

Spring 5-16-2016

# Competency Guide For Intrathecal Pump Nurses

Christine Tevlin  
christine.tevlin@shu.edu

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## Recommended Citation

Tevlin, Christine, "Competency Guide For Intrathecal Pump Nurses" (2016). *Seton Hall University DNP Final Projects*. Paper 11.

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By

Christine Tevlin

DNP Scholarly Project Committee

Dr. Mary Ellen Roberts

Dr. Jane Dellert

Melissa Hess

Submitted in partial fulfillment of the Requirements for the degree of

Doctor of Nursing Practice

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Approved By the DNP Scholarly Project Committee:

  
Dr. Mary Ellen Roberts

Date: 3/11/16

  
Dr. Jane Dellert

Date: 3/20/16

  
Melissa Hess

Date: 3/11/16

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### Acknowledgements

I want to acknowledge the support and love from my husband and children without your patience I would have not been able to accomplish this goal. I want to express my deepest gratitude for my advisor Dr. Mary Ellen Roberts, for her kindness, patience, and guidance. I want to also thank my mentor Melissa Hess for her wisdom in this specialized field. I want to dedicate this work to my deceased father John J. Walsh. He is the one who has given me the strength and determination to fulfill this goal. Thanks Dad!

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### Abstract

There is a strong need for healthcare providers to improve the quality of care, which benefits not only patients but the whole population. Due to the increasing cost of health insurance, society is forced to bear the cost of poor care for patients. The Institute of Medicine (IOM) stunned the nation in 1999 with, “To Err is Human: Building a Safer Health System” which reported that between 44,000 and 98,000 people die each year from preventable medical errors (IOM, 1999). Since then there has been a move in the direction of accountability and quality care for patients. This change has had a large impact on the importance of continued competency. A culture of excellence first begins with the power of knowledge.

In 2003 the IOM introduced the core competencies for health professionals that include; working in interdisciplinary teams, provider patient-centered care, employing evidence-based practice, use of informatics and applying quality improvement (Greiner, Knebel, & Institute of Medicine, 2003). This DNP final project was to implement a competency based course to improve quality care for patients who have Intrathecal Baclofen Therapy (ITB) and Intrathecal Pain Therapy (ITP). The intrathecal pump therapy has been used for many years and if not done effectively complications can be fatal.

Programming errors, administering incorrect medication concentration/dosage and pump and catheter malfunctions can place the patient at risk for over/under dosage as well as withdrawal symptoms (Bhimani, 2008). This project addresses these crucial issues as well as implements an educational tool to prevent human error and equipment malfunction. The significance of this project is to demonstrate that there are currently little data in the area of best practice for this specialized therapy. According to Stetkarova, Yablon, Kofler, & Stokic, (2010) a standardized data collection and complication-reporting procedure along with appropriate training

should be implemented in centers offering ITB treatment. This project is comprised of a learning manual containing various topics. The topics include: how the pump works, the various modes available for the delivery of medication, the different patient populations, patient education, and assessment of patients. The manual discusses the refill procedure, programming procedures, risk and complications, medications, and formulas with calculations. There is a mandatory examination for healthcare providers to take at the completion of the course.

The learning manual was developed by using information from intrathecal pump manufactures, current policies at the home care agency, and other reliable sources. An extensive review of the data was performed to develop the learning manual and an exam which was part of the project. The examination consisted of 100 questions. The desired outcome of the project is a passing score of 90% on the examination with the allowance of the healthcare provider to retake the exam after remediation.

The significance of this project is to improve the quality of care delivered to patients that use intrathecal pump therapy. The idea of a learning manual and exam for competency for intrathecal pump therapy was conceived since there was little data available. This extensive course covers many pertinent areas with regard to intrathecal pump therapy. The clinical significance is that many complications can occur with intrathecal therapy such as; infection, pocket refill, under or overdosing of medication, and other life threatening complications. The implemented methodology was rolled out to this national home care agency consisting of a competency course manual and final examination.



