

Nuclear Pharmacy

Background

Nuclear pharmacy was the first pharmacy specialty established by the Board of Pharmaceutical Specialties (BPS) in 1978. This specialty area is involved with the preparation of radioactive materials to improve and promote health through the safe and effective use of radioactive drugs to diagnose and treat specific disease states.

There are two main types of environments where nuclear pharmacists are employed. Institutional nuclear pharmacy is usually linked to a major medical center/hospital where preparations are made on-site. This is in contrast to the commercial centralized nuclear pharmacy where radiopharmaceuticals are prepared and then delivered to the hospital and/or clinic. While the quantity of radiopharmaceuticals used is relatively small in both settings, nuclear pharmacists must complete additional training in radiation safety regarding the compounding, preparation, and delivery of radioactive materials.

Because nuclear pharmacy is a unique field, this profile offers a non-inclusive list of responsibilities encountered by pharmacists in this career:

- Ordering, receiving, storing, and controlling inventory of radioactive drugs (radiopharmaceuticals), other drugs used in nuclear medicine, and related supplies.
- Preparing radiopharmaceuticals by combining radioisotopes with reagent kits and compounding radiopharmaceuticals that are not commercially available.
- Performing functional checks of instruments, equipment, and devices and determining radiopharmaceutical quality and purity.
- Filling prescription orders.
- Packaging, labeling, and transporting radiopharmaceuticals.
- Properly handling hazardous chemicals and biological specimens.
- Communicating radiopharmaceutical-related information to others.
- Ensuring that patients receive proper preparation before radiopharmaceutical administration and trouble-shooting unanticipated outcomes.
- Laboratory testing of new radiopharmaceuticals, new compounding procedures and quality control methods and participating in clinical trials.

As one can see in the above list, nuclear pharmacists have diverse responsibilities. According to survey results, 37% of their time is spent on medication preparation/compounding. Sixteen percent is spent on medication dispensing (including associated patient counseling), followed by 11% on service (such as committee work for the institution), and the remainder split across a variety of other functions.

Characteristics

Thirty-two pharmacists responded to the 2012 *APhA Career Pathway Evaluation Program* survey. Among the respondents, 75% had earned a PharmD degree. Fifteen percent had earned an advanced degree (MS) and 35% indicated earning some other degree (other than

MA, MS, MBA, or PhD). Forty-five percent achieved BPS Certification, 66% had earned a certificate and 14% had taken other training.

The mean age of respondents was 41 years old. Seventy-five percent were male. Just over half (55%) identified themselves as being in management.

None of the respondents to this survey earned less than \$100,000. Fifty percent earned \$100,000 - \$120,000, 20% earned \$120,000 - \$140,000 and 30% earned greater than \$140,000. Twenty-one percent of these pharmacists reported that they earn between \$80,000–\$100,000 per year. Nuclear pharmacists work an average of 46 hours per week.

Fifty-five percent reported that they are “extremely satisfied” with their job and 42% indicating they are “somewhat satisfied” with their work. Similarly, 32% report being “extremely challenged” with their work and 58% reported “somewhat challenged.”

Insider’s Perspective

What aspects of the job are most appealing?

Most respondents said that they really enjoyed their work environment. Specifically, “it’s dynamic and changing, so it’s not boring, “its hands on work, you’re not behind a desk all day long,” and “work[ing] directly with hospital staff to determine what each patient needs.”

Several respondents enjoyed that their job did not include insurance or billing issues. “We are not open to the public and do not have any involvement with patient insurance.”

Another respondent said that nuclear pharmacy “combines the science with the art. [There is] not much patient contact but [the job] still requires [a] broad clinical background.”

What aspects of the job are least appealing?

Many pharmacists shared that they didn’t enjoy the hours that are typical of nuclear pharmacy practice. “Due to the time sensitive nature of radiopharmaceuticals, the hours worked are frequently during the night.” In some instances, pharmacists also have to be on call, which was mentioned as a negative.

