a few hours, along with my rotating partners, by Mrs. Smith and Miss Studor for a surgery orientation. They showed us where to get surgery scrubs and the locker room so we could change. We then had to watch a video about sterile fields and what to do if something is contaminated.
After watching the video, they took us upstairs to surgery for the first time to look around. They showed us the dark room and where the leads are kept and then we got to go in on a case and observe. I was so excited and a little nervous because the equipment used for surgery was unlike any other I had seen in the department.

My week in file room ended and I began my first rotation in surgery. It all looked so complicated and it was hard to believe that I would be learning how to manipulate these machines more commonly known as C-arms. Since we were unfamiliar and had no experience with the C-arms, our job was to help the technologists and senior students move the C-arm along with the monitor into the room and set up in preparation for a case. We would then go along with a technologist to observe how to perform the case. There are so many locks and ways to move the machine that I thought I would never understand the equipment. After the surgeons were done with x-ray, we would unplug the machine and take it back out of the room. My best experience in surgery during that first week was a case where the surgeon told me what he was going to do and even let me come around behind him to look into the incision he had made. He pointed out the fracture and explained how he was going to fix it. I went back around to the machine and the technologist I was with let me push the exposure button when the surgeon asked for an image. This may not seem like such a big deal, but I thought it was great that the surgeon took the time to let me see from his point of view as he described the extent of the damage to me. Pushing the exposure switch forced me to pay careful attention to what the surgeon wanted so I could get into the habit of listening to instructions through surgical masks that often muffle the voice. I felt
more at ease and looking forward to the next time I was in surgery when I would actually have the chance to try to operate the equipment myself.

Pediatric radiology was my next rotation and I was really looking forward to this area because I always wanted to work at Riley hospital once I finished my education. This area is relatively small compared to some of the others in the hospital. There are only two technologists that work here on a regular basis. They are excellent with the children that come in and they really know their stuff. Just as in any medical practice, pediatric radiography is considerably different from adult radiography. I found out that it is much tougher than some may think. It really does take a knowledgeable person to be able to get on a child’s level and explain the exam in terms the child can understand.

Area One is the term used for bedside and general x-ray. This is the main section of the department where inpatients and outpatients alike come to get plain radiographs. For those patients who are unable to come down to the department for various reasons, we go up to the floors and use mobile machines to perform some exams at the patient’s bedside. Most of these exams are usually chest x-rays. There are five examination rooms in Area One including four general rooms and a chest room which is a completely digital system. There is no need for cassettes or a reader in this room as the image will automatically come up on the screen seconds after the exposure is made. This is an efficient and convenient workspace because one will learn quickly that chest exams are the x-ray special twenty-four hours a day, seven days a week. Resourcefulness is a must because of the high volume and diversity of exams that are performed by the technologists in
this area. It was my fourth week in clinic and still I was surprised by how much there was to accomplish when working in this part of the department. I remember getting so confused when I was shown the different steps that must be taken when doing any paperwork for inpatients, outpatients, or bedsides. The inpatients need to be “sent for” so transportation will bring them down, “arrive” and “begin” all bedside requests, and do not forget to send patients back to their rooms after completing an exam. It all seemed to blur together and I did not even know where to start. However, I found the technologists were tolerant and accepting whenever I made a mistake and would take the time to show me the process again while giving me encouragement and telling me I would catch on.

The week we worked evening shift of the first semester we were in Area One, but with a different group of technologists. One nice thing about this arrangement was that we had been familiarizing ourselves with the equipment in Area One and felt a little more comfortable with it. On the other hand, every thing else about working evenings was totally different than during the day. The evening shift was responsible for all other areas including surgery, pediatrics, and fluoroscopy since the technologists from these areas would be leaving for the day. It was like they took the whole department and compacted it into two areas: Area One and the emergency room. If there was a surgery case that needed imaging then a nurse would call down to Area One and someone would go up to perform the case. Any pediatric or fluoroscopy exams would need to be completed as well. All of this was in addition to the bedsides, inpatients, and any left over outpatients that needed x-rays. There would normally be several technologists working in the
emergency room downstairs. The evening technologists take turns rotating through the emergency room so the same people are not working down there every night. The evening crew is a fun group to work with and they are really good about standing back and letting you do exams unless you need some help. The only downside is that your sleeping schedule gets changed and it is hard to get into a routine since you are only on evenings for one week.