## Background

Intrathecal pump therapy can be broken up into two areas, Intrathecal Baclofen Therapy (ITB) and Intrathecal Pain Therapy (ITP). Both treatments are administered directly into the spinal cerebral fluid space via a catheter that is connected to a pump that is surgically implanted into the abdomen. The pump is powered by an internal battery that last from 5-7 years, depending on the flow rate of the medication. The faster the flow rate the sooner the pump will need to be replaced. The medication is instilled in the pump prior to implantation and the medication is replenished as needed. A patient that has a faster flow rate will need their medication to be refilled more frequently.

ITB was introduced in 1984 by Penn and Kronin (Khan, Birks-Agnew, Bullock, & Rushton, 2010). The patient populations that benefit most from ITB therapy include patients with Multiple Sclerosis (MS), Spinal Cord Injury (SCI), Cerebral Palsy (CP), and Traumatic Brain Injury (TBI). This select patient population suffers from severe disabling spasticity and these spasms can have a negative impact on the patient's quality of life.

Baclofen is the desired medication for treating spasms and stiffness. Spasticity is described as muscle stiffness, tightening, involuntary jerking, pain, and weakness. Many patients have severe pain with spasms which impairs the quality of life. Their mobility, sleep patterns, energy level, mood, sexual function, family and social interaction are affected. In a survey of the North American Research Committee of Multiple Sclerosis (NARCOMS), 84% of the 18,727 MS patients surveyed, reported some degree of spasticity symptoms (Erwin et al, 2011). There have been several treatments utilized over the course of time. Baclofen is the desired medication to manage spasticity symptoms.

Oral Baclofen has limited effectiveness and often causes many adverse side effects that limit the titration of the required dose. ITB pumps have proven to be much more effective by delivering lower doses. Several studies have been done to support the conclusion that ITB therapy can increase quality of life by decreasing spasms.

According to a study done by Ochs and Tonn (1996) mobility was improved; 58% of bedridden patients were able to use wheelchairs, 14% of patients using wheelchairs were able to stand and 10% of these patients were able to ambulate with the use of crutches. The overall satisfaction with ITB by physicians was 87% and patients 91% (Ochs & Tonn, 1996).

Dario, Scamoni, Bono, Ghezi, and Zaffaroni (2001) reported that over 60% of patients and physicians described spasticity and pain relief after initiation of ITB therapy as good or very good throughout the 12-month follow-up period. They also reported a decrease in spasticity with improved ADL's and mobility. Moreover, physicians reported good or very good levels of overall satisfaction with the ITB therapy for almost 90% of patients.

A few benefits from ITB therapy are reduced tone in extremities, less spasms in the trunk area, and other extremities, reduction of spasticity related pain, improved sleep and overall quality of life. It also eases the caregiver's tasks with activities of daily living.

The other area, Intrathecal Pain Therapy (ITP), is administered on a different type of patient population with another form of medication. The first clinical use of an implanted intrathecal opioid delivery system was used in 1981 for the use of chronic pain of malignancy (Knight, Brand, Mchaourab, & Veneziano, 2007). The patients that benefit from ITP therapy are patients who are suffering from terminal illness such as cancer, chronic non-malignant pain such as failed back surgery, complex regional pain syndrome, and other chronic pain syndromes.

The patient population who will most benefit from ITP are those that experience chronic pain and the numbers increasing at a dramatic rate. In the United States 20-30% of the population experience chronic or recurring pain and approximately 2/3 of this population have had pain for more than 5 years (Knight et al, 2006). Pain has put an economic strain on the society with the loss of productivity, disability, and health care utilization. The cost of chronic pain is estimated at \$100 billion a year in the United States (Knight et al, 2006).

ITP has been proven to be cost effective. According to a cost analysis study by Brogan, Winter, Abiodun, & Safarpour (2013). A retrospective chart review was done on 36 cancer patients who underwent ITP. The median cost of opioid medication prior to implantation was \$21.26 per day versus \$16.01 for median daily cost of ITP medication. The total median cost for ITP which includes pump implantation, refill charges, and the cost of any residual non ITP opioid use were \$ 318.33/day. The study concluded that estimated time achieved cost equivalence with 3 patients in 3 months, 3-6 months with 2 patients, 6-12 months with 2 patients, 12-24 months with 1 patient, and greater than 24 with the remaining 28 patients (Brogan et al, 2013). Although it took several months to be cost effective ITP is a more cost- beneficial management strategy. The aim of ITP is to decrease or possibly eliminate the use of other non ITP opioids.