Others mentioned that they miss patient and colleague interaction as nuclear pharmacists rarely see patients and there is typically a small staff in the pharmacy.

What advice should students and practitioners consider when selecting the option of working in nuclear pharmacy?

The majority of respondents recommended that when considering nuclear pharmacy, make sure that the hours will work for you. Be ready to work early hours, be on call, and to work the midnight shift.

One pharmacist said that, despite the challenging schedule, “nuclear is the best kept secret in pharmacy.”

Collaboration With Other Professionals

Collaboration with other professionals ranked in the upper mid-range with a 6.0 rating. While communication with physicians in a nuclear pharmacy is often limited to new prescription orders via the telephone and fax, this collaboration is face-to-face when available. Often both the pharmacy and the physician's office are engaged in longer discussions with each other, thereby allowing the physician, nurse, and pharmacist to communicate accurately and concisely to ensure the patient gets optimal therapy.

= 6.0



Educating Other Professionals

Typically, nuclear pharmacists engage in educating other professionals when they provide in-service education. Some pharmacies choose to educate physicians, nurses, and other related staff about the importance in handling the radiopharmaceuticals to ensure that guidelines are followed.

= 4.4



Variety of Daily Activities

As mentioned earlier in the background section, respondents are involved in a number of different roles. The challenges often arise in resolving therapy and other prescription-related problems. Nonetheless, respondents indicated that they tend to engage in some repetitive activities.

= 4.4



Multiple Task Handling

In order to ensure the timely and accurate dispensing of prescriptions in a pharmacy, especially in nuclear pharmacy, a pharmacist is often required to handle multiple tasks at once. This could include answering questions from staff, addressing nurses' and physicians' concerns, checking filled prescription orders, and tracking the medication. Respondents indicated that they tend to work on multiple tasks at one time.

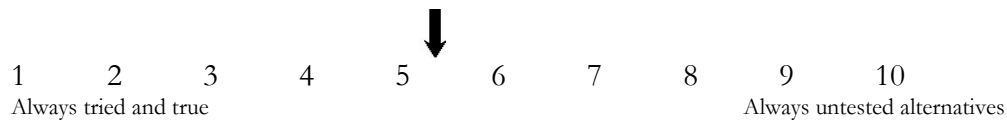
= 7.5



Problem Solving

The problems are often complex in many situations taking into account the physiological changes in a diverse patient population. With a rating of 5.3, nuclear pharmacists indicated that they tend to use both tried-and-true and untested solutions to address problems.

= 5.3



Focus of Expertise

Respondents rated this factor in the high range, indicating that they require a specialized knowledge base. Nuclear pharmacists rated this factor the highest across all other groups.

= 8.7



Innovative Thinking

In response to the question, “To what extent does your practice involve generating new ideas (innovative thinking) pertaining to pharmacy?” respondents rated the factor at 6.8, indicating that their practice is split regarding innovative thinking. Opportunities for idea generating in nuclear pharmacy may include the tailoring of therapy for the patient using radiopharmaceuticals for treatment versus diagnosis.

= 6.8



Applying Scientific Knowledge

Applying scientific knowledge received an upper mid-range rating of 7.8. The application of scientific knowledge is applied in determining dosage ranges and adjustments necessary taking into account some of the pharmacokinetic considerations that need to be incorporated for the patient.

= 7.8



Applying Medical Knowledge

Applying medical knowledge received a lower rating (4.9) than the previous factor. Because of the nature of the work that nuclear pharmacists perform, it is understandable that they apply more scientific versus medical knowledge.

= 4.9



Creating New Knowledge by Conducting Research

Nuclear pharmacy is a setting designed mostly for the application of learned knowledge. There are some opportunities to conduct research in the nuclear pharmacy setting; however, for the most part, this setting is where knowledge is applied.

