
Mentoring and the Nuclear Medicine Technologist

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Mentoring has a rich tradition throughout history. Capable instructors and experienced nuclear medicine technologists guide the path of the new trainee, with success being determined by the quality of the mentorship that takes place. This article provides an overview of mentoring for nuclear medicine technologists, including what it is, how it can work, and what benefits it may provide. Advice on improved application of mentoring is also presented.

Key Words: mentor; mentee; mentoring; leadership; career

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To become a nuclear medicine technologist (NMT), one embarks on a journey to gain both knowledge and wisdom. To achieve this end, the technologist's training involves didactic learning and a hands-on clinical internship. Capable instructors and experienced technologists guide the path of the new trainee. The success of each NMT is determined by the quality of the mentorship that takes place. The word *mentor* comes from a character in one of Western society's oldest written tales, Homer's *Odyssey* (1). In this story, Odysseus has gone to fight in the Trojan war. He leaves behind his son, Telemachus, to help Penelope, Odysseus's wife, run the kingdom in his stead. One can imagine that Odysseus was concerned about how his kingdom would manage without him and how his son would adjust to the challenges and pressures of his new responsibilities. Fortunately, Odysseus had a trusted friend by the name of Mentor, whom he charged with his son's education and training to prepare him for the task. It was fortunate that Odysseus set up this relationship because he would be gone for 20 years and his son would face challenges beyond his wisdom and experience. Mentor guided the young Telemachus, and

it was because of this relationship that Telemachus was successful in preserving his father's kingdom (2,3).

The goal of this article is to give an overview of mentoring for NMTs. Definitions will be provided of what mentoring is, followed by a description of how mentoring can work, including the different methods and techniques. Next, the benefits of mentoring will be discussed. Finally, advice for improved application of mentoring will be presented. Throughout, this article will discuss how mentoring applies to the NMT.

THE MENTORING ENVIRONMENT

A mentor is a person who achieves a one-to-one developmental relationship with a learner and whom the learner identifies as having enabled personal growth to take place (3,4). The learner in this relationship is called the mentee. Mentors have 2 primary focuses (5). First, a mentor provides career-related support by increasing a mentee's exposure, visibility, success, and advancement in an organization and by providing coaching, protection, sponsorship, and challenging assignments. Second, a mentor provides psychosocial support by contributing to the mentee's sense of identity, providing friendship, confirmation, counseling, and role modeling. In a typical scenario, a senior-level individual acts as the mentor and a junior-level individual is the mentee (6,7).

A mentoring relationship can be formed in a couple of ways (7,8). First, a formal arrangement can be made in which a mentee is assigned a mentor, as in the case of Telemachus and Mentor. This arrangement can be through a program within a business or organization. Usually, such programs have specific steps, goals, and timelines. When a student enrolls in an NMT program, the instructors and technologists are essentially assigned as mentors. They are responsible for guiding the training of each student. They need to first present basic concepts of radiation health and safety, mathematics, physics, instrumentation, chemistry, physiology, and anatomy. Once the students transition into the clinical setting, their mentor technologists are responsible for demonstrating the application of these skills and monitoring the students' progress as they begin to perform new procedures. Next, the mentor has the important

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task of helping students see how the concepts they learned in the classroom guide the decisions they make in the clinic. Finally, the mentors test and approve the competency of students in the numerous procedures they might be asked to perform once they find employment. There is a limited time frame in which the students must complete their programs and prepare for their certification examination. This formal mentoring can be challenging because the mentor and mentee do not have much freedom in selecting whom they will work with beyond the application, interview, and selection process. The ability of each mentor and mentee to engage in the mentorship process will dictate their success.

There is also a second, more informal, way in which a mentoring relationship can be established. Informal mentoring is more likely to occur in the working environment as those who have less experience seek out support and insight from those who have more training or are in an advanced stage of their career. This type of mentoring is one in which NMTs can find opportunity and growth in their career as they become proficient in the work and their tasks begin to feel routine. In the informal approach, the mentoring relationship can develop more naturally as people with similar goals and motivations build a rapport of teaching and wisdom sharing.

Both formal mentoring and informal mentoring have strengths and weaknesses (7,8). The type of setting to pursue depends on the goals and direction desired. A subgroup of these 2 settings is peer-to-peer mentoring (9). Here, the clear difference in status between mentor and mentee in traditional mentoring does not exist, but people who are working together at a similar level share ideas and experience from their unique perspectives. Peer mentoring often happens in the NMT workplace. Each NMT has different skills, experiences, and strengths. As peers interact with each other, they can choose this valuable mentoring approach by asking each other questions and seeking to share tips that they have learned during their daily work. Peer mentoring can be uniquely rewarding because it can provide advice, empathy, and support by coworkers of similar status.