Currently there is little data on the topic of competency courses for intrathecal pump therapy. There was also limited data on the topic of educational courses and certification related to intrathecal pump therapy. There is no certification or educational courses available today for intrathecal pump nurses. Due to the limited amount of data this author developed this project to promote quality care, enhance competency and provider awareness. Not only do healthcare providers need to be competent when caring for patients who use intrathecal pumps but there should also be a certification developed to measure competency.

This project is a competency based course at one nationwide home care agency that is used to increase the quality of care for patients who have intrathecal pumps used for both ITB and ITP therapy. The course includes a learning module with an examination. The learning module contains topics such as; components of the pump, modes of medication delivery, patient education, clinical assessment tools used, refill process, risks and complications, medication, and formulas and calculations. The examination is comprised of 100 questions and with a pass rate set at 90%. The examination will be available for all healthcare providers who care for patients receiving ITB and ITP therapy. This course was implemented in a national home care agency that specializes in both ITP and ITB therapy.

This home healthcare agency always strives for quality improvement of their nurses in order to eliminate the potential risks associated with intrathecal pump therapy. If the nurse is not properly educated, the result could be fatal for the patient. As a recent example, a major pump manufacturer has recently had two recalls due to pump malfunctions, including over /under dosing of medication and battery malfunction. This author, herself, has also experienced defective pumps in the field. For this reason, the home healthcare agency was open and willing to participate in this author's project.

The aim of the project is to deliver safe quality care for this specialized therapy. To successfully implement this project first the healthcare providers need to be educated in this specialized therapy using the learning module. After the education has been completed the mandatory 100 question examination is taken. The required passing grade must be 90% or greater. The significance of the project is to provide additional education to healthcare providers so that they will be better prepared in this specialty area.

### Theoretical Framework

In order to make a case for the theoretical framework of this project the work of Dr. Patricia Benner, a nursing theorist, was explored. Her theory demonstrates the necessity of education and experience in order to achieve the highest expert level. The overall goal of this project was to bring competent nurses to the expert level.

Dr. Patricia Benner, introduced the concept that expert nurses develop skills and understanding of patient care over time through a rigorous education and a wide variety of experiences, which is a prerequisite in becoming an expert. The Dreyfus Model of Skill Acquisition tool is used by Benner in understanding the difference between the experienced nurse and the novice.

This model considers advancement in skilled performance, based upon education, experience, clinical knowledge development, and career progression in clinical nursing (Myrick & Barrett, 1992). There are five stages in this model which consist of novice, advanced beginner, competent, proficient, and expert.

The novice health care provider lacks confidence and requires physical and verbal cues due to their lack of experience. The advance beginner is efficient and skillful in some areas of their practice but still requires occasional supportive cues. Advance beginners also need support in the clinical setting and assistance in setting priorities. The competent nurse is able to demonstrate efficiency because they have a plan established from a perspective based on considerable conscious, abstract and analytic examination of the problem (Benner, 1982). A proficient nurse learns from past experiences what typical events to expect in a given situation and how to modify ones response in a given event. The highest level is the expert nurse who has

an enormous background of experience and no longer relies on analytical principle. They have an intuitive grasp of the situation and are able focus on the problem without wasteful consideration of a large range of unproductive possibilities.

Another tool, used by Benner, for clinical learning is known as the Situated Cognition Theory which is based on the fact that learning is influenced by situations where it occurs (Jones, 2007). The goal of this theory is to help develop a higher-level thinking and reasoning skills that are needed for nursing.

Health care is becoming more complex and specialized that it requires nurses to obtain advance knowledge and skills to meet the demanding needs. One must first learn by experience in order to become advanced. This takes place by transitioning through the different stages in order to become an expert in the clinical field. Experience teaches the proficient nurse what to expect in a given situation. Whereas a competent nurse does not have enough experience to recognize a situation in terms of the overall picture or which aspects are most salient or important. According to Benner experience is not the mere passage of time or longevity; it is the refinement of preconceived notions and theory by encountering many actual practical situations that add nuances or shades of differences to theory (Benner, 1982).