I was looking forward to my next rotation in the emergency room because I had heard that there was always something to see. This area requires the most critical thinking since the majority of patients are in pain and may be unable to move exactly as we would like for our images. My goal for the first semester was to become acquainted with the layout of the emergency room and to know the location of each numbered bed. This is essential because after you receive an order you must go find the patient and bring them to x-ray for the exam. I also watched closely as the technologists would unhook the patients from the vital signs monitor in order to move them and then later hook the patients back up once they were brought back to their assigned room. It is critical that the patient is hooked up correctly because the nurses are constantly observing the patient’s vital signs in case of any change.

Things really get busy when a trauma one comes in to the emergency room. This is a patient who is usually in serious condition and has come by ground in an ambulance or by air in the Lifeline helicopter. Their estimated arrival is announced throughout the emergency room and staff makes necessary preparations. There are only a couple of local hospitals that meet the requirements to receive and treat
these critical patients. One great thing about going through clinical at Methodist is that you do get hands on experience with a wide variety of patients and situations.

The next rotation on the schedule was fluoroscopy, the area that surprised me the most during my observation because I was completely ignorant of the existence of the barium studies that are performed. These exams require the use of a contrast agent, most often barium, to visualize the organs of the digestive system that do not appear on plain radiographs. Depending on the section of digestive anatomy being examined, a patient may be required to drink the barium, have it inserted rectally, or have it introduced through a tube that is placed down the nose to the beginning of the small intestine. The radiologists are able to watch as the contrast moves through the patients’ body because the fluoroscopy unit works much like a video camera, using live x-ray. There are a number of supplies needed for each exam and the type of barium depends on what exam is being performed. This was the area that I really used my notebook to write down what was needed for each exam because it was a substantial list. When I returned to fluoroscopy the second semester I was glad I had taken the time to write down everything. A little warning for future students that I wish I had before starting the program is to be ready to insert the contrast into any opening. Furthermore, be ready for it to come back out!

The last rotation of the semester arrived faster than I expected. I was scheduled to be in MPC, the Methodist Professional Center. This area is located in a separate section of the hospital away from the main radiology department. It is more of a clinic type setting as they regularly perform exams on outpatients and
Methodist employees. This is where all the lung transplant patients come to have follow-up chest x-rays. As I mentioned earlier, you become a pro at chest x-rays before you officially learn positioning in class. Another common exam to this area is an IVU, or intravenous urogram, which requires us to inject contrast material into the patient's vein. An IVU is a study of the urinary system from the kidneys to the bladder. This exam requires a lot of images and I thought these would be impossible to learn.

MPC is a good area for students in that most of the patients are able to cooperate and easily move into any reasonable position. One thing that I did not like was the equipment in the rooms. It is older and not as practical or user friendly as some of the newer equipment in main radiology. I remember being in the middle of performing an exam and not being able to move the tube into the position I wanted. I found it somewhat frustrating and embarrassing to have to ask a technologist for help in front of the patient. Then I realized that I should not get discouraged because everyone has had to learn something new at one time or another. I decided I would make it a priority to practice manipulating these x-ray units during free time in between patients until I became comfortable.

First semester had finally come to an end and I found myself slowly becoming more comfortable with the daily routine. I had already learned so much in such a short time. By this time, I knew the detailed anatomy and was able to perform exams for all of the upper and lower limbs. The senior students were graduating and so from here on out it was up to me to remember what to do when I made my rotations through each area again.
Class time is considerably reduced in second semester since there are only two classes. Procedures 2 and Principles 2 pick up where first semester ended and continue to build upon the basic concepts. Procedures 2 is again taught by Miss Studor and labs are still an essential element to learning the remaining exams. It was a shock to us all when during one of the lab periods we were instructed to undress and change into hospital gowns. After coming back into the room, all the while trying to keep our gowns closed in the back, we were told this was an exercise used for us to experience the same vulnerability as our patients.