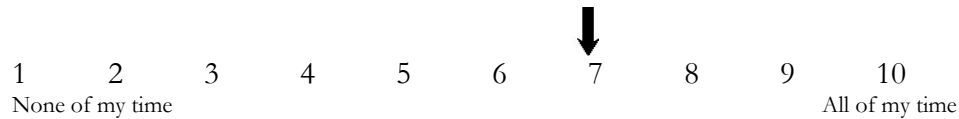
= 2.8



Management/Supervision of Others

The upper mid-range score of 6.9, indicates that they tend to spend a higher amount of time supervising others.

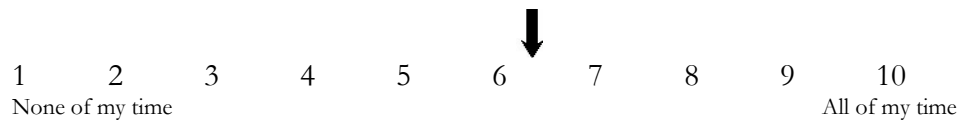
= 6.9



Management/Supervision of a Business

Nuclear pharmacists also rated this factor the highest across all profiles. At the mid-range score of 6.3, they tend to spend a higher amount of time in business management than other career profiles. This reinforces the amount of time listed in the characteristics section spent on business-related activities.

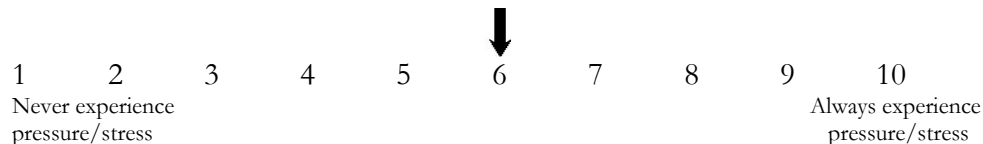
= 6.3



Pressure/Stress

Although some of the respondents indicated in the open question fields that there was low stress in their work, as a group nuclear pharmacists rated this factor in the mid-range.

= 6.0



Work Schedule

It is interesting to note that the response is split considering that hours/schedule were listed as both a most and least appealing aspect of the practice.

= 4.3



Part-Time Opportunities

Respondents indicated that there are some opportunities for part-time work in the field. Perhaps part of the discussion here is the need for someone with a special knowledge base

being available for a position.

= 3.7



Job-Sharing Opportunities

Nuclear pharmacists indicated a low range response to job-sharing at a rating of 3.4.

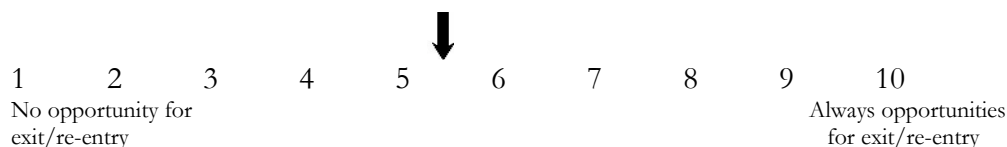
= 3.4



Exit/Re-entry Opportunities

Opportunities do exist for exit/re-entry in the field. The difficulty here is being able to re-enter the same position.

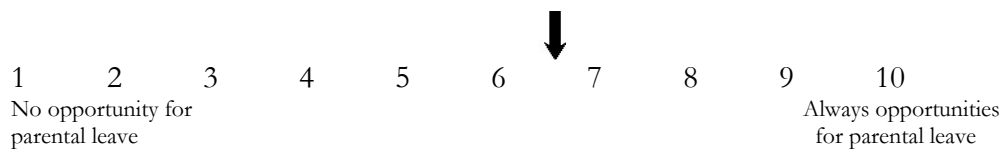
= 5.4



Parental Leave Opportunities

Many nuclear pharmacies are part of larger organizations, which offer parental leave as a benefit. Respondents rated this factor in the upper mid-range at 6.6.

= 6.6



Leisure/Family Time

Respondents rated this factor at 6.7, indicating that many feel they have time available for leisure activities and family.