### Literature Review

An extensive literature review was done by looking into several databases which included searches on CINAHL (Cumulated Index to Nursing Allied Health 1999-2015), MEDLINE (National Library of Medicine 1995-2015) and PubMed. Some of the key words used were competency courses for intrathecal pump therapy, certification for intrathecal pump therapy, and quality care for intrathecal pump therapy. There was limited data found on these searches. However, the American Association of Critical-Care Nurses (AACN) suggests that the certification of nurses benefitted patients, families, and organizations. Ridley & Rawlins (2006) suggests that it is imperative that clinicians maintain an adequate case load to maintain competency in preventing complications with the refill and programming process of the pump (Ridley & Rawlins, 2006).

One article was found on the topic of best practice with intrathecal baclofen therapy. In 2004 fourteen practitioners with ITB therapy developed best practice guidelines (Ridley & Rawlins, 2006). One of the recommendations that was made was that this specialized therapy should be coordinated by a team with a designated leader. The team consists of the surgeon, Physician and/ or Nurse Practitioner, Physician Assistant managing the pump. The patient, family members, and caregivers are also important members of the team. It also suggests that experience and volume increases the competence of the healthcare provider and therefore improves patient outcomes while reducing the occurrence of complications. The author also emphasizes the importance of patient and family education which continually plays a key role during ITB therapy.

The importance of competent healthcare providers is emphasized all throughout the article. In order to be effective, the patient's goals and expectations must be clearly defined prior

to implantation. The article also discusses individualized dosing patterns that enhance patient satisfaction and outcomes. The practitioners who participated in the forum describe ITB as a comprehensive program provided by a multidisciplinary team of healthcare practitioners not simply a procedure (Ridley & Rawlins, 2006).

The intrathecal pump nurse must be competent not only when performing the refilling of the pump with medication but also needs to be aware of the complications related to intrathecal pump therapy. The National Council for State Boards of Nursing (NCSBN) defines competency as “the application of knowledge and the interpersonal, decision-making, and psychomotor skills expected for the practice role, within the context of public health” (p.81). The most commonly performed maintenance procedure is the refill procedure. The refill process includes maintaining aseptic technique when accessing the pump septum, emptying the residual medication, maintaining negative pressure, and refilling the reservoir with new medication. If the needle is not properly placed in the pump it can lead to a pocket fill which is high doses of medication improperly delivered into the subcutaneous tissue.

From May 1996 to September 2010 Medtronic Inc. received 351 reports worldwide related to the occurrence of pocket fill with 8 being fatal (Medtronic, 2010). Injection of highly concentrated solutions of medication can lead to rapidly developing symptoms of overdose, progressing to coma and respiratory depression and death. Subcutaneous injection of Baclofen may result in CNS depression, lethargy, hypotension or hypertension, respiratory failure, seizures, coma, and death. Clonidine can induce hypertensive crisis, encephalopathy, and myocardial infarction. Bupivacaine can lead to central nervous system and cardiovascular toxicity. The estimated occurrence of pocket fills per refill worldwide is as high as 1 per 10,000 (0.0101%) although the actual occurrence is unknown because it is not required to report (Medtronic, 2010).



Certification provides patients and their families with validation that the nurse caring for them has demonstrated experience, knowledge and skills in that specific specialty. The definition of certification by the American Board of Nursing Specialties (ABNS) is “the formal recognition of the specialized knowledge, skills, and experience demonstrated by the achievement of standards identified by a nursing specialty to promote optimal health outcomes” (Williams & Counts, 2013). Today’s patients are acutely and critically ill and require intensified awareness and extraordinarily intricate care from highly skilled health professionals. This select patient population is seen in acute care settings, doctor’s offices and in the home.

According to a November 2002 Harris Poll, 78% of respondents knew that nurses could be certified (AACN.org). Awareness of nurse certification was slightly higher than all other professions inquired about including physicians, accountants, teachers and mechanics. Americans prefer hospitals that employ nurses with specialty certification. According to the poll, 73% said if given a choice they would select a hospital that had a higher percentage of certified nurses (AACN.org). Certification provides an ongoing validation for specialty experience of knowledge and skills. In the study done by the IOM *To Err is Human; Building a Safer Health System*, recommends that healthcare professionals have periodic reexaminations and relicensing.