Another opportunity that promotes patient empathy is the taste testing day. The menu consists of five types of different contrast agents: crystals, thick barium, thin barium, barium paste, and gastrografin. The crystals are sour and fizz like seltzer tablets when they mix with liquid. The purpose of these crystals is to put air into the esophagus and stomach so these organs will expand and be better visualized. We always tell the patients not to burp after swallowing the crystals, but we found out how hard that is to accomplish. Needless to say, we had an excellent burping contest afterwards! The thick, thin, and paste are all various consistencies of barium. Even though it is all barium, each one has its own unique flavor and texture. I struggled the most with the paste because it is worse than peanut butter when it comes to sticking to the roof of your mouth. Of all the contrast that we sampled that day, gastrografin was by far the worst. It is a yellow, syrup-like fluid that smells like a lemon cleaning solution. This is what is used when a tear in the digestive system is suspected, such as in the stomach or large intestine. The body naturally eliminates the water soluble gastrografin if it does leak out of the digestive
system whereas barium would not be absorbed by the body and would require surgical removal.

Radiographic Principles is taught by Mrs. Smith and by the end of this class you will know anything you ever wanted, and then some, about the four radiographic concepts of density, contrast, detail, and distortion. Classes are only during Tuesday and Thursday afternoons with lab schedules being the same as the preceding semester. This allows for more time to be spent in clinic practicing exams on real patients.

One must shift into higher gear throughout clinic time when second semester arrives. This is when you begin testing your skills by performing competency exams. A competency is an exam you perform for a grade without any assistance from a supervising technologist. You are required to position the patient, set a technique, and critique the images. These competencies demonstrate your knowledge of any given exam on a real patient. A list of the sixty-one required competencies is provided to keep track of your progress. Do not be alarmed by the number as this count includes several observational competencies as well as final test outs on the technique panel, vital signs, CPR, monitor hook up, and venipuncture. I know the list seems long at first, but once you start passing the exams and marking them off it does not appear as long as it once did. It is mandatory for every individual in the program to have at least eighteen successful competencies for the second semester. Although I was nervous the very first time I performed an exam for a comp, I will never forget the joy I felt when I discovered
that I had passed. The satisfaction I experienced was worth all the hard work that it had taken to get me to that point.

There were some new clinical areas, in addition to repeating previous rotations, since the fall semester was much longer than the summer one. We would spend one week at Hendricks Regional Health in Plainfield and two weeks at Hendricks Regional Health in Danville. Plainfield is more of a clinic setting so most patients are walking around and in good condition and can usually hold any position needed for an exam. On the other hand, Danville is the main hospital of the county so there is a broader array of patients although it does not compare to Methodist. The reason for these rotations was to give us experience working in smaller facilities and with plain film as these two locations did not have digital systems.

First rotations at these sites were rough for me. I think a lot of it was because many things were done so differently than what I had become accustomed to at Methodist. I also did not have the advantage of having any senior students around to orient me to the area and the technologists. I discovered it was best to be up assisting and asking questions until I became familiar with their practices because that was the only way I was going to learn.

Two rotations that only applied for second semester included a week in triage and a week in myelograms. The triage rotation consisted of visiting an assortment of areas each day of the week. The rotation is named for the Friday observational rotation to the emergency room triage front desk. Triage in the emergency room means sorting patients and setting priorities based on the urgency of the situation. It was interesting to watch as patients first entered the emergency room and staff
gathered information and performed initial vital signs. I was amazed as I listened to some of the patients' stories and was shocked by the crazy things people do. The days leading up to this are spent observing in the reading room, MRI, CT, and a few hours working in the file room.

Myelograms are contrast procedures performed to view the spinal cord. There is a special room in the fluoroscopy utilized for these exams. The patient must lie on their stomach so the physician can insert a spinal needle into the lower back. Once the needle is in position a contrast medium is injected and the spinal cord can be visualized. Lumbar punctures are also performed in the myelogram room. The difference between the two is that the purpose of a lumbar puncture exam is to insert a spinal needle in order to collect a sample of spinal fluid to be sent to the lab for testing. The needles used for these exams are longer than the needles most people are used to seeing. This, combined with the fact that the patients are conscious during the procedure, can be somewhat uncomfortable to watch. I remember the first time I observed the needle placement I had to look away because I felt a little dizzy. However, it is one of those things you get used to after seeing it performed a number of times and I have not had any more problems.

One of the final projects required to complete the second semester of clinic is an oral presentation of a case study in which you were involved. During clinic time you will come across different signs of diseases that can be visualized on your images. This pathology is the topic of your case study so you must obtain an understanding of the specific disease by researching information found in books and from speaking with radiologists. Hard copies of the images taken during the
exam illustrate the signs of the researched disease to your classmates. The assignment provides practice in research and public speaking as well as useful information to other students.