Within each of these classifications of mentoring, there are approaches that can bring different benefits and can be customized to the need at hand (Table 1). One such modification is situational mentoring (10), which is usually a short-term relationship with a specific purpose. Someone

from an outside organization is brought in to provide training for a specific task. An example is when new technology is going to be used in the facility. The arrival of a new camera or radiopharmaceutical is often accompanied by hours or days of training. The trainers act as mentors because they instruct and then share insights from their experience that help prepare the NMTs to successfully use this new technology after the trainers have left.

A second approach often used in the health-care setting is supervisory mentoring (11). Certain individuals are nominated as the go-to people for questions and clarification. For NMTs, these individuals are usually lead technologists or department supervisors. Based on their experience, they can advise others on the best course of action in a challenging situation. This type of mentoring relationship can sometimes be less productive because of its authoritative nature. Having an open exchange may be difficult if there is fear of reprimand or consequences.

A third approach, the mentoring circle, is one in which participants from different levels within an organization come together to address a topic or challenge, allowing sharing of insights from each perspective (12). Then, the group learns holistically how best to solve the challenge at hand. This gathering may take the form of a daily huddle between technologists and management to best plan and coordinate each day. Alternatively, the leaders of an organization may formally meet to address how to implement a new program or reduce errors in workflow. The strength of this approach depends on each participant's owning the idea and being motivated to become more knowledgeable and grow. The process can be applied over the long term and can produce good results.

Another approach is flash mentoring (13), in which a low-pressure environment is created with a focus on single meetings. This alternative to the long-term mentoring relationship can help build quick improvements and teach new skills. Job shadowing can be a useful application of this technique. For example, an NMT could spend a short time in the MRI suite to better understand its workflow and processes and to improve coordination between the 2 departments.

A final mentoring situation that can add valuable insight is mosaic mentoring, in which people from an underrepresented group are invited to share their unique perspective with the majority group (14). Taking time to understand

TABLE 1
Types of Formal, Informal, and Peer-to-Peer Mentoring

Type	Description
Situational mentoring	Short-term situation with specific purpose
Supervisory mentoring	Experienced leader who coaches and guides
Circular mentoring	Different levels of leadership meeting at a common level
Flash mentoring	Single meeting to quickly attack specific issue
Mosaic mentoring	Involvement by underrepresented groups to improve perspective

TABLE 2
Mentoring Techniques

Technique	Description
Accompanying	Committing to a caring and quality process
Sowing	Preparing mentee for success through upfront effort
Catalyzing	Driving rapid change and growth by turning up pressure
Showing	Demonstrating how something is to be done, with emphasis on details
Harvesting	Focusing on the desired outcome; asking questions so that mentees make conclusions for themselves

issues from viewpoints that one has never considered can bring to light improvements in many situations. This approach can be useful in health care because treatment of such a diverse group of patients can be difficult without some understanding of their ideals, traditions, and cultures.

MENTORING TECHNIQUES

Each mentoring environment has unique strengths and advantages (Table 2). No matter the setting, it is the quality of the process that should be the focus. In each setting, it is important to concentrate on the mentoring experience. To this end, a variety of techniques are available to improve the outcomes of mentoring. Successful mentors apply these techniques to maximize improvement in their mentees. Here are 5 of the most common techniques used in business (15).

The first is called accompanying. Accompanying is committing to a caring mentoring process. The mentor works alongside the mentee. By so doing, a bond is formed that can build trust and allow for the greatest personal growth. Many NMTs have valuable memories from their initial training because of the bonds that were formed with their mentors. These bonds are the foundation of mentoring.

The second is called sowing. Undertaking a new challenge or developing a new skill can be difficult because the mentee often does not understand the breadth and depth of the task ahead. The mentor has the arduous task of preparing the learner before that person is ready to change. It takes vision to sow in the mind of a mentee the seeds of change. If one has never harvested a new crop, it is a challenge to understand the process or even comprehend how much work is needed to reach the end goal. Sowing is conveying new ideas to a mentee who may not initially understand or even accept them. However, the mentor's wisdom will eventually be realized, and the mentee will begin to make sense of these new concepts. This breakthrough often happens when the mentee faces a situation that elucidates a principle previously given. It is then that the mentee has a moment of epiphany and declares, "Now I understand what that means" or "Now I can see why they said that." Sowing is the consistent effort of the mentor to plant the seeds of wisdom.