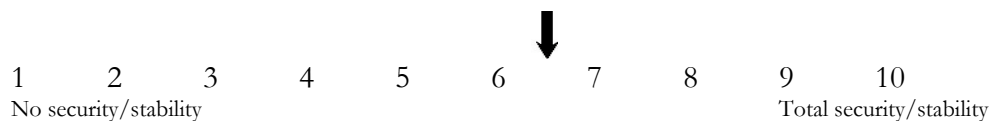
= 6.7



Job Security

Job security was rated in the high range area by these pharmacists. With the specialized knowledge necessary and the continued shortage in some areas, nuclear pharmacists indicated a high sense of job security.

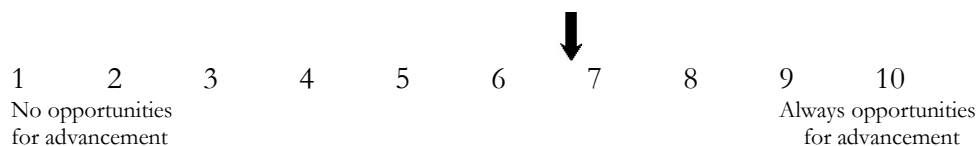
= 6.4



Opportunities for Advancement

Respondents rated this factor in the upper mid-range with respect to opportunities for advancement. Career advancement can often be limited by the size of the organization and the size of the pharmacy. In a larger company, they may have more versatility to choose the corporate ladder approach in their career.

= 6.8



Opportunities for Leadership Development

Nuclear pharmacists see a similar opportunity for leadership development as they do for advancement.

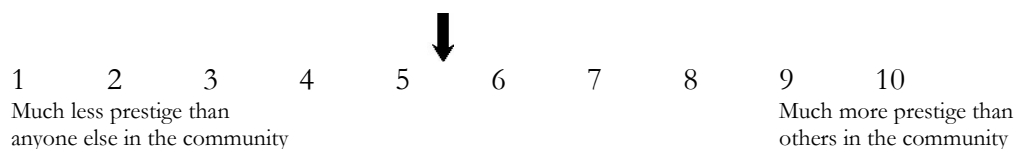
= 7.5



Community Prestige

Respondents rated this factor a score of 5.3. Pharmacists can become well known in their community for helping individuals with health care.

= 5.3

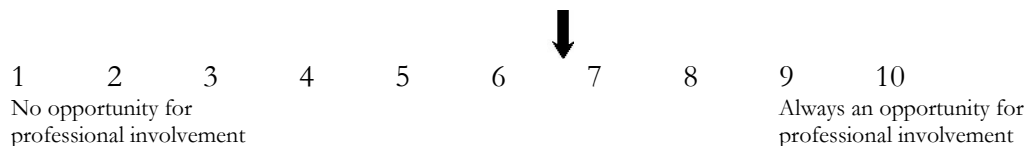


Professional Involvement

Professional involvement of individual pharmacists is critical to the development of the profession as a whole, and pharmacists need to communicate with each other so that the profession can continue to advance in providing optimum health care for the public.

Nuclear pharmacists rated this factor mid-range at 6.7.

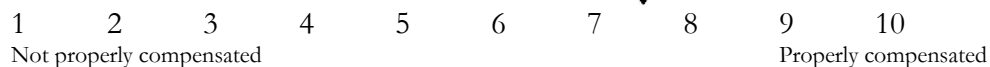
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Income

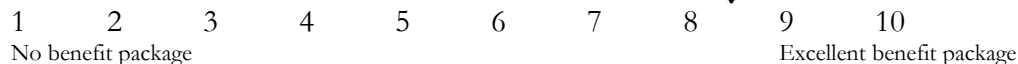
Respondents indicated that they tend to feel properly compensated for the work they perform.