The Wade study (2009) is a literature review that assesses the available evidence on the effect of nursing certification on patient outcomes, nurses’ relationships with each other and with members of other health care disciplines. The study also examines nurses’ competence development, job satisfaction, sense of empowerment, and perceptions of their jobs. The method used was a librarian-assisted literature search for articles published between 1980-2008. A total of 12 articles were included in this review that was published between 2001-2007.

A methods-description approach was used to address differences in the studies' research methodologies. Certification was found to have a positive effect with nurses' job satisfaction, sense of empowerment and sense of collaboration with other health care team members. All of the articles except one showed a significant relationship between certification and nurses' perception of their skills and knowledge being enhanced and validated. On the topic of patient outcomes two of the articles measured the relationship between certification and patient health outcomes. Only one study reported a positive correlation and the other found no clinical significance regarding the relationship of certification and patient outcomes. It is nursing's responsibility to provide safe and competent care in a specific population.

### SWOT & Risk Analysis

A SWOT and risk analysis was performed on this project. A major strength found was increased quality care for patients including patient confidence. Knowledge that nurses completed the course created more positive feelings as well as additional support from both staff and management. In addition, the nurses felt more confident after completing the course.

A weakness of the project was that it focused on only one intrathecal pump manufacturer. In addition, the course was only implemented to current employees at one agency. There was also a limited amount of data on the topic of intrathecal pump therapy.

There are several opportunity factors through the implementation of this project. Increased staff awareness through education is the most opportunistic. Another factor is the increased quality of care for patients receiving this specialized therapy. Lastly, the quality of life can be enhanced through the implementation of this therapy.

As far as the visible risks, there was only two that were identified. The possibility that there may not be available staff to continue the education of this course could make the program fail. The second risk is that although this course is mandatory at this agency, other healthcare providers that are not employed at this agency will not see a need to enroll in this course.

One strategy to address the risk of limited access is to target other nurses who care for patients receiving intrathecal therapy. In the future this project will be targeted and marketed to healthcare providers to become more competent and knowledgeable in the field of intrathecal therapy. Another strategy is to develop continuing education courses for nurses that could be offered through a continuing nursing education provider.

### Budget

My estimated yearly budget for my project will be \$3,480. These costs that will be included in my budget are the salary for a nurse to teach the course and give the examination. The supplies that are needed will include paper, ink, and miscellaneous office supplies. Another cost that is included is the cost to have the learning manual bound at \$9.00 per manual with 20 manuals being printed and bound annually. Also added to the budget is the yearly addendums to the manual and examination, to include other pump manufactures and new medication that will be available in the future. At this time I do not see any other foreseeable cost to my project.

### Methodology

The initial implementation of this course entailed the creation of the learning manual. That process began with a literature review in order to gather information on best practice and learning material in relation to intrathecal pump therapy. Next, the manual was created with all the pertinent information including an examination consisting of 100 questions. Finally, the manual and exam were piloted to 3 nurses with varying degrees of experience with intrathecal pump therapy at this home care agency. The implementation team consisted of the Director of Nursing at the home care agency and this author who has worked with intrathecal pump therapy for over four years.

In the initial stages of the project, newly hired nurses go through an orientation process of one week that is taught by the Director of Nursing. During the initial orientation phase the use of the manual was introduced. The nurses were then required to review the manual during the orientation process. Then they went into the field for approximately one month with a preceptor to have direct patient contact with this specific patient population. In the field the patient assessment tools specific to this population were reviewed. The patient assessment tools are the pain scale, spasticity scale, and the modified Ashworth scale. These patient assessment tools are widely used in this specialized population. At this point of the process critical thinking skills are enhanced with the overall knowledge of this specialized therapy. After the nurses completed the full orientation process this author reviews the material and administered the examination.