The next technique is called catalyzing. In a chemical reaction, energy needs to be invested to bring about a change. As the energy level increases, the likelihood of change increases. Sometimes, a catalyst is needed to push the reaction to completion. In catalyzing, the mentor places the mentee

into a situation of increased pressure to accelerate the learning process. When the learner is placed into this environment, several positive things can happen. First, the challenge of the situation can provoke a different way of thinking. Next, it can cause a shift in identity. Finally, it can bring about a reordering of values. The mentee needs the added level of pressure or challenge to increase the need to adapt and therefore learn and grow. Catalyzing is an aggressive technique that needs to be closely monitored to guide the desired outcome. In some situations, failure can be allowed, because mistakes are often our greatest instructors. One good example is allowing a technologist to attempt a quality control procedure for the first time. If the mentee fails, instruction can be given and the test repeated. However, when failure of the procedure would risk harm to a patient, the mentor needs to closely monitor the procedure and intervene if a mistake is about to be made. Catalyzing can come with some risk but, if done correctly, can produce the most growth.

Another method is called showing. In showing, the mentor demonstrates a skill or activity for the mentee. Some tasks are difficult to describe and are best demonstrated. Medical procedures often fall into this category. Showing how a task is done before the mentee first attempts it can provide insight that is difficult to verbalize. In addition, if the mentee has previously performed the task, a demonstration can improve the mentee's performance. During the demonstration, the aspects of the task that need more attention or further modification are emphasized. The mentor has the advantage of having mastered the technique and can bridge the gap that was preventing the mentee from achieving mastery.

Finally, a technique called harvesting can be used. In this approach, the ripe fruit is picked (i.e., a focus is placed on what the desired outcome is). The mentor seeks to create in the mentee an awareness of what was learned during the experience. The mentee is then guided to making conclusions and thus cements the concept. This technique is most effective when the mentor uses questions to guide the mentee's thinking process in coming to conclusions. The key to internalization of the concept is asking questions such as "What did you learn?" "Why do you think that worked?" "How is that useful to you?" and "Why is this important?" Socrates used this method with those who sought to learn from him, and history records its effectiveness.

Accompanying, sowing, catalyzing, showing, and harvesting are frequently used because of their ability to

TABLE 3
Mentoring Benefits

Mentor	Mentee
Improved wellness	Improved wellness
Renewed appreciation for career	Increased interest in career
Professional development	Professional development
Improved leadership skills	Guidance
New perspectives	Coaching
Knowledge gained from mentee	Life and professional skills
Personal development and growth	Improved confidence
Ability to invest in the future	Goal setting

provoke change and growth (15). Other techniques exist as well, but the success of any technique depends on the quality of the relationship between the mentor and the mentee. Building this relationship can require much investment, but embarking on such a journey brings many rewards.

THE BENEFITS OF MENTORING

At any stage in your career, you can find opportunities to work as a mentor or a mentee (16). Both roles have many benefits (Table 3). Because of what you have done so far, you can be a mentor and give to others. If you are in the mentor role, you can grow through this process as well. Being a mentor can improve your leadership skills and thus aide in your own professional development. One valuable area of professional development that comes with mentoring is self-reflection, which can lead to an increased appreciation for your career and for what you have invested to get where you are. Being a mentor also allows you to invest in the future generation, and the fruits of this labor can outlast your own gains. Mentoring can allow you to learn from your mentee in what is known as reverse mentoring. Here, the mentee can give you a new understanding of what you already know or even add to your skill set. Overall, being a mentor can improve your health, energy, and well-being because the act of investing in someone can take your focus away from your own pressures and stresses (17–22).

You probably got to where you are because of valuable mentors in your life, but there is always room to learn and grow further. Remember the benefits of being mentored, and seek new opportunities. As a mentee, you can learn new life skills and professional skills. You can seek professional growth. Career coaching is valuable to help you move to the next level. Finding a mentor can help you improve your confidence in your current role or seek a new and more challenging role. A mentee relies on goal setting to drive growth. It is valuable to seek guidance from those who have a greater employment status than yourself. As you seek new opportunities to be mentored, you can experience sustained or renewed interest in your career, because often, what is not growing is dying. Finally, a mentee mindset can improve your health and well-being

because of the energy and excitement that come from seeking new challenges and growing as an individual (23,24).