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**Benefits (vacation, health, retirement)**

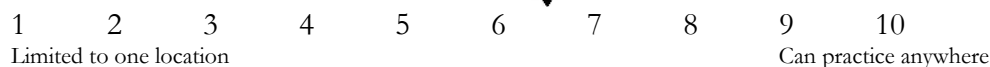
Respondents indicated that the overall benefits package is good.

= 8.3

**Geographic Location**

Geographic location was rated in the upper mid-range at 6.5. Nuclear pharmacists have great opportunity to relocate almost anywhere in the United States.

= 6.5

**Working Remotely**

Very little of the work done by nuclear pharmacists can be done remotely.

= 2.7

**Autonomy**

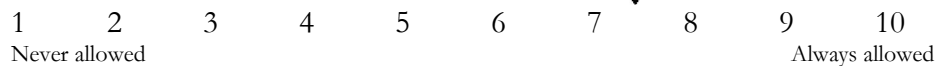
Autonomy in a nuclear pharmacy, in general, can depend on whether the pharmacist works alone or always works with another pharmacist or supervisor. In most cases, the nuclear pharmacist is highly autonomous.

= 7.4

**Self-Worth**

As stated earlier, nuclear pharmacy is involved with the preparation of radioactive materials to improve and promote health through the safe and effective use of radioactive drugs to both diagnose and treat specific disease states. Intrinsicly, this act creates a great deal of self-worth and the feeling of accomplishment in the pharmacist's daily work.

= 7.4



Mean Scores for Critical Factors

| | |
|---|------------|
| 1. Interaction with people | 1.8 |
| 2. Performing physical assessments | 1.1 |
| 3. Interpreting laboratory values | 1.9 |
| 4. Continuity of relationships | 5.7 |
| 5. Extent to which effect is direct | 3.3 |
| 6. Collaboration with other professionals | 6.0 |
| 7. Educating other professionals | 4.6 |
| 8. Variety of daily activities | 4.4 |
| 9. Multiple task handling | 7.5 |
| 10. Problem solving | 5.3 |
| 11. Focus of expertise | 8.7 |
| 12. Innovative thinking | 6.8 |
| 13. Applying scientific knowledge | 7.8 |
| 14. Applying medical knowledge | 4.9 |
| 15. Creating new knowledge by conducting research | 2.8 |
| 16. Managing others | 6.9 |
| 17. Managing business operations | 6.3 |
| 18. Pressure/Stress | 6.0 |
| 19. Work schedule | 4.3 |
| 20. Part time opportunities | 3.7 |
| 21. Job sharing | 3.4 |
| 22. Exit and re-entry | 5.4 |
| 23. Parental leave | 6.6 |
| 24. Free time for leisure/family activities | 6.7 |
| 25. Job security | 6.4 |
| 26. Opportunities for advancement | 6.8 |
| 27. Opportunities for leadership development | 7.5 |
| 28. Community prestige | 5.3 |
| 29. Professional involvement | 6.7 |
| 30. Income | 7.5 |
| 31. Benefits (vacation, health, retirement) | 8.3 |
| 32. Geographic location | 6.5 |
| 33. Working Remotely | 2.7 |
| 34. Autonomy | 7.4 |
| 35. Self-Worth | 7.4 |
| 36. Future focus | 6.2 |
| 37. Professional prestige | 5.4 |
| 38. Unique practice environment | 9.5 |
| 39. Advanced degree | 4.0 |
| 40. Entrepreneurial opportunity | 4.2 |
| 41. Additional training | 9.5 |
| 42. Interacting with co-workers | 8.3 |
| 43. Travel | 3.0 |
| 44. Writing | 3.6 |
| 45. Working with teams | 7.3 |

Reference

Schommer JC. *APhA Career Pathway Evaluation Program for Pharmacy Professionals 2012 Pharmacist Profile Survey*. February 2013.

Professional Organizations

American Association of Pharmaceutical Scientists (AAPS)
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American Society of Health-System Pharmacists (ASHP)
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