Second semester came to a close and we were halfway finished with the program. By this point we had learned the remaining routines including the barium and skull exams. We now were able to do any exam that was ordered and this was exciting. Although it may seem rough at times since the program is condensed and everything is thrown at you so fast in such a short period of time, it makes your progress even more noticeable. I felt ten times more comfortable in what I was doing and I had built more confidence in myself during the seventeen weeks of this semester than I thought possible.

Third semester classes were slightly different than what we were previously accustomed. Once again we had two classes: Procedures 3 and Radiographic Pathology with the meeting times still the same. However, this procedures course did not call for lab time because we were learning about special procedures. Special procedures included, among many things, the various radiographic modalities such as MRI, CT, and ultrasound. I really enjoyed studying about these specialty areas since I think I would someday be interested in specializing in MRI. It was helpful to take a brief glimpse into the mechanics of this modality so I would not get myself into something I disliked. To further our education of special procedures, we were each assigned a specific exam on which to compose a research paper. We needed to compile information as to what the exam demonstrated, how to perform the exam, any special supplies used, and the reason for completing the
exam. References were required to be published books, peer-reviewed articles, or information from a reputable source. Facts about some of the more uncommon exams are not easy to find so this is a project that cannot be put off to the last minute. Starting my research early saved me from plenty of heartaches later.

I found our pathology class extremely interesting because some of the radiographic appearances of certain diseases are so odd. We were required to memorize all of the signs and symptoms that went along with every disease. This practice demonstrated the importance of taking careful patient history when performing exams. It shows how much a radiologist can depend on the history we record to help make an accurate diagnosis. The thing I found remarkable was when I could understand the radiologists or technologists as they were discussing a certain disease. It felt good to have the ability to follow a conversation and recognize how the pathology is manifested on an image.

The goal for third semester clinic was again eighteen successful comps. In addition, we were required to have ten successful rechecks as well. Rechecks are exams that you have performed for comps from a previous semester. The reasoning behind rechecks is to prove you have retained the ability to perform an exam. Once you have passed a recheck on a specific exam, you cannot recheck on it again.

We began our third rotation through the clinical areas of surgery, surgery evenings, pediatrics, bedsides, general, ER, ER evenings, fluoroscopy, MPC, Danville, and Plainfield. Since we were studying special procedures in class we
had two weeks of rotations in clinic to observe in some of the specialty areas as well. The first week of specials included rotations to Ortho Indy, emergency room CT, cardiac cath, radiation therapy, and special procedures. Ortho Indy is the private office for the orthopedic physicians who operate at Methodist. This office is located in the outpatient section of the hospital and the patients consist of follow up surgery cases. The patients come to the office for x-rays to confirm that all is healing well after surgery. This rotation provides an opportunity for students to gain experience in a busy outpatient office. The emergency room CT can be a busy place. Most of the trauma one cases are sent here so there is always something interesting to see. It is so fascinating to be able to view the body in cross-sectional slices. Cardiac cath is where all the heart catheterizations are performed. The physician inserts a catheter, small tube, at the area of the groin and manipulates it up to the heart or coronary arteries. Once in place, a radiographic contrast is injected to visualize the anatomy. If a blockage is found in a coronary artery then a balloon on the catheter can be inflated or a stent, small wire mesh, placed to open up the vessel and allow better blood flow. Radiation therapy is an extremely precise and effective method of utilizing radiation for the treatment of cancer. I was surprised by the size of the space and equipment required for these treatments. The rooms have a long hall leading from the control panel to the actual machine so the therapists view their patients during treatment on a monitor. The last area in this rotation was to the section of the department designated particularly for special vascular procedures. Procedures performed here may include placing filters,
stents, or contrast studies to view the vessels of organs such as the lungs, liver, or spleen. The details of each exam are discussed in the procedures class.

Rotations during specials week two include main and outpatient CT, MRI, lithotripsy, nuclear medicine, and ultrasound. We visit main CT this time in order to observe a biopsy which consists of removing a small sample of cells or tissue from the patient’s body. The sample is then analyzed using a microscope to diagnose specific diseases. The physicians use CT in order to locate the size and position of a mass. Unlike conventional radiography or CT, MRI does not produce radiation, but instead uses a magnet to create images. I found that MRI requires a lot of patient cooperation in that it is exceedingly important to hold still. I had not realized that if the patient should move, even just slightly, that an entire scan, lasting anywhere from twenty minutes to half an hour, would need to be repeated.