The pilot portion of the project was performed on three nurses at this home care agency. One of the nurses had completed the field orientation and had no prior experience with ITB or ITP. The other nurse had a year of experience with intrathecal pump therapy. The last nurse has been working with intrathecal patients for approximately three years. The scores varied with an average of 88% on the examination. The desired goal was that the passing score to be 90% on the

examination. The two nurses with the least experience fell below the desired passing score. It was found that remediation needed to occur with the two less experienced nurses and the nurses were allowed to retake the examination and both passed with 92% and 90%.

The course is consistent with the current literature on best practice guidelines. Prevention of serious adverse effects is dependent on education of the healthcare providers, patients and family. Education can lead to early recognition of complications and initiate the appropriate treatment needed. Continued competency for healthcare providers can have a large impact of the quality of care and occurrence of complications related to this therapy. The course is efficient and timely.

## Phases of Implementation

### Needs Assessment

A review of literature was done on the topic of competency, continued competency, and best practice on the topic of intrathecal pump therapy. The search revealed little data on these topics. Most of the information found focused on clinical outcomes and complications. Most healthcare providers receive on the job training with no formalized training. Currently no extensive competency course is available at this home care agency. This is a problem not only for patients who receive this specialized therapy but for the healthcare providers who provide the therapy.

In 2003 the Institute of Medicine (IOM) identified several challenges to health care in the United States and called for educational strategies to include a focus on competency (Tilley, 2008). As an employee at this agency I felt a strong need for consistency in the way we care for the patient that require this therapy. When caring for these patients we, as healthcare providers, are not only performing a technical task but also a complete assessment of these specialized patients.

### Obtaining Support from Stakeholders

It was important to get the support not only from the Director of Nursing (DON) of the home care agency but other healthcare providers. This project was first suggested to the Director of Nursing and then to the Vice President of this agency. Senior staff was very receptive and there was no resistance when this project was proposed. I had several meetings with the DON and VP to discuss the progress of the course and the information that was to be included in the manual. Several suggestions were made by both senior staff members to include the addition of content. The content was added to the manual and examination. At this point the expected financial cost was discussed and a budget was drafted. The estimated cost for the course for this National Home Care

Agency was \$3,480. The economic impact from the possibility of a malpractice lawsuit far outweighs the cost of the course.

### Implementation Process

The first steps were to initiate the gathering of essential data to compile, review and develop the competency manual. The majority of time and effort was spent on the development of the manual and exam. This information was gathered from several reliable sources such as the leading pump manufacturer, current policies and procedures at this home care agency and the limited data that are available in the literature on best practice. The manual describes key components of how the intrathecal pump works such as the reservoir, catheter and programmer.

It is important that the healthcare provider know not only how the pump works but the mechanisms that make it function. If one of these areas is not working properly this can negatively affect a patient and can possibly lead to death. For instance if the catheter is dislodged from the pump or if there is a kink in the catheter the patient may present with certain signs and symptoms that are discussed in the manual. There are various modes discussed which are available for the delivery of medication such as; simple continuous, flex mode, and patient activated with personal therapy manager (PTM).

Each patient has different needs and goals for this therapy and the manual discussed some different modes of delivery that can benefit these patients. With regard to the flex mode, patients may need different doses of medication during the day possibly when performing activities of daily living where an additional dose of medication can reduce stiffness and spasticity. The manual discusses the select patient population that would benefit from an intrathecal pump. This therapy when used properly can have a large impact on improved activities of daily living and mobility.



According to an analysis done by Ochs and Tonn (1996) with the use of ITB mobility was improved; 58% of bedridden patients were able to use wheelchairs, 14% of patients using wheelchairs were able to stand and 10% of these patients were able to ambulate with the use of crutches. The overall satisfaction with ITB by physicians was 87% and patients 91% (Ochs & Tonn, 1996).

The next section of the manual is the patient education portion for the implanting of the pump preoperatively and postoperatively. It is important for healthcare providers to be able to use critical thinking skills to avoid complications. Also included in the manual are the pain scale, spasticity scale, and modified ashworth scale. The modified ashworth is used specifically for patient that have muscle stiffness and rigidity the manual describes how to perform this test. The refill procedure is then covered and if this is not done perfectly it can lead to death. If a pocket fill is suspected the manual discusses the emergency steps that need to be taken.