TIPS FOR THE MENTOR

If you desire the benefits of being a mentor but are not sure where to start, here are a few tips (Table 4) (25–31). First, no matter how far along you are in your career, you can mentor others. If you have been working for a long time in your field, reinvest what your mentors gave you into those who are just starting out. If you are early in your career, do not underestimate what you have learned so far. Find peers or students with whom to share your knowledge. You may be a great support because you have gone through the same challenges that they soon will face or are currently facing.

Once you have found a mentee, commit time and energy to that person. Any good partnership takes time to develop. You should ask questions to understand your mentee’s motivations and goals. Establish a regular schedule to discuss progress and to evaluate goals and future directions. Be clear about your expectations regarding this schedule so that your mentee learns to value your time and use it appropriately. The endeavor will be more successful if you first develop a good framework.

After you have established this basis, look for opportunities to give good feedback—direct information that the mentee can act on. Feedback can sometime be perceived as criticism. If you explain your reasoning for the feedback, it may be received in greater accord with your intent and help spur growth and improvement. It is in this aspect of mentoring that the time you spent developing a bond pays off.

Finally, do not settle for simply guiding your mentee, but look for ways to advocate and promote as well. Recommend that your mentee be considered for new projects, and suggest opportunities for growth. If you have had a good relationship with your mentee, you will want to see this person succeed and you will be in a good position to write letters of support or endorsements on social media. The success of your mentee is where lies the true reward for your efforts.

TIPS FOR THE MENTEE

If you are looking for ways to grow and improve in your career, seek a mentor (25–31). One great way to find a formal mentoring opportunity is to become involved in your professional society, as the many opportunities for growth

TABLE 4
Mentoring Tips

Mentor	Mentee
Find someone to mentor	Seek opportunities for growth
Invest in your mentee’s success	Value your mentor’s time
Give open, honest feedback	Value feedback and act on it
Sponsor and promote	Build trust by being dependable

and leadership development in such societies are among the best benefits they offer. Some organizations have formal internships or leadership programs for which you can apply. Regarding informal mentoring, you may find that opportunities abound in your working environment if you look for them. Perhaps you would rather not directly ask someone to be your mentor because of feelings of awkwardness or a fear of rejection. If so, instead of asking directly, find people at work and in your professional organization who have similar goals and ambitions, and learn about what they do. Offer to help them with projects they are working on, or volunteer to help on a committee that they lead. Do not be afraid to share your ideas, as some great mentoring experiences can result.

Value your mentor's time. Come prepared. Use time with your busy mentor to work on focused objectives. Avoid wasting time in catching up or socializing or in asking questions for which you can find the answers yourself. Listen carefully to your mentor's recommendations and do your best to act on them so that at your next meeting you are prepared to report on your progress. If you can show results from the mentoring process, your mentor's excitement, efforts, and commitment to continue investing in you will increase.

Focus on having an open, objective mind. If you are feeling an emotional response to feedback, try to understand your mentor's perspective. Increase your understanding by asking direct questions such as "How can I improve?" "What do I need to understand better to be effective?" and "Should I be doing something that I am not?" The more often you ask for and accept feedback, the faster you will grow and the more your mentor will benefit from the relationship.

If you are diligent in your efforts with your mentor, you can build a real ally who will want to create future opportunities for you by recommending you for promotions, projects, and opportunities. In fact, your mentor will be better prepared to find these opportunities for you after having seen firsthand how you work, where your strengths lie, and what your level of energy and commitment are. You can build your mentor's trust by always following through on assignments and doing your best work. This trust will become invaluable as you go forward in your career.

MENTORING IN THE FUTURE

The creation and proliferation of social media have brought about an evolution in workplace dynamics. Mentoring for NMTs can take place in this new digital communication forum, and studies are beginning to show that social media can create beneficial mentoring outcomes (32). Social media is increasing the opportunities for communication between professionals, thus making it easier for mentors and mentees to engage each other. Discussion forums, blogging, e-mail, web-based training, and online collaboration enhance communication and increase the sense of connection. As nuclear medicine becomes more specialized, social media is creating a valuable forum for sharing

of ideas, improvement of social support, and teaching between NMTs. The advancement of social media allows for mentoring among nuclear medicine professionals who previously could not interact because of geographical distance.

CONCLUSION

Mentoring has a rich tradition throughout history because of the many benefits to those involved. If you desire a rich and fulfilling career, consider mentoring as an invaluable tool in this pursuit. Mentoring opportunities abound for NMTs at work, in professional societies, in education, and in the community. NMTs need to become involved in mentoring so that they can be prepared to lead the field through the many challenges ahead. May your journey be a successful one.

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