Lithotripsy is a procedure that uses shock waves to crush kidney stones. After being sedated, the patient is placed into a large tank filled with water. Fluoroscopy, which is continuous x-ray, is used to locate the stone and center it with the path of the shock waves. Once this is accomplished, the spark plug found in the bottom of the tank is ignited and a shock wave is produced. Nuclear medicine uses radioactive materials that require special handling. The hot lab is the area in which these materials are stored. I enjoyed observing as the radioactive materials were drawn up in syringes and injected into patients. After the patient received the injection they would be placed under a radioactive sensitive camera that would produce an image. The images collected show areas of concern according to the amount of radioactive material found in a particular site. Ultrasound uses sound
waves instead of radiation to produce an image. What many people do not realize is that ultrasound is used for so much more than just prenatal imaging. Ultrasound is used to visualize organs that do not normally appear on plain radiographs, such as the gallbladder. It can also be used to determine whether a mass is solid or fluid filled. However, I will have to say that my best experience in this area is when I was able to see the tiny heartbeat of a three-week old embryo.

As part of our third semester clinical grade we were required to take a test that covered everything we had learned in the program up to that point. It had been set up to simulate the national exam we would be taking after graduation to obtain our license. The catch was that we were not told on what day the test was scheduled. The main point was to test what we had retained and give us an idea of what we needed to review before taking our national exam. Another portion of our grade depended on giving another oral presentation. However, this time it was a review of a journal article that pertained to radiology. We were to summarize the article in our own words and present our findings to the class.

The best thing about this semester of clinic is the National Football League draft in February. All college seniors who want to play professional football must participate in the NFL draft. These players come to Methodist hospital for all their x-rays. Along with the routine chest x-ray, we take images of anything a player previously injured. This is an exciting thing to be a part of as not every hospital can offer this opportunity. The technologists really depend on us for extra help so this is one of the rare occasions that additional time off can be earned. Even if you do not
have an interest in football, this event is a lot of fun and a good chance to become better acquainted with the technologists in a different atmosphere.

Third semester came to a close as we began discussing the outline of our final semester. There are no didactic classes during fourth semester so it is an excellent time to begin studying in preparation for the national exam. Therefore, we meet for review every Monday afternoon with Mrs. Thaler. We take several practice quizzes and then go through all the answers to understand why the other choices are wrong. Then there are individually scheduled times during clinic to go up to the computer lab to complete some computer tests. In addition, fourth semester requires both a case study and journal review presentation. These are the final assignments of the program and when these are finished you feel as though you are home free.

I love fourth semester clinic because it is as if you are working as a technologist since you are able to perform exams without direct supervision. You feel comfortable returning to each of the areas since this is the fourth rotation and your confidence continues to increase. This is the time when it is necessary to finish the list of comps as well as perform ten more rechecks. A few of the exams on the list, especially skull work, are rare and therefore may be simulated. Simulations are much like procedure labs in that you position for each exam on a fellow student and then an instructor checks to make sure you have performed it correctly. The only difference is now you also have to set the technique panel properly. Once I finished simulations it felt good to mark these exams off my list and sense that I was a little bit closer to graduation.
Well, here I am merely two weeks from graduation and I could not be any more excited! Looking back it has gone by so much faster than I imagined it would during that first week a year ago in May. It is ironic that I can see a reflection of myself when I watch this year’s new students just starting out on their journey. I know what they are feeling and how hard it can be in the beginning. I remember being there myself and wondering how I would get through it. Soon it will be their turn to take over where we leave off and the circle will continue. They will have stories of their own to share and memories that will last.
References

These pages are dedicated to the sources from which I benefited throughout the clinical portion of the program at Methodist including textbooks, professional journals, and personnel.


13. Lynnette Fulk, BS, CNMT, RT(R), Patient Care Instructor.

14. Dawn Smith, AS, RT(R), Clinical Coordinator, Ball State University/Clarian Health-Methodist Hospital Radiography Program.

15. Elizabeth Studor, BS, RT(R), Instructor, Ball State University/Clarian Health-Methodist Hospital Radiography Program.

16. Donna Thaler, MSM, RT(R)(M)(QM), Program Director, Ball State University/Clarian Health-Methodist Hospital Radiography Program.

17. All the radiologic technologists, too numerous to list, at Methodist, Danville, and Plainfield!