The last portion discusses risk and complication, medications, and formulas with calculations. The formulas in the manual assist with calculating flow rates, refill intervals, and calculating daily dose for second medications. Currently specific medications that are approved by the Food and Drug Administration for the use in intrathecal pump therapy are discussed in the manual. The medication and side effects are reviewed along with signs and symptoms of over/under dose.

The next stage of my project was then to develop an exam from the learning manual. The exam consists of 100 multiple choice questions demonstrating critical thinking skills. After the manual and examination were completed, the DON and VP reviewed it for accuracy. Both senior staff are healthcare providers and considered experts in this specialized field. The DON at this home care agency then provided a one week orientation to two newly hired healthcare providers. After the orientation was complete they had direct patient contact with a preceptor who consisted

of this author and the District Manager. After the orientation process was complete this author reviewed the material with the healthcare providers and administered the exam.

This course was piloted on three nurses from with various levels of experience. One of the nurses had completed the field orientation. The other nurse had a year of experience with intrathecal pump therapy. The third nurse has been working with intrathecal patients for approximately three years. The less experienced nurse found the information very helpful while the more experienced nurses found that it was good to review the material that they are currently using in their practice.

### Project Results

The desired goal was a passing score of the examination was set to 90% by the DON and VP. The scores varied with an average of 88%. The nurse with the least experience scores fell below the desired score. It was found that remediation and clarification within the manual and exam needed to occur. A policy was put into place that required the regional director to remediate any employee with a score below 90%. After a period of remediation is complete the nurse must have a passing score of 90% on the examination

In this case, after the retake both nurses passed with a 92% and 90%. A policy was developed and approved at this National Home Care Agency which states that the regional director remediates any employees with a score below 90% and re-administer the examination.

### Summary & Conclusion

Intrathecal pump therapy is an effective and widely used treatment option for this select patient population. According to an analysis done by Ochs and Tonn (1996) with the use of ITB mobility was improved; 58% of bedridden patients were able to use wheelchairs, 14% of patients using wheelchairs were able to stand and 10% of these patients were able to ambulate with the use of crutches. The overall satisfaction with ITB by physicians was 87% and patients 91%

(Ochs & Tonn, 1996). The literature supports that it is imperative that healthcare providers providing intrathecal pump therapy must be competent. Ridley & Rawlins (2006) suggests that experience and volume increases the competence of the healthcare provider and therefore improves patient outcomes while reducing the occurrence of complications. If healthcare providers are not properly trained it can be an ineffective treatment modality and can be fatal. Critical thinking skills are needed to provide this specialized therapy safely and accurately. Healthcare providers must know how to provide competent clinical care in all phases of this drug delivery system.

If one area of these phases is done inaccurately it can be fatal. This competency course was established to provide a tool that can be used to help facilitate the use of best practice and continued competence. The course was implemented at this national home care agency specializing in intrathecal pump therapy. This course can also be used by other healthcare providers that deliver this specialized therapy.

The objective of this project was to develop a competency manual with a mandatory examination. The motivation for this project was very important because there is not another extensive competency course available to healthcare providers who specialize in intrathecal pump therapy. Healthcare providers that provide this specialized therapy need to be competent when caring for this select patient population. As healthcare providers, we must be delivering the best quality of care to our patients. Although this course was piloted on only three healthcare providers the goal of increased staff awareness through education and increased quality of care for patients was achieved. As a result, long lasting benefits to a larger population are now possible.

### Future Recommendations

This course was initiated at a home care agency that employs 40 nurses nationwide who provide this specialized therapy. According to the Director of Nursing this course will be taught to all newly hired nurses and after their orientation the mandatory examination will be given. It will also be mandatory for all nurses to take this course on a yearly basis as part of their annual competencies. All nurses will be required to have a passing score of 90% on the examination. If the nurse does not pass on the first try they will be required to receive remediation from their regional manager and retake the test. This was a major policy change at this agency.

This manual focused on the largest national pump manufacturer. There will be an addendum in the manual to include the other pumps currently on the market. This manual will be updated annually to include updates and changes in best practice. This author will facilitate the use of this course at this agency. The course will then be marketed to other agencies and healthcare providers who use intrathecal pump therapy. This course will increase quality care for patients and can be taken by any healthcare provider who delivers this therapy.

Since there is no available certification for intrathecal nurses, I plan to apply to credentialing centers to obtain certification. One of my goals is to apply to the American Nurses Credentialing Center to obtain a certification course for intrathecal nurses. I want to also develop continuing education courses for nurses that could be offered through a continuing nursing education provider. I believe that there should be a certification available for intrathecal pump nurses due to its specialization. Another long term goal is that prescribing and managing providers of intrathecal therapy will use this course. I plan on targeting and marketing all healthcare providers that work in the field of intrathecal therapy.

As stated in the beginning of this project, there is a strong need for healthcare providers to improve the quality of care that will benefit not only patients but the whole population. People are dying each year from preventable medical errors. This project helps us move in a positive direction towards more accountability and quality care for patients. This competency course can have a large impact on the patient's receiving intrathecal therapy as well as the providers who administer it.

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Appendix A  
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## Appendix B

### Manual Power Point

#### Intrathecal Pump Competency Course

By  
Christine Tevlin, MSN, RN

#### How the System Works

- What is an Intrathecal Pump?
- Device Longevity
- What is a programmer?
  - Interrogating the pump
  - Run Logs
- Alarms

#### Programming Modes

- Simple Continuous
- Flex Mode
- Patient Activated Dosing with Personal Therapy Manager (PTM)
- Bolus

#### Patient Population

- Intrathecal Therapy for pain
  - failed back surgeries
  - Reflex Sympathetic Dystrophy (RSD)
  - Causalgia
  - Chronic Pancreatitis
  - Cancer

### **Patient Population continued**

- Intrathecal Therapy Baclofen (ITB)
  - Cerebral Palsy
  - Multiple Sclerosis
  - Stroke
  - Brain Injury
  - Spinal Cord Injury

### **Pump Implantation**

- Trial
- Preoperatively
- Pump Implantation
- Postoperatively
- Discharge Instructions

### **Patient Assessment Tools**

- Pain Scale
- Spasticity Scale
- Modified Ashworth Scale

### **Refilling the Pump**

- Refill Interval dependent on
  - concentration
  - stability
  - reservoir volume
  - dosing
- Goals for refill appointment
  - Response to therapy

### Goals continued

- Confirm system performance
- Refill and update pump
- Monitor any changes in disease
- Patient Education

### Refill Procedure

- Wash Hands prior to palpating the pump
- Interrogate pump verify medication
- Maintain sterile technique
- Access pump
- Remove medication
- Maintain negative pressure
- Instill new medication
- Update pump

### Risks and Complications

- Catheter complication-dislodging, kinking, breakage
- Pocket fill
- Over/Under Dose
- Infection
- Pump malfunction

### Medication Guidelines and Stability

- Medication used for spasticity
- Medications used for pain
- Stability chart

### **Formulas & Calculations**

- **Flow rate**
- **Flow rate error**
- **Refill interval**
- **Calculating daily dose second medication**

## Appendix C

### Sample Examination Question

- 1) If the patient hears the pump making beeping sounds, they should call their clinician immediately. This may indicate that the pump needs:
  - A. A drug refill or battery needs replacement
  - B. The wrong drug is in the pump or too much is being infused
  - C. The pump has flipped over or has over heated
  - D. Software update is needed or daylight saving
  
- 2) When the pump reaches end of service:
  - A. It stops
  - B. It can still communicate via telemetry
  - C. The patients should seek immediate medical attention
  - D. All of the above
  
- 3) The catheter access port:
  - A. Anchors the pump in place
  - B. Identifies the pump model and manufacturer
  - C. Provides direct access to CSF
  - D. Is 22 gauge or larger
  
- 4) When would a bridge bolus be programmed?
  - A. When changing the patients daily dose
  - B. Changing from a Simple Continuous to a Flex Mode
  - C. Upon interrogation
  - D. Changing the concentration from 500mcg/ml to 2000mcg/ml
  
- 5) A patient's pump is refilled with combination of Morphine 10mg/ml and Lioresal 500mcg/ml. How long is the medication stable in the pump?
  - A. 40 days
  - B. 30 days
  - C. 60 days
  - D. 90 days